11

Cocoa marketing and prices

Bymolt, R., Laven, A., Tyszler, M. (2018). Demystifying the cocoa sector in Ghana and Côte d'Ivoire. Chapter 11, Cocoa marketing and prices. The Royal Tropical Institute (KIT).

11.1 Marketing

11.1.1 Marketing structures

Marketing structures in Ghana

In Ghana, the government has considerable involvement in virtually all facets of the cocoa sector. The country is quite unique amongst cocoa producing countries in the way that it gradually, and only partially, introduced marketing reforms from the 1990s onwards. The Cocoa Marketing Company (CMC), a subsidiary of the state-owned marketing board COCOBOD, is the only entity legally permitted to sell Ghanaian cocoa onto the world market. The government's monopoly on cocoa sales has led to cocoa being described as a 'political crop'. The reluctance to introduce fully-fledged market reforms appears to be related to the Ghanaian government's dependence on export revenues from cocoa. Each year, COCOBOD sells around 70% of the crop for the coming season on the international futures markets.[1] Hedging, in this way, is a prudent risk management strategy in case the cocoa price falls during the season.

In the 1990s, reforms by the Ghanaian government did allow for some competition in internal marketing, through the introduction of Licensed Buying Companies (LBCs). Private LBCs act as competitors to the state-owned Produce Buying Company (PBC), which provides buying services for which they receive a fixed margin of the 'Free on Board' (FoB) price. PBC employs a district manager on a commission basis who, in turn, hires a number of purchasing clerks on commission to purchase cocoa beans from cocoa growing communities.[2,3] In our study, PBC was found to be the largest buyer in our sample, with 57% of households selling to them, followed by Kuapa Kokoo (18%), AGL/Armajaro (15%) and Olam (12%) (Table 11.1). This is not necessarily representative of all of Ghana as LBCs are present to varying degrees in each region and the figures we report are partly an outcome of our random sampling approach. Through their local purchasing clerks, LBCs are well embedded in cocoa growing communities.

[1] Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/

[2] Laven, A. (2010). The risks of inclusion: Shifts in governance processes and upgrading opportunities for cocoa farmers in Ghana. Amsterdam: KIT. Available at: https://pure.uva.nl/ws/files/1437472/77981_18.pdf

[3] Kolavalli, S., Vigneri, M. & Gockowski, J. (2016). The Cocoa Coast: the board managed cocoa sector in Ghana. Ghana strategy support program, International Food Policy Research Institute (IFPRI). p.45. Available at http://www.ifpri.org/publication/cocoa-coast-board-managed-cocoa-sector-ghana

Table 11.1   Cocoa marketing, types of buyers, Ghana

	Ghana
PBC/Produce Buying Company	57%
KKL/Kuapa Kokoo	18%
AGL/Armajaro	15%
OLAM	12%
AAMC/Akuafo Adamfo	7%
ABL/Adwumapa	5%
Other licenced buying company (LBC)	5%
FCL/Fedco	4%
TGL/Transroyal	3%
CMGL/Cocoa Merchants	2%
RCL/Royal Commodities	1%
Other buyer (e.g. pisteurs)	1%
Cooperative/ groupement /association de producteurs	0%
CEMOI	0%
Barry Callebaut / SACO	0%
Cargill	0%
Don't know	5%
N	1,200

Marketing structures in Côte d'Ivoire

In Côte d'Ivoire, the cocoa sector was liberalised between 1999 and 2011. However, in 2011, new reforms were launched which re-regulated the sector, with the Conseil du Café-Cacao (CCC) responsible for the management, regulation, development and price stabilisation of cocoa. The reforms were promoted as a way to raise and guarantee minimum farm-gate prices on a sustainable basis, boost output, and apply stricter controls on bean quality. Sales in cocoa take place in auctions. During these auctions, about 70 to 80% of the coming year's expected crop are sold to exporters.[4] The CCC allocates the export-licenses.

Ivorian cocoa producers typically sell their unprocessed cocoa beans through local buyers (*pisteurs*) or farmer cooperatives. These, in turn, sell to larger buyers (*traitants*), processors and exporters, who sell to international traders. Private sector multinationals such as Barry Callebaut, Cargill, Cémoi, and Olam also provide marketing support and training to *pisteurs* and cooperatives to improve efficiency and reduce marketing costs, while strengthening their supply chain.[5] In our study, 65% of respondents reported selling through *pisteurs*, with 36% selling through a cooperative (Table 11.2). Producers may, of course, sell their cocoa through more than one avenue.

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[4]   Laven, A., Buunk, E., Amerlaan, T. (2016). Determination of Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire, and Indonesia. Appendix to Report: Market Concentration and Price Formation in the Global Cocoa Value Chain. SEO Amsterdam Economics. P.33 Available at http://www.seo.nl/uploads/media/2016-79A_Bijlage_A_bij_Market_Concentration.pdf

[5]   Ibid

Table 11.2 Cocoa marketing, types of buyers, Côte d'Ivoire

	Côte d'Ivoire
Other buyer (e.g. pisteurs)	65%
Cooperative/ groupement /association de producteurs	36%
Don't know	0%
N	505

11.1.2 Seasonality

Cocoa is predominantly sold on several occasions during the 'main season'. In our household survey, cocoa households indicated that the main season runs from around October to December in Ghana, and until January in Côte d'Ivoire (Figure 11.1). A smaller proportion of respondents also reported selling cocoa in the 'light season' which occurs around April to May, and some households also manage to sell a little cocoa outside of these seasons.

Figure 11.1 Months in which cocoa is sold, percent of cocoa households
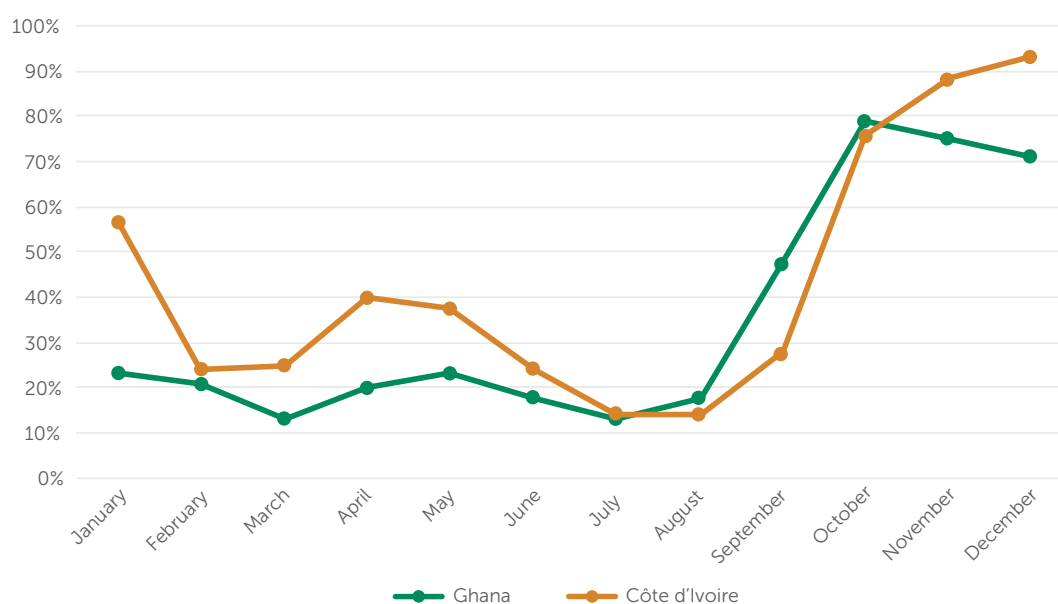
11.1.3 Producer prices 2015/2016

In our household survey, respondents reported a price of US$1.73/kg in Ghana (GHS 6.64/kg, based on GHS 425 per bag of 64kg) and US$1.66 in Côte d'Ivoire (CFA 1000/kg) for the 2015/16 season. Because the marketing boards of Ghana and Côte d'Ivoire set the producer price at the start of the season in October, no variation was found in the reported cocoa price within each country. Furthermore, there is little difference in the producer price between countries after conversion to USD/kg. It is in each country's interest to offer similar prices to producers to discourage smuggling across their shared border. The small calculated difference between the countries in US dollars may be the result of our chosen exchange rates.

11.2   Producer price formation

11.2.1   Producer price formation in Ghana

In Ghana, the price that producers receive for their cocoa is determined by a multi-stakeholder platform known as the Producer Price Review Committee (PPRC). The PPRC fixes producer prices annually at the start of the cocoa harvesting season in October, and these prices are expected to be maintained for the period of one year.[6]

Fixed producer prices mean there is no room for farmers to negotiate prices or for prices to be differentiated based on quality. (However, premium payments for certified cocoa are possible). Fixed prices can be advantageous for Ghanaian cocoa farmers when the world market price is falling during the season. On the other hand, in a bullish market, Ghanaian cocoa farmers do not benefit from price increases within a season.

For the 2017/2018 season, the producer price is set at 75% of net FoB price. The remaining 25% of the net FoB value is used for cost items such as a buyers' margin, crop finance, hauliers cost, storage and shipping, disinfection and grading, inspection and government/COCOBOD revenue.

The use of a 'net' FoB price is somewhat controversial because it implies that certain costs are deducted before allocating a share of the price to the producer. To arrive at the net FoB price, the PPRC first deducts an amount from the gross FoB for disease and pest control, fertiliser application (hi-tech), operational input costs, and rehabilitation (nurseries and seedlings). Some have argued that some service provision (e.g., fertiliser procurement and distribution) would be better handled by the private sector, as there are frequent complaints that inputs do not reach farmers on time or are vulnerable to corruption[7] or patronage.[8] A small amount of the gross FoB price is also deducted for a scholarship fund and child education support.

