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The Partially Liberalized Cocoa Sector in Ghana

Producer Price Determination, Quality Control, and Service Provision

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ABSTRACT

The cocoa sector in Ghana is one of few examples of an export commodity sector in an African country that has withstood the pressure to fully liberalize. Despite substantial government control over internal and external marketing via the Ghana Cocoa Board (COCOBOD), the current institutional arrangement is able to pass on a significant share of export prices to farmers, a key objective of the liberalization of commodity markets in Africa. As Ghana continues to capitalize on its recent discovery of off-shore oil reserves, the government and donors alike are concerned that the competitiveness of the cocoa sector may be threatened. The overall objective of this study is to examine the competitiveness of the cocoa sector by focusing on four aspects of the current set of institutions, including (1) the process of determining producer prices; (2) the outcomes of the introduction of private licensed buying companies; (3) COCOBOD's role in maintain quality, and the costs and benefits of this process; and (4) trends in COCOBOD expenditure on the provision of various goods and services. The methodology adopted for this study is primarily that of an expenditure review.

On the basis of the understanding of processes and outcomes, the study makes inferences on the effectiveness of the current system, including (1) apart from political pressure the current pricing system lacks a mechanism to maintain high producer shares; (2) the introduction of licensed buying probably did little to reduce costs, and the operations of private licenses buying companies are hampered by inefficiencies in the public components of the system; (3) centralized marketing and quality control has given Ghana a reputation for quality cocoa, though the introduction of partial liberalization appears to have negatively affected quality; and (4) large surpluses left with COCOBOD appear to have encouraged over-the-budget spending on services that are not delivered efficiently.

Keywords: liberalization, quality control, tree crops, cocoa, agricultural services

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ABBREVIATIONS AND ACRONYMS

CMB	Cocoa Marketing Board
CMC	Cocoa Marketing Company
COCOBOD	Ghana Cocoa Board
CODAPEC	Cocoa Diseases and Pest Control Program
CRIG	Cocoa Research Institute of Ghana
CRP	Cocoa Rehabilitation Project
CSSVD	cocoa swollen shoot virus disease
CTOR	Cocoa Take-Over Receipt
EU	European Union
FOB	free on board
GHS	Ghanaian New Cedi
GoG	Government of Ghana
IMF	International Monetary Fund
LBA	licensed buying agent
LBC	licensed buying company
MOFEP	Ministry of Finance and Economic Planning
NDC	National Democratic Congress
NLC	National Liberation Council
NPP	New Patriotic Party
PBA	Produce Buying Agency
PBC	produce buying company
PPRC	Producer Price Review Committee
QCC	quality control company
UGFCC	United Ghana Farmers' Cooperative Council

1. INTRODUCTION

Market sharing, price fixing, and unstable domestic prices motivated Ghana's colonial government to establish the Cocoa Marketing Board (CMB) in 1947 (Stryker et al. 1990). Before each season, CMB announced the official producer price, and it gave licensed buying agents (LBAs), now licensed buying companies (LBCs), a fixed allowance per ton[1] to cover procurement and transportation costs, and a profit margin that varied with the price. The surpluses that CMB generated during periods of high world prices were to be used to finance CMB deficits when prices were low. In addition, the surpluses were to "be used for other purposes 'of general benefit to the cocoa producers and the industry,' including research, control of crop diseases, credits, cooperatives, and provision of other amenities and facilities to the producers" (Stryker 2011, 88).

CMB, which was renamed the Ghana Cocoa Board (COCOBOD), grew to become responsible for every facet of Ghana's cocoa industry. It supplied inputs, undertook all market operations including quality regulation, and supported research. In addition, it provided scholarships to children of families in the cocoa sector, constructed roads, and delivered health services. At its peak in the early 1980s, COCOBOD was the largest single employer in Ghana, with well over 100,000 employees. COCOBOD conducted these activities through its divisions and subsidiaries. Its profit-making limited liability subsidiaries included the Cocoa Plantations Company Ltd., Produce Buying Company (PBC), and Cocoa Marketing Company (CMC). The divisions included Cocoa Research Institute of Ghana (CRIG), Cocoa Services Division, and Quality Control Division. In a joint venture with other partners, it also established cocoa processing units such as the West African Mills Company Ltd. and the Cocoa Processing Company Ltd. Also, the Abuakwa Formulation Company supplied agrochemicals required for the sector.

COCOBOD operations became dysfunctional. By the early 1980s, production had fallen from 591,000 tons in 1964 to 159,000 in 1983, and the producer share in free on board (FOB) prices was as low as 21 percent. The reforms in the sector introduced as part of the overall reforms in the economy included divestiture, the reorganization of COCOBOD, and the introduction of competition in internal marketing. COCOBOD divested 92 publicly owned cocoa and coffee plantations and its majority shareholding in processing companies. It eliminated subsidies and left marketing of inputs and haulage to private firms. Some of its functions were hived off to other organizations. Road building, for example, was moved to the Ministry of Roads, and extension services were shifted to Ministry of Food and Agriculture. Nearly a decade later, COCOBOD reintroduced the use of LBCs to procure cocoa from producers at declared prices. By 2003, the staff level had been reduced by nearly 90 percent, bringing it down to about 5,000 from its peak of 100,000.

The cocoa sector in Ghana is one of the few examples of an export commodity sector in an African country that has withstood the pressure to fully liberalize. Instead, the government initiated a stakeholder-led process to determine producer prices and reintroduced the use of LBCs to procure cocoa from the producers, but left external marketing under the control of COCOBOD. The cocoa sector therefore underwent only a partial liberalization. Despite substantial government control over internal and external marketing, the current institutional arrangement is able to pass on a significant share of export prices to farmers, a key objective of the liberalization of commodity markets in Africa.

The Ghanaian cocoa sector is considered a successful case of agricultural development in Africa (Kolavalli and Vigneri 2010). The reforms resulted in increased production that reached one million tons, making Ghana the second largest cocoa producer in the world. COCOBOD has played an important role in maintaining quality, thus earning Ghana a reputation for high quality and commanding a premium price on the global market. Through various public programs, the sector has been able to achieve some growth in productivity, and the institutional structure has been able to pass on a significant share of export prices to producers.

As Ghana gears up to shift its economy from being based on cocoa to being based on oil, the government and donors alike are concerned that the competitiveness of the cocoa sector may be threatened. Export commodities like cocoa are likely to be affected by appreciating exchange rates and increasing prices of production factors such as land and labor. With the onset of oil production,

[1] The paper uses metric tons containing 1000 kg.

export volumes of cocoa could be 5–6 percent lower by 2015 (World Bank 2009). The Ministry of Finance and Economic Planning (MOFEP) and COCOBOD are now open to an external examination of opportunities to make the sector more competitive. In an effort to boost these efforts, the two agencies have asked the World Bank to prepare a policy brief to feed into the revision of its cocoa strategy.

Objective and Organization

The overall objective of this study is to examine opportunities to improve the competitiveness of the cocoa sector. Competitiveness at the producer level can be defined as offering producers incentives to increase productivity; competitiveness at the sector level can be defined as achieving a higher level of quality in its various dimensions than the competitors. At the producer level, competitiveness also involves the provision of sufficient public goods and services to enable producers to respond positively to incentives.

As a part of this overall objective, the study will examine four aspects of the current set of institutions:

- The process of determining producer prices in the partially liberalized marketing system and trends in the producer share of free on board prices.
- The outcomes of the introduction of private licensed buying, including effects on the overall marketing costs, the viability of the current mix of private and public functions, and the incentives to seek efficiency in the partially liberalized market.
- COCOBOD's role in maintaining quality, and the costs and benefits of this process.
- Trends in COCOBOD expenditure on the provision of various goods and services, rationale, and unit costs.

The methodology adopted for this study is primarily that of an expenditure review. It includes an examination of budgetary and expenditure processes and the assembly of data on revenues and expenditures. On the basis of the understanding of processes and outcomes, the study makes inferences on the extent of incentives in the system that seeks efficiency and identifies opportunities to make expenditures more effective.

Two consultants familiar with the operations of COCOBOD gathered information on the processes and assembled data on revenues and expenditures with the assistance of the research department of COCOBOD and Quality Control Company (QCC). The final dataset was developed to be consistent with budgets and expenditures presented in reports by the Producer Price Review Committee (PPRC) and COCOBOD and data published by the International Monetary Fund (IMF). Wherever gaps appeared in information on expenditures, budget-derived figures have been used. COCOBOD had an opportunity to review the information, clarify inconsistencies, and suggest modifications.

In addition to drawing from the extensive literature available on Ghana's cocoa sector, the primary author traveled through the cocoa-growing area to interact with researchers at CRIG, quality control staff at the inland port in Kumasi, district managers of LBCs, purchasing clerks, and producers. We worked with the QCC to better understand the quality control processes. We also interacted with LBCs in groups and individually. We presented the preliminary findings and the data to stakeholders in workshops in November 2011 and March 2012.

The rest of the report is organized as follows: In Section 2, we examine price determination processes and trends in producer share, and taxes in particular. In Section 3, the report examines the outcomes of the introduction of LBCs, trends in marketing costs, and incentives in the system to seek efficiency. Quality control processes and costs are examined in Section 4. In Section 5, we examine the provision of services, the rationale, and the unit costs of provision. Finally, in Section 6, we summarize and offer some recommendations.

2. PRODUCER PRICE DETERMINATION

Taxes and inefficient marketing systems have historically denied producers of export commodities a decent share of the export prices. Virtually every country with a major export crop in postcolonial Africa used marketing boards or *caisses de stabilisation* to directly tax farmers by fixing producer prices below world prices. Excess taxation was responsible for lost opportunities, especially for farmers who cultivated crops with no synthetic substitutes such as cocoa, coffee, and vanilla, where the concurrent production of alternatives does not decrease market demand (McMillan 2001). In general, tax rates on agriculture are historically much higher in Africa than in other regions of the world. Between 1960 and 1984, the total taxation of agriculture was 51.6 percent in Sub-Saharan Africa, compared with just 25.2 percent in Asia and 27.8 percent in Latin America (Schiff and Valdez 1992).

African taxation policies have particularly targeted perennials like cocoa, coffee, and vanilla. These crops are especially prone to government actions that are inconsistent over time because they tend to have a longer time gap between planting and harvest, which locks in the initial capital investment made by farmers (McMillan 2001). Consequently, governments may announce a price that covers sunk and harvest costs. After harvest, however, farmers can be cheated out of their sunk costs, receiving a price that covers only harvesting costs. Data support this theory and show that tax rates vary directly with the ratio of sunk to total costs and expected future earnings (McMillan 2001, Table 4). Cocoa, coffee, and vanilla have historically been taxed more heavily than crops with lower fixed costs like cotton, groundnuts, and tobacco.

Several studies (Besley 1997; McMillan 2001) have demonstrated that in the long term it is disadvantageous for governments to pursue high-tax policies. Once repeatedly cheated, producers will revise their choices, stop planting new trees, and revert to parallel markets where available. Ultimately, a high-tax-regime strategy is self-defeating and will successively require the implementation of both price and non-price policy measures to restore farmers' trust and production investments in perennials. Significant examples can be drawn from the politics of cocoa in both Ghana and Côte d'Ivoire (Woods 2004; Kolavalli and Vigneri 2010). The initial expansion phases in both countries allowed ruling elites to tax cocoa producers heavily, taking advantage of high world prices and of farmer willingness to be buffered from world price swings through the operation of marketing boards. Through the bust cycles that characterized the economics of cocoa production, as well as dips in international prices, farmers were squeezed by higher production costs and declining shares of export prices. In Ghana, production fell by 74 percent over the course of 20 years. It did not increase until the government enacted policies that provided farmers with a higher percentage of world market prices.

The boards that controlled trade prior to liberalization, in addition to serving as convenient instruments to tax producers, also added to marketing costs because of their inefficiencies. Marketing margins—the spread between producer and world prices—were reduced substantially after market reforms, reflecting the lower processing and marketing costs of a competitive private sector (Kherallah et al. 2002). This, in turn, has improved the transmission of world prices to farmers. As in most African countries, Ghana heavily taxed its major exports such as cocoa to finance its public expenditures (Herbst 1993). The revenue extraction had a varying effect on production, depending on global prices, marketing costs, explicit taxes on the sector, and macro conditions such as inflation and overvaluation of exchange rates.

The tax policies of the first post-independence administration exemplified heavy taxation of an export commodity. The Convention People's Party, founded by Ghanaian leader Kwame Nkrumah, benefited from extremely favorable post-war market conditions (Beckam 1976). Following a sharp increase in global prices in the 1950s, farmers were paid two to three times more than what they had received before the war, but between 1947 and 1965 the government also collected almost one-third of the total value of cocoa exports as duties, with a graduated *ad valorem* tax. Following its third political victory in 1957, the government reduced producer prices to 1954 levels. It gave a monopoly over internal marketing to the United Ghana Farmers' Cooperative Council (UGFCC), an organization that favored the administration, and it made a "voluntary contribution" on behalf of cocoa farmers to finance the second development plan. When world prices plummeted in the early

1960s, the government required farmers to save 10 percent of their earnings in national development bonds, redeemable after 10 years, which it replaced with a flat-rate income tax set at the required savings rate.

The turnaround in Ghana's cocoa sector began with the implementation of the Economic Recovery Program in 1983, which included the Cocoa Rehabilitation Project. The policy changes, including higher farmgate prices relative to neighboring countries and the devaluation of the cedi, reduced both direct and indirect taxation of cocoa producers as well as incentives to smuggle cocoa out of the country. Through the Cocoa Rehabilitation Project, the government compensated farmers that replanted trees infected with swollen shoot virus. This led to substantial rehabilitation, with a large number of farms replanting higher-yielding cocoa tree varieties developed by CRIG. Production rebounded to 400,000 tons by 1995/96 and productivity increased from 210 to 404 kilograms per hectare.

Cocoa production grew markedly from 2001, driven by a combination of record-high world prices, increased share of FOB (free on board) price being passed onto farmers, and a set of interventions rolled out by the Ghana Cocoa Board (COCOBOD) to improve farming practices. COCOBOD's initiatives included mass sprayings of insecticide and fungicide and subsidy packages to promote the application of fertilizers (Vigneri and Santos 2008). Some of the growth during this period may also have been due to the influx of cocoa smuggled from Côte d'Ivoire, estimated between 120,000 and 150,000 tons in 2003/04 (Brooks et al. 2007).

Commitment to Increase Producer Prices and Reduce Taxes

Following the reforms, the government articulated its commitment to pass on a significant share of export prices to farmers and to reduce taxes in many programs and strategies. In 1987, as a part of the Agricultural Services Rehabilitation Project, the government committed to increase producer share to 55 percent of prices, which it raised to 70 percent in the Cocoa Sector Development Strategy (Table 2.1). Similarly, it committed to reduce taxes to 15 percent and also to make them as "residual payments" or whatever is left over after producers and marketing agents are adequately compensated rather than a fixed percentage of export revenues.

Table 2.1—Targets established to increase producer share of FOB prices

Program	Targets related to		
	Producer price	COCOBOD expenditures	Taxes
Agricultural Services Rehabilitation Project (1987)	Increase from 30% of long-run world price to 55% by 1988/89	Reduce from 30% of FOB price to 15% net of retrenchment costs	—
Cocoa Rehabilitation Project (1989)	Maintain above 50% of FOB prices	Reduce COCOBOD operating costs	—
Cocoa Sector Development Strategy	Raise from 65% of FOB price in 1999/2000 to 70% by 2004/05	—	Reduce from 25% of FOB price to 15% of FOB price by 2004/05
Ghana Cocoa Sector Development Strategy	—	—	Taxes should be residual payments

Source: GoG (1999; 2010).

These commitments may have been guided by a number of studies that emphasized the role of producer prices in encouraging production. A World Bank (1983) study noted that a steady decline in real producer prices since the mid-1950s was the reason for the fall in production. It recommended an increase in real producer prices of nearly 50 percent to halt the decline in production. Nyanteng (1980) noted that attractive prices can lead to increased supply in both the short and the long run. He estimated that better maintenance of trees in the short run could result in a 20–30 percent increase in output. Ghana's Cocoa Pricing Policy (Bateman et al., 1990) further noted that the prices offered to producers should be based on real costs rather than an artificially set proportion of the FOB price. Emphasizing the need to reduce taxes and marketing expenditures, MASDAR (1998) noted that if

producers were to receive a greater share, COCOBOD or the government, or both, would have to settle for less.

Following the World Bank's recommendation that producer prices are set so that they maintain incentives, the government established the PPRC, an independent body, in 1983/84. Since 1996, PPRC has been chaired by the Ministry of Finance and Economic Planning (MOFEP). The committee also includes representatives of farmers, COCOBOD, licensed buying companies (LBCs), and haulers. PPRC decides on the producer prices and shares of other stakeholders based on the recommendations of a technical committee similar in composition to the PPRC committee, and also has representatives from the Institute of Statistical, Social, and Economic Research of the University of Ghana, and the Bank of Ghana.

PPRC has taken different approaches since it began recommending producer prices and compensation for other agents. Between 1986/87 and 1997/98, it estimated costs of production and marketing functions and set prices and compensation such that they yielded 20 percent returns. The implicit understanding was that any remainder would go to the government as taxes. Following complaints that the costs and yields assumed in the process were arbitrary, the board abandoned this approach. Subsequently, the prices or costs were presumably negotiated by various stakeholders on the basis of what they had received in the past. From 1993/94 onward, the committee paid attention to ensuring a decent share of export prices for producers. From 2001, the committee began setting aside a portion of the projected revenues to various service delivery programs for producers. The balance, or the net FOB price, is apportioned among producers and marketing agents. This process is explained in greater detail in the next section, and Appendix D presents data on the PPRC recommendations from 1996 to 2012.

Price Determination Processes

COCOBOD announces pan-seasonal and pan-territorial prices before the major season, though prices are occasionally increased in the middle of the season. The cocoa cropping year begins in October and is split into a major season that runs from October to April and a light season from June to September. The LBCs are required to pay producers a price that is equal to or greater than the announced prices.

The two key steps in price determination are forecasting of the revenues and deliberations of the PPRC. The technical committee of the PPRC begins its pricing exercise with projections of FOB prices in US dollars, the exchange rate of the cedi to the dollar, and the crop size in the following crop year. The Cocoa Marketing Company (CMC) and the Bank of Ghana forecast prices and exchange rates. By the time CMC offers an estimate, 60 to 70 percent of the projected main crop is likely to have been forward sold. The Bank of Ghana forecasts the exchange rates for the following year in monthly averages.

The Research, Monitoring, and Evaluation Department of the COCOBOD forecasts crop size on the basis of pod counts from 25 trees at 150 different cocoa sites. It categorizes pods into ripe, large, medium, and small pods and assumes survival to maturity rates of 100, 95, 60, and 30 percent, respectively. Using the ratio between pod counts and actual crop size from the previous year, the department estimates the next year's crop size. It also reviews forecasts during both seasons.

The PPRC recommends shares in FOB prices for all of the agents involved in production and marketing, including a combined share for COCOBOD and the government. To receive their share, COCOBOD must submit a budget to MOFEP for approval.