According to International Cocoa Organization (ICCO) data, the fixed prices that Ghanaian farmers receive are typically lower than what producers in most other liberalised countries receive (Figure 2). For the period 2000/2001 to 2014/2015, Ghanaian producers received 57% of the ICCO daily price. By fixing the prices, the

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6   COCOBOD has, on occasion, revised producer prices mid-season if the actual prices turn out to be much higher than projected, partly to discourage smuggling to Côte d'Ivoire if prices there are higher. See Kolavalli, S., Vigneri, M., Gockowski, J. (2016). The Cocoa Coast: the board managed cocoa sector in Ghana. Ghana strategy support program, International Food Policy Research Institute (IFPRI). p.45. Available at http://www.ifpri.org/publication/cocoa-coast-board-managed-cocoa-sector-ghana

7   Ibid p.100

8   Laven, A., Buunk, E., Amerlaan, T. (2016). Determination of Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire, and Indonesia. Appendix to Report: Market Concentration and Price Formation in the Global Cocoa Value Chain. SEO Amsterdam Economics. p.25. Available at http://www.seo.nl/uploads/media/2016-79A_Bijlage_A_bij_Market_Concentration.pdf

marketing board effectively applies a tax on cocoa producers. In the past, it has been suggested that COCOBOD attempts to maximise the effective tax on producers while ensuring they remain sufficiently interested in producing cocoa.[9]

An advantage of the more regulated cocoa sector in Ghana is that the international market prefers the Ghana model over fully liberalised sectors. Buyers appreciate a semi-organised sector that is capable of delivering large quantities of high-quality cocoa, and Ghana's cocoa sector is widely considered to be the best managed in Africa.[10,11,12]

While some public goods are necessary, it is important to consider whether the amount that cocoa farmers are effectively taxed is fair and equitable. There appears to be scope to improve the efficiency of the marketing board and service delivery, and to improve transparency in price-setting processes. Improved efficiency and greater transparency and accountability is believed to be the basis for cocoa producers in Ghana receiving a higher share of the international price.[13]

Table 11.3   Producer prices in US dollars expressed as a percentage of the ICCO daily price[14]

Year	Côte d'Ivoire	Ghana	Cameroon	Nigeria	Brazil	Ecuador	Dominican Republic	Malaysia
2000/01	51%	51%	60%	88%	90%	77%	53%	89%
2001/02	55%	39%	58%	70%	97%	77%	62%	88%
2002/03	58%	54%	90%	55%	97%	82%	55%	92%
2003/04	43%	66%	86%	69%	94%	75%	56%	91%
2004/05	41%	63%	82%	75%	94%	74%	54%	87%
2005/06	41%	63%	74%	86%	92%	90%	52%	86%
2006/07	41%	54%	68%	75%	100%	99%	54%	87%
2007/08	42%	39%	67%	75%	106%	95%	72%	80%
2008/09	48%	51%	70%		105%	83%	58%	70%
2009/10	65%	49%	73%		99%	83%		
2010/11	54%	60%	83%		101%	78%		
2011/12	57%	85%	104%		104%	79%		
2012/13	61%	76%	97%		94%	88%		
2013/14	52%	51%	85%		99%	87%		
2014/15	50%	52%	80%		83%	92%		

9   Ibid p.59

10 Ecobank. (2014). Ghana: Cocoa Sector Is Facing New Challenges. Middle Africa Briefing Note, Soft Commodities, Cocoa. Lomé, Togo. Available at https://www.ecobank.com/upload/20140723100236691535ay7ctp5kPP.pdf
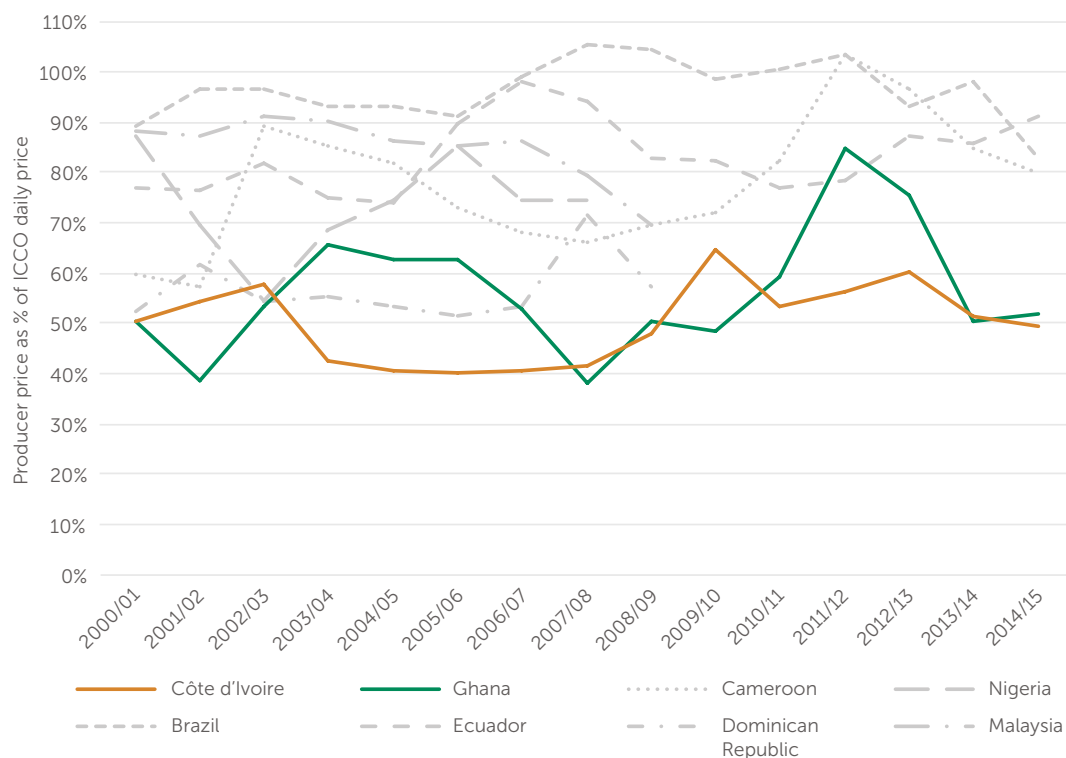
11 Gilbert, C. L. (2007). Value Chain Analysis and Market Power in Commodity Processing with Application to the Cocoa and Coffee Sectors. In Governance, Coordination and Distribution along Commodity Value Chains, 267–295. FAO Commodities and Trade Proceedings 2. Rome: Food and Agriculture Organization of the United Nations. Available at http://www.fao.org/docrep/pdf/010/a1487e/a1487e00.pdf

12 Laven, A. (2010). The risks of inclusion: Shifts in governance processes and upgrading opportunities for cocoa farmers in Ghana. Amsterdam: KIT. Available at: https://pure.uva.nl/ws/files/1437472/77981_18.pdf

13 Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/

14 ICCO. (2012). The World Cocoa Economy: Past and Present. International Cocoa Organization, Abidjan. Additional data from private database of ICCO figures up to 2014/15. Some data not available.

Figure 11.2 Producer prices in US dollars expressed as a percentage of the ICCO daily price[15]

Legend:
— Côte d'Ivoire   — Ghana   ⋯⋯ Cameroon   — — Nigeria
– – – Brazil   — — — Ecuador   — · — Dominican Republic   — · – Malaysia

11.2.2   Producer prices in Côte d'Ivoire

Since the latest reforms in 2011, the producer price is fixed by the government. The annual producer price is fixed through a PVAM (Programme of Anticipated Sales) at around 60% of the value at which the CCC is able to make its forward sales.[16]

As in Ghana, fixed producer prices mean farmers cannot negotiate prices and prices to be differentiated based on quality, although premium payments for certified cocoa are possible. In theory, fixed annual prices are a guarantee to producers, regardless of market movements within the year. To ensure the stabilisation of the farm-gate price for cocoa farmers, a reserve fund has been set up by CCC to protect against possible drops in cocoa prices in the future.

Ivorian cocoa farmers receive some of the lowest prices in the world (Figure 11.2). Between 2000/2001 and 2014/2015, Ivorian farmers received an average of 51% of the ICCO daily price, although this has improved slightly to 55% since reforms in 2011. This reflects a highly effective government tax on producers, for which farmers do not receive comparable services as Ghanaian producers do from COCOBOD. How taxes

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[15] ICCO. (2012). The World Cocoa Economy: Past and Present. International Cocoa Organization, Abidjan. Additional data from private database of ICCO figures up to 2014/15. Some data not available.

[16] This is the Cost, Insurance, Freight (CIF) price. Laven, A., Buunk, E., Amerlaan, T. (2016). Determination of Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire, and Indonesia. Appendix to Report: Market Concentration and Price Formation in the Global Cocoa Value Chain. SEO Amsterdam Economics. p.24. Available at http://www.seo.nl/uploads/media/2016-79A_Bijlage_A_bij_Market_Concentration.pdf

from cocoa are being used and how that translates into benefits for farmers is not transparently reported.[17]

Unfortunately, in 2016, a considerable drop in global cocoa prices was experienced, which was caused by an 18% increase in global cocoa production. As the world's largest cocoa producer, Côte d'Ivoire contributed substantially to this annual increase in production.[18] Although the government had forward sold a large proportion of the expected crop, many national traders who bought the forward contracts prior to the fall in prices did not also hedge (or presell) their cocoa. When the world market price fell sharply, local traders declined to buy the cocoa from producers at the fixed price and defaulted on their contracts with the government. The stabilisation fund was not large enough to maintain the guaranteed producer price, as some had previously predicted.[19] The Ivorian government responded by lowering the producer price by 36%, angering producers.[20] This naturally raised many questions about the sustainability and functioning of such an institutional arrangement for price regulation.

Box 11.1 Price terminology

FoB 'Free-on-Board' price: Term of sale under which the price invoiced or quoted by a seller includes all charges up to placing the goods on board a ship at the port of departure specified by the buyer. Also called collect freight, freight collect, or freight forward. [21]

CIF price: 'Cost, Insurance, Freight' price is a trade term requiring the seller to arrange for the carriage of goods by sea to a port of destination and provide the buyer with the documents necessary to obtain the goods from the carrier.[22]

ICCO price: The ICCO price for cocoa beans is the average of the quotations of the ICE Futures Europe and ICE Futures U.S markets.[23] This is also commonly called the world market price.

Producer price: Also known as the farm-gate price, this is the price farmers receive for their cocoa.[24]

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[17] Laven, A., Buunk, E., Amerlaan, T. (2016). Determination of Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire, and Indonesia. Appendix to Report: Market Concentration and Price Formation in the Global Cocoa Value Chain. SEO Amsterdam Economics.p.34. http://www.seo.nl/uploads/media/2016-79A_Bijlage_A_bij_Market_Concentration.pdf

[18] In Côte d'Ivoire, cocoa production increased from 1,580,000 MT in 2015/16 to 2,019,000 MT in 2016/17, an increase of 438,000 MT. See: ICCO. (2018). Quarterly Bulletin of Cocoa Statistics Volume XLIV No. 1 Cocoa Year 2017/18

[19] Ibid. p.34

[20] Fountain, A.C. and Hütz-Adams, F. (2018) Cocoa Barometer 2018. P.7. Available at http://www.cocoabarometer.org/

[21] Laven, A., Buunk, E., Amerlaan, T. (2016). Determination of Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire, and Indonesia. Appendix to Report: Market Concentration and Price Formation in the Global Cocoa Value Chain. SEO Amsterdam Economics.p.2. http://www.seo.nl/uploads/media/2016-79A_Bijlage_A_bij_Market_Concentration.pdf

[22] Ibid. p.2

[23] ICCO. (2018). Quarterly Bulletin of Cocoa Statistics Volume XLIV No. 1, Cocoa Year 2017/18, International Cocoa Organization, Abidjan

[24] Laven, A., Buunk, E., Amerlaan, T. (2016). Determination of Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire, and Indonesia. Appendix to Report: Market Concentration and Price Formation in the Global Cocoa Value Chain. SEO Amsterdam Economics.p.34. Available at http://www.seo.nl/uploads/media/2016-79A_Bijlage_A_bij_Market_Concentration.pdf

11.3 World market prices

The price of cocoa on the world market is often a contentious topic. Frequently expressed concerns are that the world market price is too low, and that farmers are not receiving a 'fair' price.[25] The worry is that low world cocoa prices are keeping farmers poor. If farmers struggle to cover their costs of production and are unable to make sufficient on-farm investments they will be stuck in a low input, low output poverty trap.[26]

We analysed the ICCO dataset from 1960/61 to 2016/17 in an attempt to identify long-term price trends and the presence of an underlying logic in world cocoa price movements.[27] We have also contrasted two periods therein: 1960/61 to 1989/90 and 1990/91 to 2016/17.

The period of 1960/61 to 1989/90 can be loosely characterised by nascent independence in many producing countries, non-democratic governmental systems, and regulated marketing structures. By the mid-1970s, a large structural cocoa deficit had sent cocoa prices soaring. At the same time, producer countries suffered from extremely high domestic inflation. The world economy was also still reeling from the effect of the oil crisis, with historically high inflation in the United States affecting the value of the dollar. Initially, the high cocoa prices of the mid-1970s depressed demand, but they also drove massive investment in cocoa production. As the cocoa trees from this investment matured, supply outpaced demand through the 1980s. To try to contain the global supply glut, the ICCO attempted to establish a 'buffer stock' policy. The world market, in a state of structural over-supply, experienced falling prices from the late 1970s until the early 1990s.

The period of 1990/91 to 2016/17 can be loosely characterised by democratic reforms and (partial) liberalisation in many cocoa producing countries, which was part of a wider trend towards a more liberalised global economy. Inflation in both producing (exporting) and importing countries was also much better under control during this period. Through much of the 1990s, prices showed signs of recovery due to a better balanced global demand and supply, which allowed the ICCO to phase out buffer stocks. However, in 1999/00, world prices touched a new low (in real terms) due, in part, to back to back surpluses and fears of a return to structural oversupply. From 2000/01 onwards, prices have been trending upwards, due to a small structural deficit. In 2009/10, the average ICCO price hit a 20 year high (in real terms) and,

[25] Fountain, A.C. and Hütz-Adams, F. (2018) Cocoa Barometer 2018. Available at http://www.cocoabarometer.org/

[26] Wessel, M., & Quist-Wessel, P. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. NJAS-Wageningen Journal of Life Sciences, 74, 1-7. P.5. Available at https://doi.org/10.1016/j.njas.2015.09.001

[27] For a reading on historical perspectives see Gilbert, C.L. (2012) The long term trend in cocoa prices, University of Trento. A power point presentation of his work is available at https://mfe.be/choconomics/cplt–gilbert.pptx

in most years, prices have remained fairly solid. However, 2016/17 was marked by a considerable price drop, which was largely caused by a surge in production as a result of favourable weather conditions in major producing countries. We are most interested in the period from 1990/91 onwards because market structures generally resemble those of today and those likely to be present in the immediate future. Also, this is the period during which the vast majority of farmers in our study planted most of their cocoa trees (See Chapter 6 Land, Cocoa tree ages).[28]

11.3.1 Analysis of world market prices

All data presented in this section is sourced from the ICCO (Table 11.4), unless otherwise stated. Global cocoa production and grinding has increased roughly four-fold between 1960/61 to the present day (Figure 11.3). However, growth has not been linear. Relatively low market growth was seen between 1960 and 1980 before an acceleration from the early 1980s to the present day.

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[28] We find that the average tree age in Ghana is 14 years and 16 years in Côte d'Ivoire

Table 11.4 World cocoa bean production, grindings and stocks[29]

Year[30]	Gross crop produced (thousand tonnes)	Crop produced change %	Grindings (thousand tonnes)	Grinding change %	Surplus/ deficit[31] (produced-grindings) (thousand tonnes)	Total end of season stocks[32]	ICCO buffer stocks	Stocks to grinding ratio[33]	US/tonne nominal[34]	US/tonne real (US$ in 2016)[35]	Price change
1960/61	1172		1002		158	461	-	46	493	3997	
1961/62	1149	-2.0%	1095	9.3%	43	504	-	46	477	3829	-3.2%
1962/63	1172	2.0%	1140	4.1%	20	524	-	46	522	4148	9.4%
1963/64	1210	3.2%	1186	4.0%	12	536	-	45.2	522	4094	0.0%
1964/65	1505	24.4%	1305	10.0%	180	716	-	54.9	389	3012	-25.5%
1965/66	1221	-18.9%	1377	5.5%	-168	548	-	39.8	491	3741	26.2%
1966/67	1364	11.7%	1381	0.3%	-31	517	-	37.4	569	4215	15.9%
1967/68	1371	0.5%	1408	2.0%	-51	466	-	33.1	644	4628	13.2%
1968/69	1258	-8.2%	1377	-2.2%	-132	334	-	24.3	913	6297	41.8%
1969/70	1416	12.6%	1356	-1.5%	46	380	-	28	730	4774	-20.0%
1970/71	1557	10.0%	1418	4.6%	123	503	-	35.5	586	3625	-19.7%
1971/72	1584	1.7%	1527	7.7%	41	544	-	35.6	583	3455	-7.0%
1972/73	1399	-11.7%	1544	1.1%	-159	385	-	24.9	1014	5822	58.7%
1973/74	1452	3.8%	1497	-3.0%	-60	325	-	21.7	1455	7865	39.8%
1974/75	1538	5.9%	1477	-1.3%	51	376	-	25.4	1331	6480	-9.8%
1975/76	1499	-2.5%	1495	1.2%	-6	369	-	24.7	1655	7383	31.0%
1976/77	1342	-10.5%	1429	-4.4%	-96	274	-	19.1	3632	15320	119.0%
1977/78	1504	12.1%	1379	-3.5%	115	388	-	28.2	3283	13002	-14.3%
1978/79	1509	0.3%	1478	7.2%	21	409	-	27.7	3504	12899	1.2%
1979/80	1672	10.8%	1485	0.5%	175	584	-	39.3	2825	9339	-20.2%
1980/81	1695	1.4%	1558	4.9%	125	709	-	45.5	2098	6111	-19.9%
1981/82	1734	2.3%	1601	2.8%	121	831	100	51.9	1868	4932	-4.6%
1982/83	1525	-12.1%	1628	1.7%	-113	717	100	44.1	1949	4847	9.6%
1983/84	1512	-0.9%	1704	4.7%	-202	515	100	30.2	2412	5812	27.8%
1984/85	1956	29.4%	1864	9.4%	78	593	100	31.8	2222	5133	-3.7%
1985/86	1975	1.0%	1849	-0.8%	112	705	100	38.1	2149	4793	-15.4%
1986/87	2011	1.8%	1910	3.3%	87	792	175	41.5	2023	4430	-15.0%
1987/88	2197	9.2%	1986	4.0%	196	988	250	49.8	1707	3606	-21.0%
1988/89	2464	12.2%	2133	7.4%	314	1302	248	61	1344	2727	-18.4%
1989/90	2406	-2.4%	2202	3.2%	187	1489	245	67.6	1193	2309	-12.9%
1990/91	2506	4.2%	2331	5.9%	158	1647	242	70.7	1193	2191	-4.3%
1991/92	2278	-9.1%	2325	-0.3%	-63	1584	233	68.1	1166	2055	-3.7%
1992/93	2485	9.1%	2415	3.9%	53	1637	230	67.8	1051	1798	-9.6%
1993/94	2436	-2.0%	2511	4.0%	-91	1545	179	61.5	1370	2276	28.9%
1994/95	2348	-3.6%	2532	0.8%	-200	1346	128	53.1	1440	2332	-1.4%
1995/96	2915	24.1%	2719	7.4%	176	1522	77	56	1438	2265	3.0%
1996/97	2710	-7.0%	2711	-0.3%	-20	1502	26	55.4	1556	2380	13.6%
1997/98	2693	-0.6%	2752	1.5%	-78	1424	-	51.8	1711	2559	13.6%
1998/99	2808	4.3%	2744	-0.3%	45	1469	-	53.5	1298	1911	-25.6%
1999/00	3077	9.6%	2960	7.9%	96	1564	-	52.9	919	1324	-27.4%
2000/01	2865	-6.9%	3065	3.5%	-220	1344	-	43.9	990	1380	13.1%
2001/02	2877	0.4%	2886	-5.8%	-29	1315	-	45.6	1580	2141	58.8%
2002/03	3179	10.5%	3077	6.6%	80	1395	-	45.3	1873	2499	11.2%
2003/04	3548	11.6%	3237	5.2%	287	1682	-	52	1534	2001	-23.5%
2004/05	3378	-4.8%	3382	4.5%	-38	1644	-	48.6	1571	1996	0.2%
2005/06	3808	12.7%	3522	4.1%	248	1892	-	53.7	1557	1913	1.8%
2006/07	3430	-9.9%	3675	4.3%	-279	1613	-	43.9	1854	2207	14.9%
2007/08	3737	9.0%	3775	2.7%	-75	1538	-	40.7	2516	2912	28.2%
2008/09	3592	-3.9%	3537	-6.3%	19	1557	-	44	2599	2897	8.5%
2009/10	3634	1.2%	3737	5.7%	-139	1418	-	37.9	3246	3631	23.9%
2010/11	4309	18.6%	3938	5.4%	328	1746	-	44.3	3105	3418	-6.9%
2011/12	4095	-5.0%	3972	0.9%	82	1828	-	46	2396	2557	-20.9%
2012/13	3943	-3.7%	4180	5.2%	-276	1552	-	37.1	2359	2466	-0.4%
2013/14	4370	10.8%	4335	3.7%	-9	1543	-	35.6	3009	3100	26.2%
2014/15	4251	-2.7%	4152	-4.2%	56	1599	-	38.5	3057	3099	10.0%
2015/16	3993	-6.1%	4127	-0.6%	-174	1425	-	34.5	3093	3132	2.7%
2016/17	4748	18.9%	4401	6.6%	300	1725	-	39.2	2142	2142	-29.6%