The estimates are usually conservative (Table 2.2). In 4 of the last 15 years, crop size was lower than projected, but COCOBOD obtained higher-than-projected prices in those years. Export prices were lower than projected in four years, but the differences were marginal. The exchange rates tend to be close to or higher than projected, leading to further underestimations in revenue in Ghanaian new cedi (GHS). The COCOBOD uses mechanisms such as bonuses to pass on additional revenues to producers for the supply of higher-quality main crop but not lower-quality light crop.

Table 2.2—Accuracy of projections used by the PPRC (ratio of actual to projected)

Year	Ratio of Actual to Predicted		
	Crop size (tons)	GHS-to-USD exchange rate	FOB price /ton (USD)
1996/97 to 2000/01	1.070	1.156	1.072
2001/02 to 2005/06	1.148	0.998	1.066
2006/07 to 2010/11	1.104	1.022	1.146

Source: Authors' estimations.

The COCOBOD usually announces the producer price just before the opening of the main cropping season in October. The PPRC explicitly considers potential or actual prices in the neighboring countries in recommending a price for Ghanaian producers (COCOBOD 2008, for example). In addition to revising producer prices midseason due to higher-than-projected prices, COCOBOD may revise producer prices to discourage smuggling. In October 2010, the government increased cocoa producer prices for the 2010/11 season to GHS 3,200 per ton, up from GHS 2,400 during the 2009/10 season, to discourage smuggling of cocoa (Kpodo 2010). The smuggling of Ghanaian cocoa, particularly to Côte d'Ivoire, can be significant. Between 1965 and 1975, less than 5 percent of Ghana's cocoa production was estimated to have been smuggled out of Ghana (Stryker et al. 1990). Ghanaian cocoa farmers are well informed of Ivorian prices. One survey found that 20 percent knew the selling price of cocoa in Côte d'Ivoire, and 24 percent knew of farmers who sold their produce on the Ivorian market (Vigneri, Francis, and Maamah 2004). Consequently, the government has devoted resources to police the borders to discourage cocoa smuggling.

Industry Costs and Net FOB price

Since 2001, PPRC has set aside a portion of the projected revenues for the delivery of services to arrive at a net FOB. The net FOB is then allocated to various stakeholders, including producers. Table 2.3 details the 2009/10 derivation of net FOB, and Table 2.4 shows its allocation.

Table 2.3—Derivation of net FOB price in 2009/10

Projected average FOB price (USD/ton)	2,550
Projected exchange rate (GHS to USD)	1.46
Projected crop size (tons)	700,000
Projected revenues (GHS)	2,606,100,000
Allocation of industry costs	
Disease and pest control	162,565,019
Scholarship fund	10,000,000
Jute sacks	19,800,000
Cocoa swollen shoot virus disease program	14,093,830
High-Tech	69,430,000
Child labor certification	2,000,000
Total industry costs	**277,888,849**
Projected revenues net of industry costs (GHS)	2,328,211,150
Net revenue per ton, or "net FOB" price (GHS)	3,326

Source: COCOBOD (2010).

Table 2.4—Allocation of net FOB price

Cost Items	Share of net FOB price (%)	GHS per ton	GHS per bag (64kg)
Producer price	72.16	2,400.05	150.00
Stabilization fund	1.50	49.89	3.12
Buyers' margin	8.42	280.05	17.50
Haulers' cost	3.40	113.08	7.07
Storage and shipping (CMC)	1.16	38.58	2.41
Quality control	1.66	55.21	3.45
Crop finance	1.06	35.26	2.20
Scale inspection and phytosanitary	0.01	0.33	0.02
Government/COCOBOD	9.34	310.65	19.42
Farmers' housing scheme	0.04	1.33	0.08
Replanting/rehabilitation	0.64	21.29	1.33
Farmers' social security	0.61	20.29	1.27
Total	**100**	**3,326.01**	**207.87**

Source: COCOBOD (2010).

In 2010, from the nearly GHS 2.6 billion expected from cocoa revenue, nearly GHS 280 million was set aside to meet the industry costs. The balance is divided by the projected crop size to arrive at net FOB price, from which proportions are allocated to producers, various marketing functions, and services to be delivered to producers. The producer price recommended in the year was more than 70 percent of the net FOB price, though this was only 64 percent of the FOB price. The distinction between net FOB price and FOB price is not lost among politicians. One of the major parties noted in its manifesto that it would give farmers 70 percent share of FOB price, excluding public sprays (NDC 2008).

Trends in Shares

We now examine the shares of all agents in FOB price for the last 15 years using the data presented in Appendix B. Table 2.5 and Figure 2.1 detail the actual share of FOB price received by producers, marketing agents, COCOBOD, and the government of Ghana (GoG). We break the study period into three separate five-year periods: 1996/97–2000/01, 2001/02–2005/06, and 2006/07–2010/11. At the end of the first period, the practice of setting aside funds to provide services to producers began. The second and third periods also observed dramatic increases in cocoa prices.

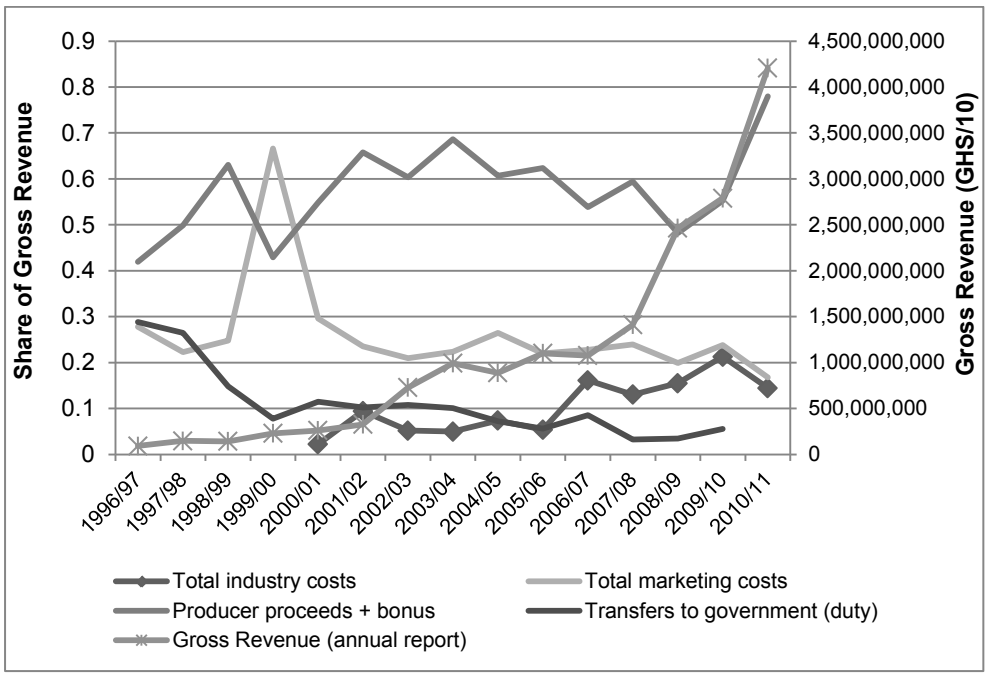
Table 2.5—Share of producers and other costs in FOB price

5-year average	FOB price (USD/ton)	FOB price (GHS/ton)	Producer proceeds	Direct marketing	COCOBOD expenses	Total marketing	Industry costs	GoG duty
1996/97 to 2000/01	1,371.80	444.20	0.51	0.21	0.14	0.34	0.00	0.18
2001/02 to 2005/06	1,500.80	1,276.60	0.64	0.16	0.08	0.23	0.06	0.09
2006/07 to 2010/11	2,520.80	3,108.80	0.54	0.14	0.09	0.23	0.17	0.05

Source: Authors' estimates.

Note: Total marketing is sum of direct marketing and COCOBOD expenses. The shares do not add up to 100 because of unaccounted for balances in most years.

Figure 2.1—Shares to producers and other agents, and cocoa revenues



Source: COCOBOD (2001a, 2002a, 2003a, 2004a, 2005a, 2006a, 2007a, 2008a, 2009a, 2010a).

The producer share has come down in the recent period after peaking at 69 percent of FOB price in 2003/04. However, the share jumped from 55 percent in 2009/10 to 69 percent in 2010/11. As previously mentioned, under the definition of net FOB price, the producer shares would be in excess of 70 percent.

The shares of nonproducers can be put into three broad categories: marketing costs, industry costs, and duty or taxes paid to the government. Marketing costs include expenditures on crop finance, buyers' margins or the commission paid to LBCs, haulage, storage and shipping by CMC, grading and quality control by Quality Control Company (QCC), scale inspection, phytosanitary concerns, stabilization fund, and COCOBOD operations. The share of total marketing costs, which was close to one-third during the first period, has declined to 23 percent.

As noted, PPRC recommends a joint share for GoG and COCOBOD in most years. MOFEP approves the budget of COCOBOD, and the balance goes to government as taxes. Under the COCOBOD law, at the end of the accounting year, COCOBOD is expected to transfer to the consolidated fund profits it makes after deduction allowed it under the law.

It is not clear how the rate of government taxation is determined. What is clear is that the rate is not fixed. When the PPRC gave 20 percent returns to stakeholders, the implicit understanding was that the balance would go to the government as taxes. When PPRC recommends a joint share for government and COCOBOD, government taxes are whatever is left after COCOBOD expenditures are met. On the other hand, it is not always only the balance that goes to the government. The government uses the funds held by COCOBOD as needed and then declares them as taxes at the end of the year. Regardless, the rate of taxation of export revenues has declined from nearly one-third in the beginning of the first period to less than one-twentieth in 2010/11. The volume of taxes, however, has increased with growing sector revenues. Taxation of the sector could even be lower than what this study suggests, as the government often repays any loans it may obtain on behalf of COCOBOD, the extent of which is not known.