[29] ICCO. (2018). Quarterly Bulletin of Cocoa Statistics Volume XLIV No. 1, Cocoa Year 2017/18, International Cocoa Organization, Abidjan. p.50

[30] Cocoa year: 1 October to 30 September.

[31] Surplus/deficit: Current net world crop (gross crop adjusted for loss in weight) minus grindings.
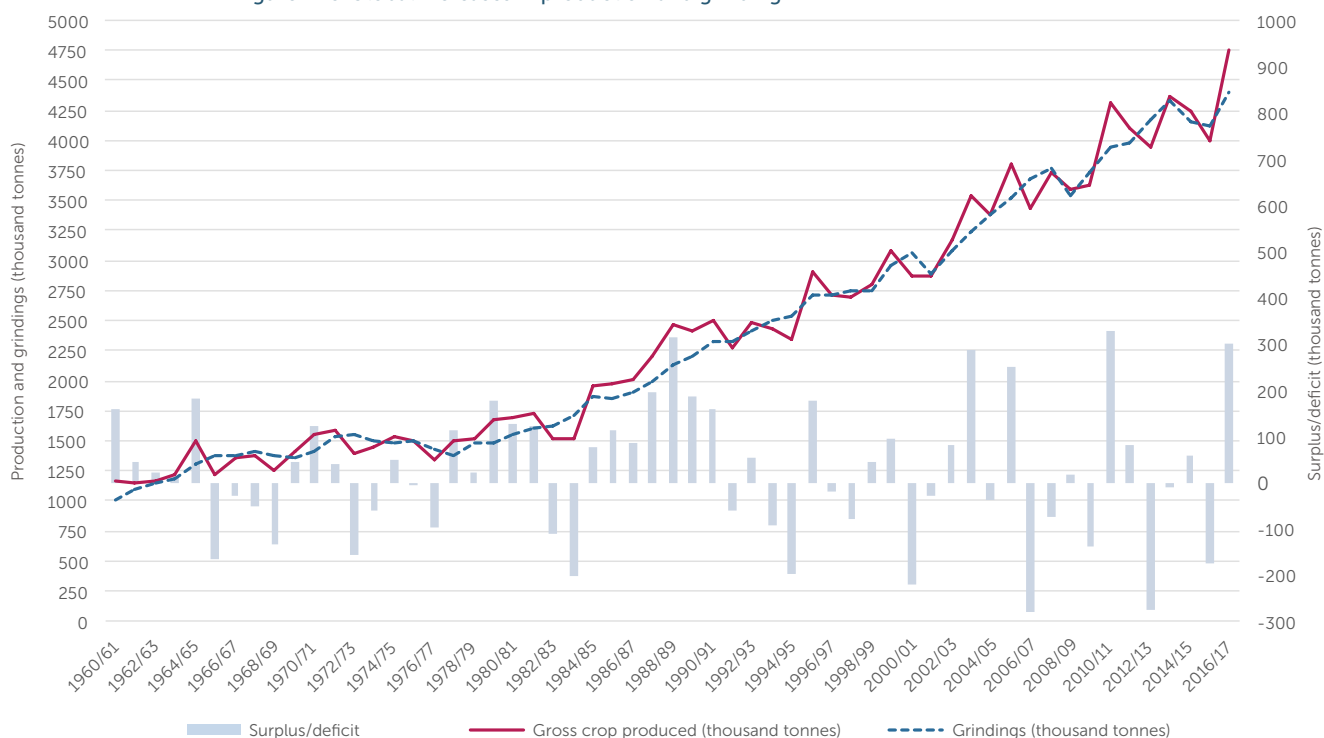
[32] Total end-of-season stocks: Computed by ICCO on the basis of yearly surplus/deficit

[33] Stocks-to-grindings ratio: Total end-of-season stocks as a percentage of grindings.

[34] ICCO daily price is the average of the quotations of the nearest three active futures trading months on ICE Futures Europe and on ICE Futures U.S.

[35] Figures calculated in US dollars in 2016, using the inflation calculator at http://www.in2013dollars.com/ . Inflation figures are derived from https://www.minneapolisfed.org/community/financial-and-economic-education/cpi-calculator-information/consumer-price-index-and-inflation-rates-1913 , the Bureau of labour statistics at https://www.bls.gov/cpi/ and using inflation conversion factors at http://liberalarts.oregonstate.edu/spp/polisci/research/inflation-conversion-factors

Figure 11.3 Global increases in production and grinding

Legend:
- Surplus/deficit
- Gross crop produced (thousand tonnes)
- Grindings (thousand tonnes)

Price analysis during 1960/61 to 1989/90

The 'stocks to grindings' ratio[36] is an important determinant of price because it represents the global cocoa supply more broadly than single season production volumes.[37]

From 1960/61 to 1964/65, the stocks to grindings ratio was around 46%, which is approximately the historical average.[38] However between 1965/66 and 1976/77, global demand for cocoa (indicated by 'grindings') began increasing. The world cocoa economy quickly shifted to a structural deficit, with demand outpacing supply by an average of 2% per annum in this period.[39] This supply deficit sent the stocks to grindings ratio plunging to an all-time low of 19% in 1976/77 (Table 11.4). Fear of supply shortages drove up nominal market prices to record highs (Figure 11.4).

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[36] The 'stocks to grinding' ratio is the most important indicator of global cocoa stores. It is a more important indicator than total end of season stocks, (expressed in thousand tonnes) because total stocks will always increase in tonnes as the market grows regardless of supply/deficit (im)balance. Specifically, the stocks to grindings ratio is the total end-of-season stocks as a percentage of grindings. For example, for the year 2016/17 we can divide total end of season stocks of 1,725 thousand tonnes by total grindings of 4,401 thousand tonnes which gives us a ratio of 39.2.

[37] It is possible that ICCO stock figures are not precise or that certain companies may have higher stocks than those registered. However, for our time-based analysis, the most important consideration is the methodology and practice for reporting ICCO stock figures has good consistency from year to year.

[38] The long-term average of the stocks to grindings ratio (1960-2017) is 43%.

[39] This represents a deficit of 442 thousand tonnes of cocoa, or an average of 37 thousand tonnes per annum.

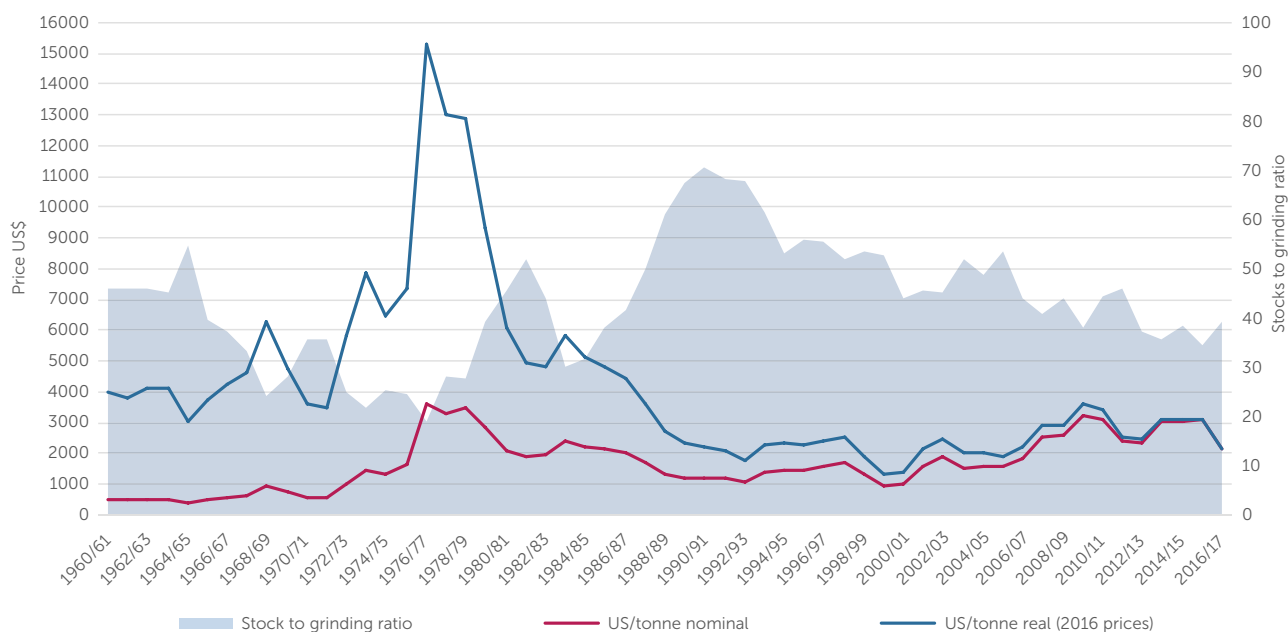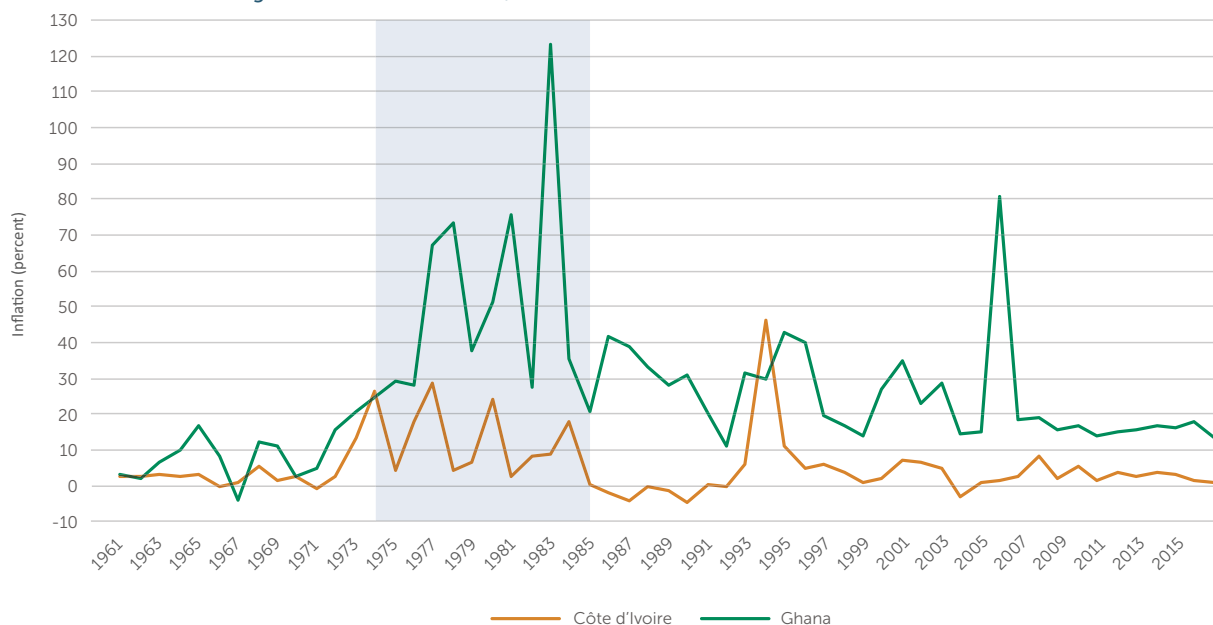Figure 11.4 Global cocoa prices US$/tonne (nominal and real 2016), and stocks to grinding ratio 1960/61–2016/17

Legend: Stock to grinding ratio — US/tonne nominal — US/tonne real (2016 prices)

Figure 11.5 Annual inflation, Ghana and Côte d'Ivoire[40]

Legend: Côte d'Ivoire — Ghana

Around this time, the global economy was in some difficulties, with the effect of the 1973 oil crisis still reverberating around the world. Inflation in the United States reached record highs driving devaluation of the US dollar. This is reflected in the substantial difference between the nominal (US$/tonne) and real prices (US$/tonne inflation adjusted to 2016 prices) of cocoa in the mid-late 1970s (Figure 11.4). At the same time, inflation in cocoa producing countries also hit new highs. In Ghana, annual inflation rose from single digits at the start of the decade to around 70% in

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[40] World Bank. (2018). Inflation, GDP deflator (annual %) for Ghana and Cote d'Ivoire. Available at https://data.worldbank.org/indicator/NY.GDP. DEFL.KD.ZG?locations=GH-CI

1977. Likewise, in Côte d'Ivoire, inflation rose from close to zero to 30% in 1977.[41] These were exceptional times by today's standards and the rapid rise in cocoa prices (both nominal and real) quickly proved to be unsustainable. It is difficult to judge the extent to which cocoa producers benefited from these high prices because much of the value was lost to high inflation and currency devaluation.

The sharp price increases in the 1970s did two things: first, the increase in prices dampened demand, with grindings falling by around 11% between 1972/73 and 1977/78) (Table 11.4); second, the high prices spurred considerable investment in cocoa planting in Ghana and Côte d'Ivoire, as well as in other producing countries. The delayed result of this investment became apparent by the mid-1980s as the cocoa trees matured and production growth far outstripped demand. The world cocoa economy swung from a large structural deficit to a large structural surplus (Figure 11.6).

In a period from the late 1970s to the early 1990s, 11 out of 13 years were marked by an annual cocoa surplus, which quickly swelled the stocks to grindings ratio from record lows to a record high of 71% in 1991 (Table 11.4). As a result, world market prices fell most years from the late 1970s to early 1990s.[42] The sector was effectively in crisis, as demonstrated by the ICCO's attempt to halt the slide in prices through a 'Buffer Stock Fund', which tried to absorb some of the excess supply. However, the attempt at price stabilisation through the Buffer Stock Fund was unsuccessful[43] and expensive to manage. The ICCO accumulated large cocoa inventories, which then took years to sell off before it was abandoned. Finally, in the early 1990s, some semblance of supply/demand equilibrium began to return.

The period of 1960 to 1990 bears little resemblance to the cocoa market of today, but it does offer some instructive lessons: As predicted by the main model of supply and demand,[44] we observe a relationship between supply (indicated by the stocks to grindings ratio) and demand (indicated by grindings), and world market prices. In the short run, high price shocks dampened demand and also stimulated higher rates of cocoa planting. Increased planting had a delayed impact on global supply because cocoa trees take time to mature.[45] When the growth in cocoa production outpaced growth in demand, a structural surplus was observed (i.e. over-supply across multiple years), driving an increase in the stocks to grindings ratio (supply) and an associated fall in prices. These interactions are explored in greater detail in the following section.

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[41] World Bank. (2018). Inflation, GDP deflator (annual %) for Ghana and Cote d'Ivoire. Available at https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG?locations=GH-CI

[42] World market prices fell from a high of US$15,320 in 1976/77 (real 2016) to a low of US$1,798 (real 2016) in 1992/93, a fall of more than 700%. In this period, annual average prices only rose in three out of 16 years.

[43] The 'Buffer Stock Fund' failed to stabilise world cocoa prices because: (i) it was economically too difficult to determine the equilibrium price; (ii) it was politically too difficult for member countries to cut production when this was needed for price stabilisation. As a result, the fund accumulated enormous inventories of cocoa that then took years to sell off as a gradual approach was deemed necessary to not disturb the market. See Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C. & Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/

[44] Marshall, A. (1890). Principles of Economics. Available at http://www.econlib.org/library/Marshall/marPCover.html

[45] Gilbert, C. (2016), The dynamics of the world cocoa price, in The Economics of Chocolate, pp. 307-338.

Price analysis 1990/91 to 2016/17

In the early 1990s, the cocoa sector began to turn a corner. The period from 1990 onwards is marked by democratic reforms, partial liberalisation in Ghana and Côte d'Ivoire, and further liberalisation in other cocoa producing countries. The ICCO also played its role though a number of reforms aimed at achieving a sustainable world cocoa economy. This 'more liberalised' period from 1990/91 to the present may be compared with the 'more regulated' period from 1960/61 to 1989/90.

The period from 1990 onwards is characterised by a measurable reduction in volatility in a range of indicators. First, there has been much lower volatility in annual cocoa surplus/deficits with smaller surplus/deficits in percentage terms.[46] Also, a pattern of relative supply/demand equilibrium has been established, with 13 years in surplus and 14 in deficit (Figure 11.6). As a result, changes in world cocoa stocks (measured by the stocks to grindings ratio) is also less volatile.[47] Finally, average annual prices are much less volatile as a result,[48] providing relatively greater certainty for all actors within the supply chain. Reduced volatility has even been achieved while rapidly growing the global market[49] and bringing about greater competition and transparency.[50]

Figure 11.6 Annual cocoa surplus/deficit (1960/61 to 2016/17)