The decrease in taxes can be explained by a few things. First, the government has committed to reduce taxes on exports. Second, sector revenues are growing, and despite the decreasing rates, the absolute levels of taxes have not declined. Finally, new tax sources have alleviated the pressure on cocoa. Cocoa duties were the single most important source of government revenue until the introduction of petroleum taxes in 1986 (Amuzu and Gaddah 2007). Petroleum taxes in 2005 were nearly six times the cocoa duty receipts.

Industry costs include all those for which funds are set aside before arriving at net FOB and three activities that are funded by shares of net FOB price: farmers' housing scheme, social security for farmers, and tree replanting and rehabilitation. The decline in the producer share of FOB price in the last decade is matched by an increase in the share of industry costs**,** which now account for nearly one-fifth of the total cocoa revenues.

Reversing what had been achieved through reforms, COCOBOD has expanded its role in recent years. The two major programs, public spraying and the import and subsidization of fertilizers, account for the bulk of these new expenditures. COCOBOD expenditures are presented in detail in Appendix C.

Pressures to Pass on Significant Share to Producers

As noted, the government set for itself targets to increase producer share by reducing both taxes and COCOBOD expenditures. It is important to consider the motives behind this policy agenda. The government may have done this initially in response to pressures from multilateral organizations to liberalize the sector. It is likely that the government sees increased production of a major export crop as a key component of Ghana's economic growth strategy.

Given the commitments, the democratic processes in the country help to keep producer shares high. The processes have raised expectations among producers. In 2003, the National Democratic Congress (NDC), which was in the opposition, urged the government to increase producer prices to at least 60 percent of export prices from the 49 percent that it claimed was the share then (GNA 2003). The two major parties, the New Patriotic Party (NPP) and the NDC, made specific promises about cocoa prices in their manifestos. The NPP, in addition to taking the credit for doubling production, claimed that it had paid bonuses in more years than the previous administration (NPP 2008). The NDC, on the other hand, promised to increase yields to 700 kilograms per hectare and pay cocoa farmers at least 70 percent of FOB price rather than the net FOB price (NDC 2008). Following its defeat in 2008, the NPP urged the NDC government to increase producer prices in 2009 (NPP 2009). The two parties are also challenging each other to reduce smuggling. The NPP has been arguing that border patrol is not an effective policy (NPP 2010).

Expenditure of Budget Surpluses

As mentioned, the projected PPRC sector revenues are often lower than actual revenues. Beginning in 1996/97, actual revenues were lower than the projected revenues in only one year, 2001/02 (Table 2.6). In eight of the past nine years, surpluses have been in excess of GHS 100,000. The process of allocating these surpluses is not clear, but it appears that COCOBOD, the recipient of funds, plays a major role.

Table 2.6—Projected and actual revenues from cocoa (GHS)

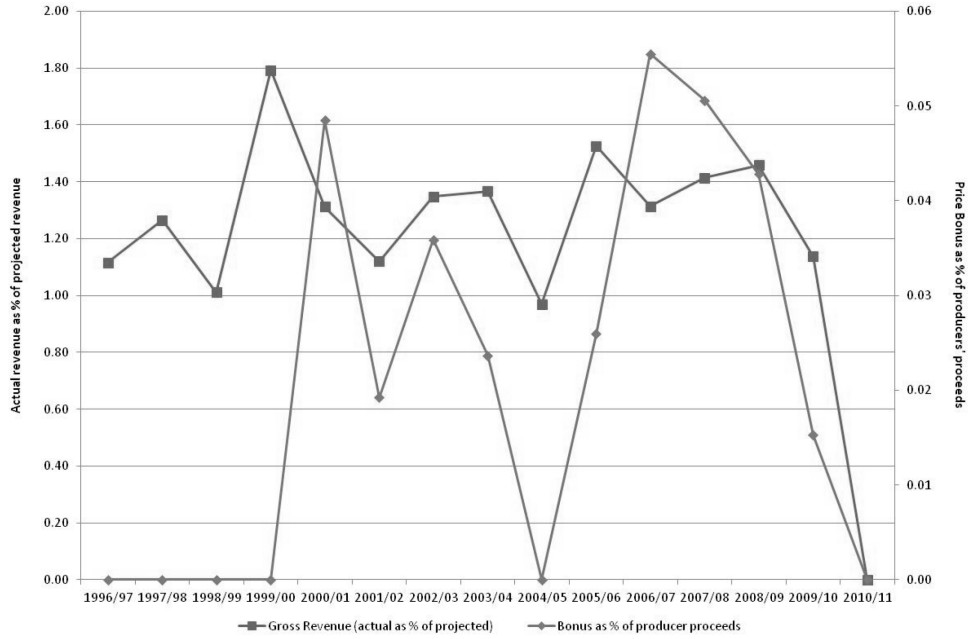
	Revenues				Surplus from	
Year	**Projected**	**Actual**	**Difference**	**Ratio**	**Price**	**Quantity**
1996/97	82,688	90,922	8,235	1.10	14,734	–6,500
1997/98	116,725	155,777	39,052	1.33	19,256	19,796
1998/99	140,333	148,700	8,368	1.06	–10,788	19,155
1999/00	127,754	217,844	90,090	1.71	84,936	5,155
2000/01	198,900	266,935	68,035	1.34	51,586	16,448
2001/02	292,486	285,909	–6,577	0.98	54,258	–60,836
2002/03	540,540	752,513	211,973	1.39	63,884	148,089
2003/04	726,000	998,491	272,491	1.38	–71,597	344,088
2004/05	915,566	794,204	–121,362	0.87	10,325	–131,687
2005/06	720,940	998,500	277,560	1.38	27,908	249,652
2006/07	819,000	929,504	110,504	1.13	90,668	19,836
2007/08	998,660	1,405,656	406,996	1.41	359,704	47,292
2008/09	1,689,350	2,311,314	621,964	1.37	464,356	157,609
2009/10	2,452,800	2,627,355	174,555	1.07	412,743	–238,188
2010/11	3,280,200	4,668,907	1,388,707	1.42	–132,092	1,520,799

Source: Authors' estimates.

The CMB ordinance of 1947 specified that CMB surpluses should be retained as reserves to stabilize producer prices, finance cocoa purchases, and assist farmers in all aspects of production (Stryker et al. 1990). The legislation enacted by the Nkrumah government in March 1965, however, required the CMB to transfer all operating surpluses to the central government, including all reserves held at the time. This legislation effectively ended the stabilization policy for cocoa. Because cocoa prices have risen to unprecedented levels in recent years, the PPRC in 2008/09 decided to set aside some revenues to smooth price fluctuations and avoid reducing producer prices.

With the formation of PPRC, any windfall revenue from better FOB price or exchange rates was to be put in a compensation account at the Bank of Ghana and shared between the government and producers in the proportions of 40 and 60 percent, respectively (Amoah 1998). The other stakeholders were not expected to share in this excess. Payment of bonuses to producers is one way for the board to transfer surpluses to producers, particularly when the surpluses arise from higher-than-anticipated prices. Bonuses have been paid to farmers in 9 of the last 15 years, ranging from 1.5 to 6 percent of the declared producer prices (see Figure 2.2). One of the reasons for establishing the compensation fund or bonuses is to ensure that producer share is at least as high as the ex-ante PPRC recommendation, and in the last 15 years, ex post shares have been close to ex ante recommendations.

Figure 2.2—Producer price bonus relative to cocoa revenue outturn



Source: Quartey (2011, 2012).

When surpluses result from larger-than-predicted crop, the additional revenue comes with incremental marketing costs that need to be incurred on the surplus crop. If the marketing agents are compensated for handling the surplus crop at the rate recommended by PPRC for the projected crop, overcompensation may occur under two conditions. First, the PPRC sets a rate of compensation per ton for organizations such as CMC and QCC to cover their annual costs if the projected crop size is handled. Second, the incremental costs of handling the surplus crops are less than the average costs for the projected crop because these organizations benefit from economies of scale. To the extent that the PPRC recommends compensation rates to fully recover costs if projected crop sizes are achieved and these organizations enjoy economies of scale, the current pricing strategy overcompensates some marketing agents when crop handled exceeds that projected.

We now examine actual revenues against revenues based on PPRC recommendations. As shown in Table 2.7, the ratio of actual to recommended revenues suggests that the producer or the economic agent received more than was budgeted before the season. A ratio of 1.01 or greater for producers suggests that some of the surpluses were transferred to producers through bonuses.

Table 2.7—Actual over predicted/allocated revenues of various agents

	Producers	Direct marketing costs	COCOBOD/ government	Industry costs
1996/97 to 2000/01	1.01	1.65	2.52	0.40
2001/02 to 2005/06	1.09	1.14	1.39	1.78
2006/07 to 2010/11	1.09	1.11	1.80	2.20

Source: Authors' calculations.

The ratios suggest widespread sharing of surpluses, as the denominator is the recommended revenue for the crop size achieved. In some years, the expenditures of COCOBOD alone exceed the share allocated to both government and COCOBOD. Industry costs or expenditures on services are often more than double the amounts recommended by PPRC.

3. PARTIAL LIBERALIZATION

Colonial governments often established marketing boards to facilitate the export of agricultural commodities to Europe and to stabilize prices for producers of export crops. After independence, most governments maintained the marketing boards because they were considered to be a more efficient export mechanism than decentralized private marketing. Marketing boards also allowed the government to maintain control over marketing of strategic commodities and to collect export taxes.