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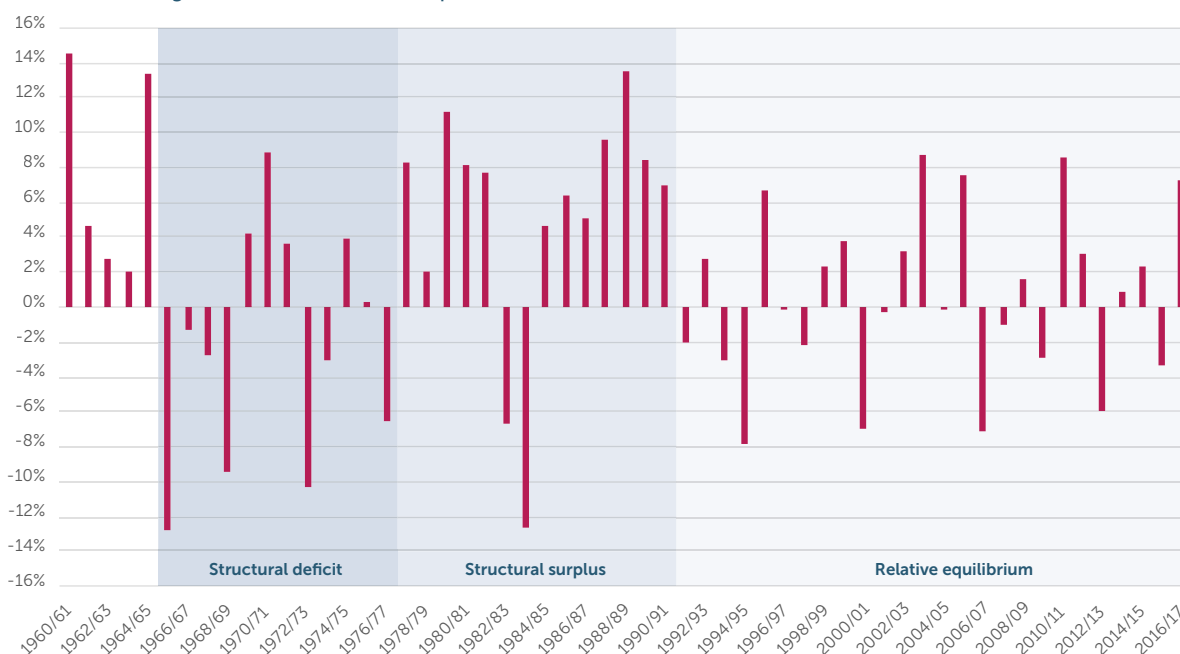
[46] We look at the standard deviation for annual surplus/deficit expressed as a percent. For the period 1960/61 to 1989/90, the standard deviation of the sample is 0.077 compared with a standard deviation of 0.049 for the period 1990/91 to 2016/17.

[47] For the period 1960/61 to 1989/90, the standard deviation of the stocks to grindings ratio was 0.214, compared with a standard deviation of 0.109 for the period 1990/91 to 2016/17.

[48] We look at the standard deviation for annual price change expressed as a percent. For the period 1960/61 to 1989/90, the standard deviation of the price change was .311 compared with a standard deviation of 0.201 for the period 1990/91 to 2016/17.

[49] For example, between 1960 and 1980, the change in global demand (grindings) was just under 50%. In the 1980s, production rapidly increased creating global surpluses. However, since 1990, supply and demand have kept pace with each other. Between 1990 and 2016, global demand grew nearly 90%.

[50] Many sector actors from governments to companies and NGOs are working to improve transparency. Specifically, improving market transparency falls under the mandate of the ICCO.

The 1990s could be described as a rebuilding decade with relatively low prices. In 1993/94, the first positive change in price was recorded for more than a decade and a minor price recovery can be observed until 1998/99 (Figure 11.7). In this period, the ICCO was finally able to sell off its buffer stocks. Unfortunately, average global prices hit a new low in 1999/2000 in inflation-adjusted terms (US$ 2016) due to back-to-back years of surplus, and fears that the world cocoa economy could return to a structural supply surplus. Nevertheless, the 1990s did achieve a recalibration of the stocks to grindings ratio, which fell from the record high of 71% at the start of the decade to a more historically normal level of 53% by the end of the decade.

Figure 11.7   Global cocoa prices US$/tonne (nominal and real 2016), and stocks to grinding ratio 1990/91 to 2016/17
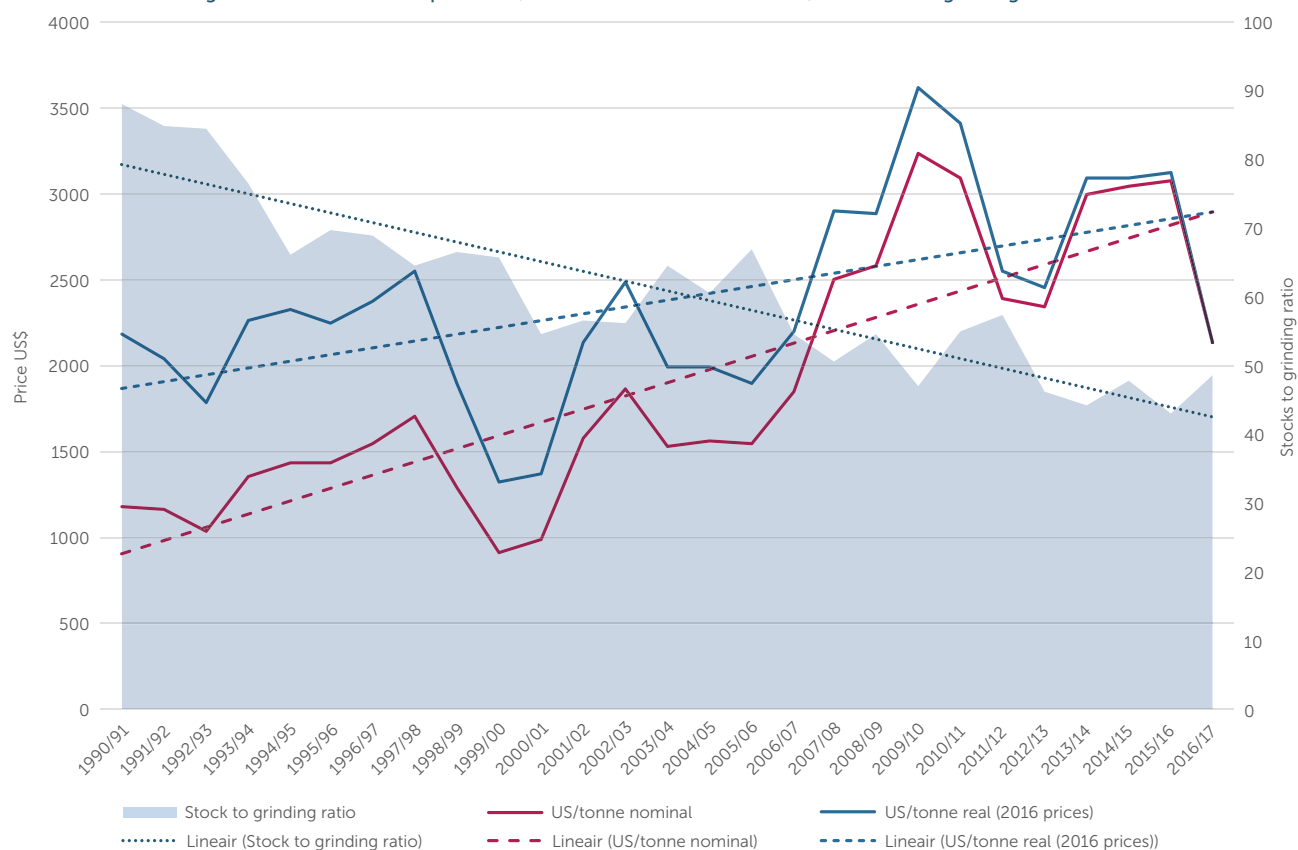
From 2000 onwards, average global prices have steadily strengthened in most years (in both nominal and real terms), due to a relatively balanced global cocoa economy. The stocks to grinding ratio has gradually declined to around 35-40% due to reasonably consistent global demand. A peak average annual price of US$3,246 was reached in 2009/2010 (US$3,631 in real terms), reflecting a 24-year high. Good prices have been maintained in a number of subsequent years, including average prices of around US$3,100 in 2013/14 through 2015/16 (in nominal and real terms).

Supply and demand trends have more or less tracked each other through the period, regardless of year to year production volatility driven by weather conditions or changes in grindings resulting from price fluctuations. It is notable that production growth steadily increased even during periods of lower prices in the 1990s and early 2000s (Figure 11.8).

Figure 11.8: Production and grindings volumes (1990/91-2016/17)
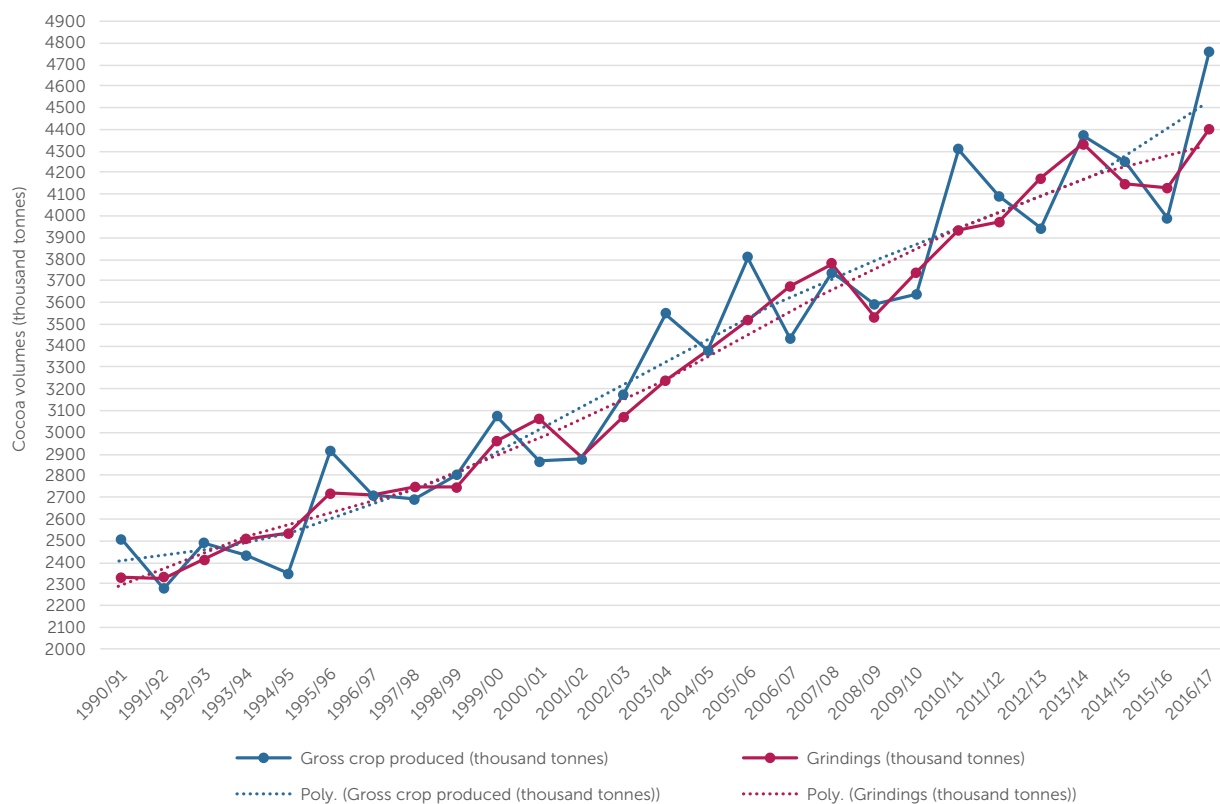
The trendline used above is polynomial to 5 orders, and shows production and grindings tracking each other. The gap opening up in 2016/17 is due to an exceptional year of production, and should not be interpreted as a trend (at least, not yet). If this single outlier year is removed, no discernable trend of supply/demand imbalance is evident.