Marketing boards usually possessed the sole authority to purchase commodities from farmers and to engage in external trade. The state-run marketing boards guaranteed a marketing outlet to all farmers with pan-territorial and pan-seasonal prices, distributed inputs for free or at heavily subsidized prices, and in most cases controlled quality of exports (Shepherd and Farolfi 1999). Pan-seasonal and pan-territorial pricing practices eliminated opportunities for arbitrage and discouraged private investment in commodity storage or transport capacity, thus reinforcing the government's control over marketing (Barrett and Mutambatsere 2005a). Although the boards set producer prices below what private marketing may have passed onto producers, they offered implicit subsidies to producers through price stabilization, input, and credit subsidies which they administer through the marketing boards (Lele and Christiansen 1989).

Over time, marketing boards became fiscally unsustainable in developing countries. By the end of the 1970s, budget deficits resulting from the management and mismanagement of parastatals had reached astronomical levels in most countries (Barrett and Mutambatsere 2005a). In addition to budgetary complications, marketing boards also faced organizational challenges. Mounting deficits, poor management, and the perverse incentives created by anticompetitive behavior brought marketing boards and price stabilization systems under attack. This triggered widespread agricultural market reforms in the 1980s and 1990s throughout the developing world, implemented mainly but not exclusively in the context of structural adjustment programs.

The reforms of cash crop marketing boards have followed four different routes to liberalization: (1) rapid disengagement of the state with little planning (cocoa in Nigeria in 1986); (2) progressive disengagement of the state from crop purchasing, exports, and processing (coffee and cotton in Uganda and coffee in Ethiopia); (3) liberalization of crop purchasing with parastatal control of exports (cocoa in Ghana); and (4) relatively little change with cash crop marketing mode, with the continuing operation of a single-channel marketing system (cotton sector in Mali and Togo). The second pattern has been the one followed by most countries with a varying degree of success (Shepherd and Farolfi 1999).

The net result of removing parastatal monopoly power typically turned on the balance between the procompetitive effects of reduced government interference in marketing operations and the anticompetitive effects of reduction of public goods and services that underpin private market transactions—what Lipton (1993) termed respectively "market relaxation" and "state compression." Since the two phenomena were typically inextricable in agricultural liberalization initiatives, experiences varied markedly.

Producer prices have generally increased after market reforms, often stimulating production of export crops. For example, prices received by cocoa producers in Nigeria and Cameroon increased to well over 70 percent of the free on board (FOB) prices, up from 20 and 40 percent, respectively. Ugandan coffee producer prices increased from 40 percent prior to reforms to more than 70 percent after the reforms. Cotton producers in Tanzania received, on average, 41 percent of the export value of their crop in the six seasons prior to reform, and 51 percent for the six seasons following reform. Cotton producer price shares in Zimbabwe also rose (from 42 to 53 percent) following industry reforms. Producer shares of export prices were higher in countries where commodity market reforms were complete compared with countries where reforms have been slow or have not taken place (Kherallah et al. 2002).

Marketing board reforms also ended pan-territorial pricing for commodities in several countries. In some cases this resulted in farmers in remote areas with poor infrastructure receiving a much lower price than farmers in more accessible areas. For example, coffee farmers in remote areas in Madagascar received around 40–50 percent of the FOB price, while farmers in more accessible areas received between 60 and 70 percent of the FOB price (Akiyama et al. 2001). Following reforms

in Tanzania, cotton farmers in the eastern part of the country found themselves with no buyers, prompting the country's cotton board to intervene as the buyer of last resort.

The effects of private-sector activities and institutional changes after market reforms have been mixed. In most cases, effective private markets for commodity sales emerged quickly when monopolies were lifted. In other instances, specific experience in marketing was limited and the private sector was ill-equipped to handle voids left by the public sector. For example, after the reforms in coffee subsectors of Uganda, nearly 200 entrepreneurs entered the new export sector. Within two years, three-quarters of these entrepreneurs were gone and 80 percent of exports were handled by 10 firms.

Input supply has been the major casualty of liberalization. The elimination of input subsidies and the removal of monopsony power in crop marketing have often led to reduced access to input financing and increased input. This has frequently resulted in substantial decreases in fertilizer application rates by farmers. Many countries have also struggled with quality control following market liberalization (Kherallah et al. 2000).

Partial Liberalization in Ghana

Prior to reforms in the sector, the (PBC), then a subsidiary of the Ghana Cocoa Board (COCOBOD), was the sole buyer of cocoa. In 1992/93, the Government of Ghana (GoG) introduced regulations under which the COCOBOD grants licenses to companies to buy cocoa beans from producers at no less than announced prices and deliver them to the Cocoa Marketing Company Ltd. (CMC), while adhering to quality standards that are stipulated by the Quality Control Company (QCC).

Private firms procured cocoa from producers before Ghana's independence. The first postindependence administration granted to the United Ghana Farmers' Cooperative Council (UGFCC), a cooperative that was sympathetic to the government, the exclusive rights to purchase cocoa from producers. In 1966, the following administration granted buying licenses to Ghanaian individuals, firms, and cooperatives that could finance and handle not less than 5,000 tons of main crop cocoa (excluding the expatriate licensed buying agents, or LBAs, who operated before the UGFCC monopsony).

Beginning with only two agents in the first year (1966/67), the number of LBAs grew to 14 by 1971/72, largely because the marketing board liberally extended credit for their operations. Some of the LBAs abused the facility by using the funds for other purposes, and others did not deliver the cocoa they claimed they had bought or redeem the promissory notes they had given to farmers. The board restricted the credit facilities to some LBAs and withdrew the licenses of many.

As the debt of LBAs mounted, the Marketing Board abolished the multiple buyer system in 1977. In its place, a purchasing department, Produce Buying Agency (PBA), was established within the Cocoa Board to function as a sole buyer. The PBA was incorporated as a limited liability company in 1981, and the company's name was changed in 1983 to Produce Buying Company Ltd. With the reintroduction of licensed buying, private companies were brought into cocoa buying for the third time.

In the 1990s commodity export markets were under a lot of pressure, notably from the International Monetary Fund (IMF) and the World Bank, to fully liberalize. Based on market research that suggested Ghana's quality control and centralized export marketing system was advantageous, the government decided to retain control over exports instead of fully liberalizing the cocoa market. The government did reintroduce regulations under which licensed buying companies (LBCs) could export, but no firm has been permitted to do so.

Outcomes

Immediately after the reintroduction of private buying in 1992, only four firms entered cocoa marketing. Currently, 27 LBCs buy cocoa from producers; however, the number has varied and not all LBCs have been active. Although a large number of them buy cocoa now, only a small number account for the bulk of the cocoa procured. Between 2001/02 and 2009/10, 11 of the 27 LBCs accounted for 96.4 percent of the cocoa delivered to CMC. The top three LBCs (PBC, Akuafo Adamfo Marketing Co. Ltd., and Olam Ghana Ltd.) delivered more than half of the cocoa beans over

the same nine-year period. Eighteen years into licensed buying and competition, PBC is still the dominant buyer, holding nearly 35 percent of the market share of a growing market.

The LBCs were expected to compete with each other and solicit more business by offering producers higher-than-announced prices, but they do not. They claim that margins are so low that it does not make sense for them to compete on prices. Only one firm offered producers one cedi per bag more than the announced price, but it discontinued the practice after one season.

Although LBCs may not compete on prices, they do offer token gifts such as exercise books, cakes of soap, and salt, and they extend credit to producers (Laven 2007). In fact, their use of nonprice incentives to attract sellers has resulted in dramatic expansion in the supply and use of COCOBOD-subsidized fertilizers. COCOBOD initiated High-Tech, a program to supply fertilizers and other subsidized inputs to farmers on credit, but it was scaled down after a couple of years because of poor recoveries. Now the LBCs are supplying fertilizers to farmers on full or partial credit through their community-based purchasing agents, who appear to be able to recover credit effectively. A substantial portion of the fertilizers subsidized under the High-Tech program is now supplied through the LBCs.

Producers continue to have access to buyers. As expected, licensed buyers prefer to conduct their operations in areas with significant production. Zeitlin (2006) finds a positive correlation between the concentration of LBCs at the village level and production. Following liberalization, PBC has continued to buy in all cocoa regions and districts, despite scarcely breaking even in some production areas where they have long-standing relationships with farmers.

Internal Marketing Costs

One of the benefits that can be expected from privatization is a reduction in marketing costs—in this case, the cost of procurement from producers. The LBCs, however, do not compete with each other to deliver cocoa at lower prices to COCOBOD. The margin that they earn is determined administratively by the PPRC. They could be expected, however, to increase their volumes by sharing a part of their margin with producers by being more efficient than others. As noted above, LBCs have not been competing with each other by offering higher prices to producers, citing small margins.

The introduction of private buyers does not appear to have reduced marketing costs at the sectoral level. An examination of buyers' margin incurred before and after partial liberalization suggests that procurement costs may not have been reduced, although it is not clear whether the PBC prior to liberalization and LBCs after perform identical functions. The share of buyers' margin in total revenues is lower after 1993; it was more than 9 percent in the three years before, compared with 6 to 7 percent in recent years. It stayed around one-tenth until 2001 and has been around 6 to 7 percent since then. The costs per ton in nominal and constant cedis, however, have been increasing in recent years (Table 3.1).

Table 3.1—Costs of procuring cocoa

Year	Buyers' margin (in thousand GHS)	Share of total revenue	Purchases (in thousand tons)	Cost (GHS/ton)	Constant cost/ton (1989 GHS)
1989/90 to 1991/92	1,294,500	0.10	276.33	4.75	3.56
1993/94 to 2000/01	11,051,325	0.09	358.85	29.09	3.90
2001/02 to 2005/06	59,364,680	0.07	578.52	99.88	4.07
2006/07 to 2010/11	139,363,450	0.06	652.21	211.67	4.12

Source: IMF Ghana Statistical Annex 1998;IMF Statistical Appendix (2000, 2005 2011).

Note: No 1992/93 figure available on buyers' margin from the IMF reports; averages for 1991/92 to 1995/96 do not include this year.

Viability of LBCs

Are the LBCs that are now playing a limited role under partial liberalization viable entities that will innovate and reduce costs and perhaps compete to offer higher prices to producers? It is widely believed that some of the LBCs, particularly international business firms, entered the business anticipating further liberalization, which will enable them to expand their operations to exports as well. On the other hand, some local firms may have entered the market because they are expected to procure only 2,000 tons to remain in business for which working capital is supplied by COCOBOD.

Essentially, the LBCs function with similar organizational design. Each company has head, regional or sector, and district offices, with managers at each level. Within each district, they have one or more societies manned by purchasing clerks, almost always cocoa growers who are recruited to buy in their own communities. The manner in which they are recruited may vary, but in most cases community leaders may be involved to some extent. The selected candidates are required to offer an immovable property as collateral or a guarantor. They enter into agreements with the district directors rather than the companies, which makes the district directors responsible for the purchase clerks. The business model is to advance funds to district directors and purchase clerks to buy cocoa in exchange for a commission per bag of cocoa purchased. Both LBCs and producers prefer to transact in cash, so the producers are no longer paid by checks as before. This business model of LBCs requires considerable managerial control to ensure that the cash advances are used to purchase cocoa. Key informants in the industry suggest that lack of adequate managerial control is the primary reason for the failure of many LBCs.

Financing of LBCs

Because their core function is buying and delivering, the LBCs require considerable working capital. COCOBOD supplies seed funding to LBCs, although the misuse of credit extended to LBCs brought an end to their role in the late seventies. Many of the local LBCs now appear to be in a position to raise funds domestically at competitive rates as banks have realized that cocoa purchasing is a viable operation.

COCOBOD raises the required funds in the international market. It initially issued cocoa bills locally, but the high costs of retiring cocoa bills prompted COCOBOD and GoG to explore the possibility of raising cheaper funds, possibly through syndicated loans. The Ministry of Finance and Economic Planning (MOFEP) permits COCOBOD to borrow offshore and supplement with locally issued cocoa bills, if necessary.

COCOBOD allocates seed funds to LBCs based on how much cocoa they delivered in the previous year, with the assumption that the LBCs will be able to cycle the seed funds through the buying process 2.2 times in the 33-week main crop season. It determines the amount by multiplying expected bean delivery by the declared producer price and dividing by 2.2. COCOBOD does not expect the LBCs to be able to recycle the funds during the 10-week midseason. COCOBOD may entertain requests from LBCs for additional funds if they can demonstrate in the middle of the season that they have exhausted their funds.

In most cases the LBCs are not able to turn over the funds more than twice, as assumed by the COCOBOD. They report having to borrow from other sources at much higher costs. Four LBCs—PBC, Adwumapa Buyers, Cocoa Merchants, and Diaby Company—report turnover rates as low as 1.2 to 1.57. Depending on the company, the interest on additional borrowing from non-COCOBOD sources could be as much as the interest paid to COCOBOD (Table 3.2). The costs of finance incurred by LBCs may therefore account for as much as one-third to three-quarters of the margins earned.

Table 3.2—Average cost of financing cocoa purchases by selected LBCs (2001/02 to 2009/10 main cropping seasons)

LBC	Tonnage delivered (tons)	Seed fund (million GHS)	Interest charged (million GHS)	Interest, other (million GHS)	Total interest (GHS)	Aggregate margin earned (GHS)	Interest/ margin
Produce Buying Co.	189,220.22	108.28	5.55	3.57	8,728,589.63	26,222,013.80	0.35
Adwumapa Buyers Ltd.	50,694.04	29.66	1.50	0.76	2,101,209.95	6,779,744.57	0.30
Cocoa Merchants Ltd.	18,734.67	10.56	0.63	1.13	1,771,716.33	2,662,190.50	0.71
Diaby Ltd.	15,248.29	14.52	0.88	0.71	1,122,834.04	2,425,301.23	0.42

Source: Adwumapa Buyer Limited 2011; Cocoa Merchants Limited 2011; Diaby Company Limited 2011; Produce Buying Company 2011.

Note: The inability of LBCs to turn over funds 2.2 times arises from various inefficiencies across the buying chain. The LBCs have identified various delays in COCOBOD operations including grading and sealing, offloading, and payments of Cocoa Take-Over Receipts (CTORs). The payments on CTORs are so delayed now that the COCOBOD advances funds against them. There are two possible reasons for the delay. The first is inadequate infrastructure and poorly designed operations. For example, CMC operations have not been adequately computerized to streamline payments, and congestion at the ports is common. The other reason is that rent-seeking opportunities available for those who grade, accept, and pay for cocoa, given the congestion, might discourage them from streamlining the processes given the infrastructure.

Incentives in the Pricing System

The pricing strategy lacks market mechanisms to make marketing organizations such as the CMC, COCOBOD, and QCC seek efficiency. The spirit of pricing is one of sharing FOB price, which leads to expectations of partaking in any increases in prices or windfalls. The LBCs too have demanded that their margins be increased as the COCOBOD has large surpluses in recent years; many, however, feel that they are the ones who are squeezed the most in the current pricing process.

In a competitive environment, all marketing agents compete with each other and reduce costs to pass on as large a share as possible of export prices to producers. The current system passes on a large share of producer prices mainly because of political pressures to keep prices increasing in nominal terms. Fortunately for the Ghana cocoa sector, export prices have decreased only once in the last 15 years, so increasing producer shares has been manageable. In 2004, for example, the PPRC recommended that producer prices be increased even when the FOB prices were expected to fall—this was the year when the producer share reached the highest level, 69 percent.

The trends in the costs of various marketing functions suggest that marketing functions are maintaining or increasing their share in growing revenues. The share of marketing costs in total revenues, however, has come down. Within the marketing costs, the share of haulage appears to be growing (Table 3.3).

Table 3.3—Trends in marketing costs (share of other agents in total marketing costs)

5-year average	Haulage	Storage and shipping	Quality Control	COCOBOD	Buying	Marketing costs in revenues
1996/97 to 2000/01	0.09	0.05	0.02	0.38	0.53	0.34
2001/02 to 2005/06	0.13	0.04	0.04	0.32	0.53	0.23
2006/07 to 2010/11	0.14	0.05	0.08	0.31	0.58	0.23

Source: Authors' estimates.

The costs per ton in constant GHS offer a better perspective (Table 3.4). Costs have clearly increased, particularly in the case of haulage. In the last three years in particular, per-ton costs have grown dramatically. CMC costs also vary significantly from year to year and are much higher than they were in the beginning of the study period, except for 1996/97. CMC is an organization whose operations should offer considerable economies of scale. Per-ton costs of both quality control and COCOBOD have risen dramatically.

Table 3.4—Constant (2005) GHS (per ton marketed)

5-year average	Haulage	Storage and shipping	Grading and quality control	COCOBOD
1996/97 to 2000/01	8.77	4.76	2.48	51.13
2001/02 to 2005/06	10.73	3.65	3.74	27.63
2006/07 to 2010/11	12.56	4.98	7.09	30.86

Source: Authors' estimates.

COCOBOD expenditures include the costs of services it delivers through Cocoa Swollen Shoot Virus Disease (CSSVD) Program, Seed Production Unit, Cocoa Services Division, Cocoa Research Institute of Ghana (CRIG), Bonsu Cocoa College, and Cocoa Clinic. The share of head office alone has declined from nearly four-fifths to one-half (Table 3.5). Per-ton costs in 2005 cedis have not declined, despite nearly three-fold increase in sector revenues over the last 15 years.

Table 3.5—COCOBOD's head office expenses

Year	Head office Expenses in COCOBOD total (%)	Head office expenses per ton (GHS)	Head office expenses per ton (2005 GHS)
1996/97 to 2000/01	0.80	71.69	44.14
2001/02 to 2005/06	0.61	62.61	16.93
2006/07 to 2110/11	0.47	133.88	17.12

Source: Authors' estimates.

4. QUALITY CONTROL

Quality control was one of the key functions performed by commodity boards that was either abandoned or severely curtailed in market reforms of the 1980s and 1990s. The speed and extent of the withdrawal of boards from maintaining quality control varied across countries and crops and has had mixed results. In some cases, quality deteriorated drastically, as in the case of the Nigerian cocoa. In other cases, such as coffee in Uganda, the decline may have been only marginal. And in other cases, the private sector appears to have been able to deliver the quality demanded and rewarded in the markets (Kherallah et al. 2002).

While it is clear that the quality of some crops deteriorated following market reforms, whether or not market liberalization is responsible for these changes is debatable. Varangis and Shreiber (2001) suggest that it is too simplistic to attribute quality changes to market liberalization alone. They contend, for example, that the introduction of bulk transport of cocoa in which beans of different quality from different producers are mixed together indiscriminately has made buyers less willing to pay a premium for quality.

Others argue that quality is invariably affected by market reforms because of the institutional void left by the removal of quality control institutions. Ponte (2002) suggests that changes in quality affect the reputation of a national crop in a global commodity market. West African cocoa-producing countries have developed a regional reputation for quality beans built on careful traditional harvesting, fermentation, drying, and sorting procedures by producers. As what is important for farmers is not just the share of the price, but also the price itself, Ponte argues that any premium for quality would be highly beneficial. These features, he argues, are more difficult to maintain in deregulated markets where voluntary coordination is hampered by the large number of actors and the absence of institutions that can closely monitor production practices. If the private agent role has not set up a system of buying in grades, producers will have no direct incentives to maintain crop quality.