Analysis of price levels

A clear relationship can observed when we plot the stocks to grinding ratio and price (whether nominal or real US$2,016) for the period 1990/91 to 2016/17 (Figure 11.9). Using ICCO data, the stocks to grindings ratio is the strongest indicator of price trends and price levels[51] and may be thought of as the market's interpretation of the relative scarcity of cocoa both in the present and in the near future. When running an OLS regression analysis we find the relationship between the stocks-to-grindings ratio and price (US$ in 2016) is highly significant. For every percent point change in the stocks-to-grindings ratio the price per tonne shifts around $31 in the opposite direction. Our analysis is consistent with that of the ICCO, who argue that "world market prices have, in general, continued to reflect adequately the degree of imbalance between supply and demand across time."[52]

It is important to note that this is a two-way relationship. While the stocks to grindings ratio affects average annual prices, price levels also influence annual demand (grindings) and investments in future cocoa production (i.e. tree planting).

Of course, the relationship between the stocks to grindings ratio and price is also affected by other factors such as changes in annual production and trader confidence in the cocoa market.

Figure 11.9 Relationship between stocks to grindings ratio and real price (US$ 2016)
(logarithmic trendline) (1990/91 to 2016/17)

$R^2 = 0,32358$

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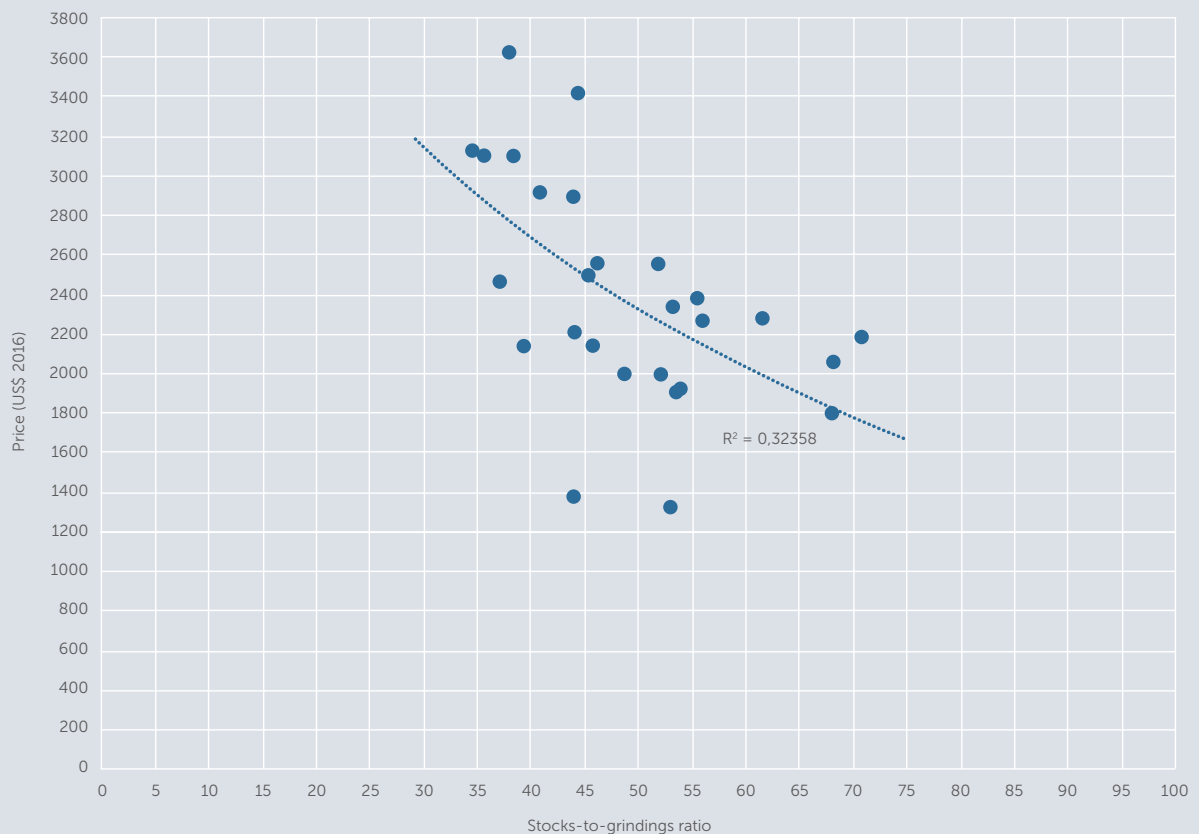
51   This relationship also holds for the period 1960/61 to 1989/90 despite the greater annual volatility in demand and supply.

52   ICCO. (2012). The World Cocoa Economy: Past and Present. International Cocoa Organization, Abidjan. P.6

Analysis of volatility and annual price changes

While the stocks-to-grindings ratio is a good predictor of price levels and price trends, changes in average annual prices are also affected by changes in annual production levels (supply) and grindings (demand) (Table 11.4).

First, we compare the volatility of the annual change in 'Gross crop produced' (supply) and 'Grindings' (demand) using the coefficient of variation (CV).[53] Since 1990/91, the change in 'Gross crop produced' has a CV of 317 compared with a CV of 143 for 'Grindings'. This indicates that there is more than twice the volatility in annual changes in production than in grindings.

Annual changes in the gross crop produced are largely driven by weather conditions in the main producing countries, although there can also be external influences which affect supply chains, such as geopolitical tensions. Since 1960/61, only fives times has the change in gross crop produced exceeded 15%. (Table 11.4). The most recent spike in production occurred in 2016/17, which was the largest ever annual increase in cocoa production (in metric tonnes). On average, global production has increased by around 3% per annum since 1990/91.

By contrast, grindings (demand) is fairly inelastic because processors are constrained by their technical capacity within a single year, and by the capacity of their own markets to absorb additional volumes of cocoa products. Between 1990/91 and 2016/17, grindings has also increased by around 3% per annum, which has been made possible through investments in additional processing capacity to meet long-term demand from brands and consumers. Since 1990, there have been roughly an equal number of surplus and deficit years, thereby maintaining something of an equilibrium (Figure 11.6).

When running a simple OLS regression we find a highly significant positive correlation between the percent change in production and percent change in grindings (demand). In other words, when annual production increases by more than the trend, demand also increases more than the trend. We expect this is due to the ongoing interactions between supply expectations, price and demand. For instance, in 2016/17 there was a 19% increase in production which contributed to a drop in prices, but which stimulated a 6.6% increase in grindings. This is an important dynamic, as an increase in grindings can limit the annual surplus/deficit and prevent the stocks-to-grinding ratio from growing too quickly, which affects price levels in subsequent seasons (Figure 11.9).[54]

We also ran a OLS regression to explore the correlation between the annual cocoa trade balance (surplus/deficit) and change in price from the previous year. As expected, we find a significant negative correlation between these variables. This suggests that cocoa prices typically increase when there is a deficit in a given year and decrease when there is a surplus, as was seen in 2016/17. This is in-line with standard economic theory.

We further investigated whether annual average prices are more volatile now or in the past. For the period 1990/91 to 2016/17 we find a coefficient of variation (CV) of 5.14 compared with 5.53 for the period 1960/61-1989/90. This suggests the average annual price is not more volatile now than in the past, and perhaps less so.

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[53] A coefficient of variation (CV) is the ratio of the standard deviation to the mean multiplied by 100. The CV for a single variable aims to describe the dispersion of the variable in a way that does not depend on the variable's measurement unit. This allows CVs to be compared to each other in ways that other measures, like standard deviations or root mean squared residuals, cannot be.

[54] More sophisticated econometric modelling is required to described these interactions precisely.

11.3.2   Global markets

Futures markets

Technically, the world cocoa price is established on the cocoa futures market. Cocoa futures prices are based on the ICE Futures Europe exchange in London and on the ICE Futures US exchange in New York. The marketing boards of Ghana and Côte d'Ivoire opt to auction most of their cocoa on these markets. This is partly because the futures market allow marketing boards and traders alike to hedge their risks as it fixes the price for future delivery. The exchanges thus play a crucial role in reducing price uncertainty in the market and provide a price insurance function to the cocoa market as traders are able to hedge open positions in the market. Futures markets also make the price 'discovery' process on spot markets much more visible and transparent.[55]

The world cocoa market can be described as 'efficient' in that they operate like markets with full competition. The price therefore is 'right' in the sense that prices are discovered through high volumes of trading with a high amount of competition which makes it extremely difficult for any one trader to affect prices.

Speculation

Some market participants believe that speculators move commodity futures away from their fundamentals of supply and demand, thereby distorting prices and exacerbating volatility[56] and 'failing farmers'.[57] While speculative trading in cocoa futures has increased by more than 400% over the past three decades, several studies have concluded that there is no evidence that the prices in the cocoa market are distorted by speculators.[58,59] ICCO has also previously conducted an econometric test on the relationship between price changes in the futures and spot markets. It found that price changes in the futures market run ahead of the spot market and that speculation in the cocoa market actually *reduces* price volatility rather than increases it.[60] A large number of buyers (i.e. more competition) and high volumes of trade make it virtually impossible for any one buyer or seller to affect international market prices because the volumes that a single entity trades are small in relation to the total market size.