Masters and Abbott (2000) make a similar point—the quality of cocoa beans depends primarily on farmers' production practices, including the method of harvesting beans from pods and the fermentation and drying processes. The highest-value beans come from countries where smallholder producers deliver to a marketing system that imposes strict standards at the point of first handling and keeps higher-quality beans carefully segregated. On the other hand, countries with laissez-faire marketing systems typically deliver lower-quality beans because of the difficulties in checking for uniform quality in large lots of beans. Laissez-faire policies allow marketing agents to mix beans of high and low quality, a practice that allows bad beans to drive out the premium potential of the good ones (Gilbert 1997).

Some scholars suggest that maintaining high quality standards may not be all that important. For example, Tollens and Gilbert (2003) argue that quality outcomes are also determined by the demand for quality, that is, the level of quality for which exporters are willing to pay. Recent advancements in processor technology have substantially changed the quality requirements for internationally traded cocoa beans. Grinders that produce liquor, butter, and powder now depend much less on traditional origin parameters; bean quality is more strongly linked to how well the intermediate product adapts to specific technical requirements in the manufacturing process of final goods (Fold 2002). Thus, a decrease in quality following reforms may simply reflect that the public marketing boards were insisting on too high of a quality level (Gilbert and Tollens 2003).

LMC International (2000) suggests that liberalization of the cocoa sector in the 1990s has been a major cause of a decline in cocoa quality. They argue that this had led to practical difficulties in fulfilling contracts, struggling to meet contract specifications, and increased arbitration. In Côte d'Ivoire, the liberalization of the cocoa sector led to an intrinsic decline in the quality of beans due to lack of quality control procedures throughout the production and marketing chain. The main problem is that of excessive mixing of beans of different quality and a high percentage of free fatty acids in beans resulting from insufficient drying. Though the system in Côte d'Ivoire is successful in moving large volumes of cocoa quickly, the intense competition has affected bean quality in the absence of rigid quality checks up-country. Similarly, following liberalization in Nigeria, cocoa was purchased at high prices with little regard to quality, and much was exported before it was fully fermented and dried.

Fold (2002) questions whether the complexity of a state-regulated quality control system—such as that prevailing in Ghana—actually meets an international market demand that justifies its existence when processors' advanced grinding technology is able to compensate for mixed-quality lots of cocoa beans. He notes that the structure of demand from the few dominant transnational grinding companies is now based on nonspecific parameters of bean quality (with the exception of the fat content). Grinders that produce liquor, butter, and powder depend much less on traditional origin parameters of bean quality, which is now linked to how well the intermediate product adapts to specific technical requirements in the manufacturing process of final goods.

Cocoa Quality Criteria

The Federation of Cocoa Commerce, which governs the quality of cocoa traded globally, grades cocoa as I, II, or substandard. All cocoa traded must be thoroughly dry and free from foreign matter. The three grades are based on percentage of moldy, slaty, and otherwise defective beans (Table 4.1).

Table 4.1—Criteria for grading cocoa

	Containing no more than (percent count)		
	Moldy beans	Slaty beans	Other defects
Grade I	3	3	3
Grade II	4	8	6
Substandard	>4	>8	>6

Source: Cocoa Marketing Board 1947.

The other dimension of observed cocoa quality is the category based on bean size and weight. The beans are primarily categorized into main and light crop (Table 4.2).

Table 4.2—Changes in bean size categorization

Category	Number of beans in 100 gm		
	1994/95 to 1999/2000	1999/2000 to 2008/09	2008/09 to date
Super main crop	—	—	Up to 90
Main crop	Up to 100	Up to 100	91–100
Super light crop	—	—	101–110
Light crop	101–110	101–120	111–120
Small beans	111–120	121–130	121–130
Type 4		131–150	131–150
Remnant	121–150	150–180	151–180
Substandard	—	Above 180	Above 180

Source: COCOBOD 2010d.

Resulting from consumer demand of food safety, pesticide residue levels are also emerging as an aspect of quality. The Japanese established legislation on residue levels in food imports including cocoa beans in May 2006, and the European Union (EU) introduced maximum residue levels in September 2008. The EU requires only that the nibs be tested for residue level; the Japanese, however, who import nearly 50,000 tons annually from Ghana, require that whole beans be tested, including the shell. Ghana's exports are able to meet the EU requirements but not the more stringent Japanese requirement.

The major factors that contribute to cocoa quality are high-yielding and disease-tolerant planting material, disease and pest control (both pre- and postharvest), timely harvest of ripe pods, fermentation for a period of six days, adequate sun drying to reduce moisture content to 7.5 percent, removal of bad beans during the drying process, and appropriate storage of cocoa beans. The dimensions of cocoa bean quality, particularly flavor and color, depend largely on the planting material used (Clapperton 1993).

How Is Quality Maintained in Ghana?

Quality Control Company (QCC), which in its earlier form was a subsidiary of the Ghana Cocoa Board (COCOBOD), maintains the quality of cocoa exported from Ghana. Its mandate is to initiate, introduce, and maintain quality standards in COCOBOD operations and to ensure compliance with international standards. The QCC inspects and certifies storage and other facilities of licensed buying companies (LBCs); inspects, grades, seals, and certifies bagged cocoa; disinfests stored cocoa, storage sheds and containers in which cocoa is shipped; undertakes research to support the above operations; and educates farmers and agents of LBCs on the proper preparation and storage of cocoa.

The QCC seeks to improve the quality of exports through both education and regulation. QCC trains farmers to ferment cocoa for six days in heaps of appropriate size, to turn the heaps frequently, and to dry cocoa to bring the moisture content down to 7.5 percent using appropriate drying mats while polishing beans and taking out placenta and flat and small beans. It also teaches farmers to store cocoa in bags stacked on gratings and pallets in rainproof sheds. QCC also advises producers on good agricultural practices, including the proper use and application of approved pesticides.

Each season, QCC begins the quality control process with an inspection of storage sheds of the LBCs. In particular, they look for signs of insect infestation, roof leakages, and general hygiene. It issues a Certificate of Registration for the sheds that meet the hygienic requirements, which are then designated as Scheduled Grading Centers. The QCC will not grade and seal cocoa in a shed that is not certified.

The QCC uses a moisture meter to check the moisture content, bean counts to determine the category, and cut tests to determine the grade. All quality control tests are carried out at all the up-country depots and the three takeover centers at the ports. QCC has staff in all 73 districts of the six cocoa-growing regions of Ghana, an area office at Hohoe in the Volta region, the two ports in Tema and Takoradi, and an inland port in Kumasi. These regions are manned by managers who have responsibilities over district quality-control officers responsible for the districts.

To sample for the cut and count tests, inspectors draw cocoa beans from all sides of the bags using a stab sampler known as a sampling horn. They then bulk and mix the samples drawn from 30 bags stacked as a lot in the depots. They draw separate samples for the two tests from this box sample. First, they take 100 grams of the beans for the count test. For the cut test, they then heap the beans in the box sample and divide them into four quarters. They reject two opposing quarters and subject the rest to a similar process until about 300 beans are left. These are then put into three sampling bags in approximately equal quantities. Beans are sequentially squeezed out of the three bags to cut 100 beans if one bag is being graded or 300 beans for two or more bags.

In the cut test, the inspector cuts 100 beans lengthwise through the middle and counts the number of defectives. The defects include moldy, weevil-damaged, germinated, slaty, flat, or decayed beans. When a bean is defective in more than one respect, only one defect is counted, whichever occurs first in the defects mentioned above.

Graded bags of cocoa are sealed at the depots and the bags are issued a Certificate of Inspection of Produce. The officer also issues an Evacuation Certificate, which indicates the grade, category, and drop mark for easy traceability. This certificate accompanies the produce to the take-over centers. If the graded bags are not evacuated from the depot within a reasonable time, the QCC officer may again subject 30 percent of the stock to quality tests and reissue evacuation certificates. At the take-over centers, cocoa arrivals are once again sampled by QCC port staff using the same procedure but pooling samples from 600 bags or a truckload. A Purity Certificate is issued for every parcel of cocoa of acceptable standards. A final sampling is conducted for all consignments prior to shipment using the same procedure but pooling samples from 200 to 250 bags, depending on whether cocoa is shipped in bags or poured into containers. By following this procedure, every bag is likely to be sampled at least three times before it is shipped out of the country (see Appendix A). The pooling of samples from bags, however, is done over larger quantities as the cocoa moves from depots to ports.

Ghana Cocoa Quality

Ghanaian cocoa attracts a premium on the world commodity markets because of its flavor, higher fat content, and lower content of defective beans and foreign matter. It is the preferred choice of some reputable chocolate and beverage manufacturers. The premium that Ghanaian cocoa gets because of its quality is estimated to be between 4 and 6 percent (Gilbert and Tollens 2003). The authors use the relative unit values of cocoa beans imported into Europe from the four West African cocoa-producing countries and the premiums or discounts for beans from these origins traded on the Euronext-LIFFE cocoa market for period averages between 1988 and 2008. The analysis shows that Ghanaian cocoa draws a premium of 3 to 5 percent relative to Côte d'Ivoire, currently the world's largest producer of cocoa, and has clearly been earning a price premium over Cameroon and Nigeria, the other key producers in West Africa (Table 4.3).