Given that prices are fixed annually by the respective marketing boards of Ghana and Côte d'Ivoire, daily, weekly and monthly price changes should not directly affect farmers in these countries. Nevertheless, it is important to note that changes in price

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[55] Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. p.31 Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/

[56] Ibid. p.31

[57] Fountain, A.C. and Hütz-Adams, F. (2018) Cocoa Barometer 2018. P.53 Available at http://www.cocoabarometer.org/

[58] Ohomeng, W., B. Sjo and M. Danquah (2016), Market efficiency and price discovery in cocoa markets, Journal of African Business. Abstract available at https://www.tandfonline.com/doi/abs/10.1080/15228916.2016.1142801

[59] Bohl, S., and P. M. Stephan (2013), Does futures speculation destabilize spot prices? New evidence for commodity markets, Journal of Agricultural and Applied Economics, vol. 45(4): 595-616. Available at https://pdfs.semanticscholar.org/9e41/22e2c570407c81fd41a67cde63bf53bd7b2c.pdf

[60] Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. p.34 Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/

from year to year are much larger than changes in price from month to month (or week to week). Therefore, while speculators' fears or optimism may lead to cocoa being over-sold or under-sold in a given month, the underlying fundamentals of supply and demand still hold.

Prices paid by companies

Prices paid by companies are also often under scrutiny. It is important to note that, in Ghana and Côte d'Ivoire, companies are not legally able to buy cocoa directly from producers. Therefore, prices paid by companies are determined by the futures market (described above).

In the past, regulators have also looked at whether there is too high of a market concentration of buyers in the market which could affect prices. Recent mergers and acquisitions of companies in the cocoa sector assessed by the European Commission were not considered to be above the level of anti-competitive concentration from the point of view of European anti-trust law. To date, there is a lack of clear evidence that market concentration among processors has artificially reduced the world cocoa price below the level that equalises supply and demand.[61]

11.4 Summary

The governments of both Ghana and Côte d'Ivoire closely regulate their country's cocoa sector. While both have enacted certain reforms in recent decades, the COCOBOD in Ghana and the CCC in Côte d'Ivoire regulate the prices and coordinate the marketing. In Ghana, the Cocoa Marketing Company, maintained a monopoly over external marketing. In Côte d'Ivoire, the CCC allocates the licenses for export.

In Ghana, LBCs are permitted to act as competitors to the state-owned PBC for internal marketing purposes only. LBCs provide buying services for which they receive a fixed margin of the FoB price. In our study, PBC remains the largest buyer in our sample, with 57% of households selling to them. Kuapa Kokoo (18%), AGL/Armajaro (15%) and Olam (12%) were also found to have a notable market share.

In Côte d'Ivoire, cocoa producers typically sell their unprocessed cocoa beans through local buyers (*pisteurs*) or farmer cooperatives. These in turn sell to larger buyers (*traitants*), processors and exporters, who sell to international traders. In our study, 65% of respondents reported selling through *pisteurs*, with 36% selling through a cooperative.

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[61] Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. p.i. Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/

In Ghana, producer prices are set by the PRRC, and in Côte d'Ivoire by the CCC, fixed for a period of one year. Fixed prices can be advantageous for farmers if the world market price falls during the season but is guaranteed by the government. On the other hand, in a bullish market, cocoa farmers do not benefit from price increases within a season. Fixed prices also mean that price differentiation for better quality is not possible in Ghana and Côte d'Ivoire.

Ghana and Côte d'Ivoire both forward sell a large proportion of the expected production as a hedge against market volatility. Both countries also operate a stabilisation fund to help them maintain the announced producer price should world prices fall during the season. Unfortunately, this was not enough to protect Ivorian producers from falling prices in 2016/17, which raises questions about the institutional framework.

There is no evidence that regulated price mechanisms in Ghana and Côte d'Ivoire lead to higher prices for cocoa farmers than liberalised price mechanisms in other countries. Through their monopoly positions on external marketing, COCOBOD and CCC are able to effectively tax producers at rates that contribute to farmers receiving consistently lower prices than those in liberalised markets. For the period 2000/2001 to 2014/2015, Ghanaian producers received an average of 57% of the ICCO daily price, while Ivorian farmers received an average of 51% of the ICCO daily price.

Part of the cocoa revenues received by the marketing boards in Ghana and Côte d'Ivoire are reinvested in the sector and in general public goods. However, there is a perceived lack of transparency in decision-making and the efficiency of the allocated public reinvestments (e.g. input distribution) has been questioned. Farmers in Ghana receive considerably more institutional support than farmers in Côte d'Ivoire.

Between 1965/66 and 1976/77, global demand for cocoa began increasing and the world cocoa economy quickly shifted to a structural deficit, which plunged the stocks to grindings ratio to an all-time low of 19%. Fears of scarcity drove up nominal market prices to record highs, which was compounded by very high inflation in Ghana, Côte d'Ivoire and internationally. It is difficult to judge the extent to which producer countries benefited from these high prices because much of the value would have been lost to high inflation and currency devaluation.

The sharp price increases in the 1970s lowered demand in the short term and spurred considerable investment in cocoa production. The delayed effect of this investment in production led to a structural surplus through the 1980s and early 1990s, and associated falling prices throughout the period.

The period from 1990/91 to 2016/17 is characterised by greater stability and lower volatility. A pattern of relative supply/demand equilibrium was established during this period, with smaller annual imbalances in supply and demand.

Since 2000, average global prices have trended upwards (in both nominal and real terms). On several occasions, average annual prices have pushed above US$3,000/ tonne in real terms (US$2,016), reflecting price levels not seen for two decades. It is in this context that we must consider the narrative that current prices are 'too low'.

Across years, price levels and trends are closely correlated with the 'stocks to grindings' ratio. The 'stocks to grindings' ratio represents the global supply of cocoa more broadly than single season production volumes. In recent times, the stocks to grinding ratio has gradually declined from a high of around 70% in 1990 to around 35-40% today, due to reasonably strong and consistent global demand. This has had a generally positive effect on price trends.

Changes in average annual prices are also affected by the annual (expected) surplus or deficit of cocoa. Global cocoa production (supply) is much more volatile than grinding (demand) with changes in annual production volumes largely driven by weather conditions in major producing countries. Processors are constrained by their technical and storage capacity to absorb a year on year increase in production, and by demand in their own markets.

Since 1990, growth in cocoa production volumes and grinding volumes have more or less tracked each other, increasing by around 3% per annum. This represents increased investment in cocoa production (i.e. planting and yield improvements), increased investment in storage and processing capacity, and increased demand from existing and new markets. Annual changes in production rarely exceed +/-15%, the most recent time being in 2016/17. Annual changes in grinding have not exceeded +/-8% in this period.

Change in grindings (demand) negatively correlates with changes in annual price. In a year where there is a large increase in production, over-supply puts downward pressure on prices which can, in turn, increase demand in the short term. This is important because the increased demand helps to offset any increase in the stocks to grindings ratio, which is correlated with price levels for subsequent seasons.

The year 2016/17 was an outlier in terms of production volume, and there is no evidence that it is a sign of a new trend. 2016/17 was marked by the largest ever change in production volumes (tonnes) and the fourth largest change as a percent of production. This led to a single year fall in prices, and much uncertainty in the market. Most of the production increase can only be attributed to weather conditions, as most other factors influencing production levels (e.g. production improvements, tree planting etc.) take place over several years and we would be able to observe trends if this was the case.

Cocoa prices paid by companies are determined by the international futures market and spot markets. Therefore, critique of prices that companies pay should be directed

to how prices are formed on international futures markets. It is important to note that Ghana and Côte d'Ivoire opt to sell most of their cocoa on the futures market for reasons of efficiency, high competition, price transparency and the ability to hedge.

There is a lack of evidence that speculation in future markets is able to appreciably affect cocoa prices one way or the other. Speculation may, in fact, reduce price volatility because more buyers and sellers aid the process of price discovery, informed by futures markets.

In the past, high cocoa prices have stimulated higher rates of production growth, which leads to structural surpluses and falling prices. This effect can be seen from the late 1970s through to the early 1990s. The fact that high prices can spur investment in cocoa planting is an important consideration in today's market, given that prices have been trending upwards for some time, growth in demand is relatively constant, and ongoing concerns about deforestation in both Ghana and Côte d'Ivoire (see Chapter 6 Land).

There is a lack of evidence that low world prices slowed growth in cocoa production in recent decades. From a global perspective, farmers have continued to expand production even when cocoa prices hit record lows in the late 1990s and early 2000s, although production rates varied across countries. No delayed effect is clearly evident. This suggests that, even in periods of low cocoa prices, cocoa has remained relatively competitive compared with other crop options and/or there are other factors that motivate farmers to expand cocoa production (such as land tenure security) (see Chapter 7 The importance of cocoa).

From a policy perspective, trends are more important than annual figures. As with any agricultural commodity, weather conditions (favourable or unfavourable) in major producing countries can have a considerable effect on prices, and therefore demand. Trends allow us to understand changes through time, whereas some individual years can be outliers caused by weather conditions and bias interpretations of cause and effect.

From a policy perspective, it is important that arguments for and against market interventions (particularly price interventions) are based on a good analysis of market dynamics. Our analysis illustrates that the market is a system that generally follows economic principles of supply and demand, if imperfectly. It is not possible to intervene in one aspect without triggering effects in other aspects. For those entertaining the idea of a cocoa cartel, supply management (buffer stocks), or guaranteed (minimum) prices, there should be good evidence that the intervention will, as a minimum, do no harm to farmers over time.[62] Good intentions to increase prices to farmers can also harm them if a supply/demand imbalance results.

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[62] Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C. & Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. P.97. Available at http://www.seo.nl/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/