Table 4.3—Cocoa unit values and terminal market differentials

	Cameroon		Ghana		Nigeria	
	Unit value (%)	Differential (%)	Unit value (%)	Differential (%)	Unit value (%)	Differential (%)
1988–1991	2.7	—	3.7	—	–0.4	—
1992–2002	–3.0	0.2	1.1	4.8	–2.1	–0.5
2003–2008	–7.8	—	5.2	4.9	–0.7	–0.9
1988–2008	–3.3	—	2.8	4.9	–1.4	–0.7

Source: Adapted from Gilbert 2009. Figures reported are relative to those of Côte d'Ivoire, the reference country.
Note: — = not available.

Ghanaian quality is, however, made up of more than physical attributes. The premium may also be attributable to packaging in properly labeled sacks, clear identity, and consistency in delivery. These are some of the aspects of quality that can be attributed to the centralized marketing system. Some aspects are achieved by small-scale processing of cocoa in Ghana. For example, Ghanaian beans also have a luster because unwanted attachments are removed by hand motions while the beans are dried on mats. Hand movements that turn them as they dry also make flatter beans fall through, resulting in greater uniformity of beans.

Quality after Partial Liberalization

Prior to the liberalization, cocoa beans presented for inspection, grading, and sealing at the depots were occasionally rejected because of unacceptable levels of slaty, germinated, weevil-damaged, and moldy beans. Today, rejections for these reasons have reduced because of improved storage infrastructure at the farmgates and more rapid primary and secondary evacuation of cocoa to the take-over centers. In their place, however, have emerged new quality challenges that include admixture (a mixture of large and small beans), not thoroughly dry cocoa, black beans, and recently purple beans.

Prior to the liberalization of internal marketing, the PBC inspected the beans prior to sale for quality and bulked beans so as to achieve homogeneity in size. The LBCs, which are now competing with each other, are allegedly accepting beans that are not thoroughly dried or properly sorted into bean size categories. However, cocoa waste from grading at the farm levels sold as a proportion of the total crop does not appear to have changed significantly.

The proportions of cocoa rejected at the depots are not known, but at the inland ports, only a small portion of the cocoa delivered is still rejected: 2.27 percent and 1.77 percent of total procurement for 2008/09 and 2009/10 crop seasons, respectively (Table 4.4). The rejected lots are reconditioned and put through quality checks again at LBC's expense.

Table 4.4—Cocoa beans rejected (metric tons) at three take-over centers during 2008/09 and 2009/10

Year	Activity	Port			Total
		Takoradi	Tema	Kaase	
2009/10	Received (tons)	285,833.75	282,068.81	62,281.81	630,184.38
	Rejected (tons)	4,338.56	1,638.69	5,171.44	11,148.69
	% rejections	1.52	0.58	8.3	1.77
2008/09	Received (tons)	308,921.94	298,853.00	100,370.44	708,145.38
	Rejected (tons)	8,245.38	1,644.88	6,206.44	16,096.69
	% rejections	2.67	0.55	6.18	2.27

Source: COCOBOD 2010d.

More than 98 percent of Ghana's cocoa exports are usually of grade I (Acquaah 1999). In 2003/04, however, Morinaga and Co. Ltd. (2004) of Japan reported unusually high levels of purple beans in cocoa from Ghana. A subsequent survey conducted by COCOBOD in selected cocoa districts showed that on average 32.3 percent of beans were purple (Adzaho et al. 2010). COCOBOD attributes this largely to underfermentation of cocoa beans by the farmers in the presence of numerous buyers willing to buy cocoa without much regard to quality. COCOBOD subsequently revised its grading system to track the presence of purple beans as well (Table 4.5).

Table 4.5—Grade standards for purple bean

% purple	Grade level
1–20	Grade I
20.3–30	Grade II
30.3–45	Grade II*
Above 45	Substandard

Source: COCOBOD 2006e.

Note: The sample size for estimating purpleness is 300 beans and therefore the range for grade levels cannot be continuous.

By these new standards, the bulk of the country's production and exports fall into grade II (Table 4.6). Content of purple beans, however, is not a quality parameter applied in grade determination under the Federation of Cocoa Commerce rules and regulations.

Table 4.6—Grade of cocoa received including purple beans in 2008/09 and 2009/10

Year	Season	Grade			Total
		I	II	Substandard	
2009/10	Main	2768.50	582,757.19	80.19	585,605.88
	Light	—	44,563.13	15.38	44,578.51
	Total	2768.50	627,320.32	95.56	630,184.39
	% share	0.44	99.55	0.02	100
2010/11	Main	3618.38	630,539.38	192.44	634,350.19
	Light	712.88	72,961.69	120.63	73,795.19
	Total	4331.25	703,501.07	313.06	708,145.38
	% share	0.61	99.34	0.04	100

Source: COCOBOD 2011b.

In addition to the increase in number of purple beans, admixture has emerged as a problem. The absence of bean uniformity is believed to be a problem associated with new plantings, as beans may not grow to full size on them. COCOBOD has now specified tolerance levels to reduce admixture. COCOBOD also regularly revises categorization to meet the Federation of Cocoa Commerce requirements. It initially had only four categories: main crop, light crop, small beans, and remnants (Table 4). It has created more categories to increase uniformity. It also makes use of mechanical graders and sorters to export beans of uniform size.

Not much has changed in tracing cocoa to the grading and certification center since the introduction of licensed buying.

Benefits of Quality Control

Does it pay to have such a rigorous quality control system? The costs of quality control are usually less than 2 percent of the revenues. So long as Ghanaian cocoa earns premiums greater than 2 percent, the resources that go into quality control appear to pay for themselves. A more important concern is whether the market will continue to offer a premium for quality. There is evidence that some key actors in the chocolate industry remain heavily dependent on Ghanaian cocoa (the obvious example being Cadbury, which continues to rely on Ghanaian beans as vital for the specific taste of its chocolate).

While the Ghanaian publicly enforced quality control system appears to be beneficial, opportunities do exist to reduce costs. As noted, LBCs complain of inordinate delays caused by quality inspections. Also, the current sampling procedures are so elaborate that it is difficult to imagine that they are followed adequately. The quality control process, however, offer benefits beyond price premiums. Ghana's national reputation for consistently high-quality cocoa has also been the single most important factor enabling the country to forward-sell up to 70 percent of its crop.

5. PROVISION OF SERVICES

The cocoa ordinance of 1954 gave the Ghana Cocoa Board (COCOBOD) the mandate to use budget surpluses for purposes of general benefit to the cocoa producers and the industry, which led to its involvement in every aspect of the cocoa industry. Having shed a lot of activities as part of the reforms in the early eighties, the board has gradually expanded the scope of activities since 2001. The expenditures on programs that COCOBOD oversees were GHS 720 mil in 2010/11, nearly three times that of the expenditures of the Ministry of Food and Agriculture, which was GHS 250 mil (Table 5.1).

The services that the COCOBOD offers fall into to two broad categories: those designed to directly enhance the welfare of producer households and those that aim to sustain and develop cocoa production. The welfare programs include the scholarship scheme, which has been in existence since 1951, and recently initiated programs including social security, farmer housing, and efforts to reduce the worst forms of child labor in the cocoa sector. Both short- and long-term objectives guide the goods and services provided to make production sustainable. Those that are short-term oriented include the High-Tech or fertilizer subsidy program, the Cocoa Diseases and Pest Control Program (CODAPEC) or public spray program, and cocoa extension. Those with longer-term benefits include the program to control CSSVD, cocoa research, cocoa college, and cocoa replanting/rehabilitation.

Nearly all of the services that are provided through industry costs are directly or indirectly managed by COCOBOD except for the building of cocoa roads, which are built by the Ministry of Roads and Highways. COCOBOD may make an inventory before each season of the roads that need to be rehabilitated or maintained and pass on the funds to the ministry directly or through the Ministry of Finance and Economic Planning (MOFEP).

The scholarship program and cocoa research are managed somewhat more independently of the COCOBOD. The scholarship program is managed by an administrator under the oversight of seven trustees. The trust grants new and continuing scholarships on the basis of academic performance, with the scholarships allocated to different regions in proportion to their shares in the total production, but shared uniformly by the districts within a region. The Cocoa Research Institute of Ghana (CRIG) at Tafo, which was established by the colonial government in 1938 as the Central Cocoa Research Station of the Gold Coast Department of Agriculture to identify and control CSSV, is managed by the COCOBOD. It is the largest producer-funded research organization in Africa (Byerlee 2011).

The rest of the programs are managed by various units within the COCOBOD. The CSSVD control unit assists farmers with disease-infected farms in replanting their farms with early bearing, high-yielding, and disease-tolerant trees. It also helps to rehabilitate old moribund farms and promote the adoption of good agronomic practices. The unit surveys for the presence of diseases in 41 cocoa districts broken down into sectors and blocks to define its operational area. In 2010, the CSSVD control unit began a two-component cocoa rehabilitation program to increase productivity and quality of cocoa. The first component cuts down cocoa trees that are more than 30 years old and replants hybrid varieties in areas that are disease free. The second component removes parasitic plants (mistletoes) from infested cocoa trees nationwide and promotes fertilizer application to depleted soils in high-cocoa-producing districts, in collaboration with the cocoa High-Tech section.

Cocoa extension, which was ceded to the Ministry of Food and Agriculture in 2000 but brought back to COCOBOD in 2010, is now implemented with a public–private partnership also by the CSSVD Control Unit. The Seed Production Unit of the COCOBOD supplies seeds and seedling to producers.

COCOBOD also maintains a welfare fund under the COCOBOD law to fulfill its commitment to social responsibilities. Its recent plans include the distribution of one million insecticide-treated mosquito nets to farmers, the supply of 3,000 solar water pumps and 9,000 solar streetlights to cocoa-farming communities, and the distribution of 200,000 solar torch lights to farmers at discount prices.

Table 5.1—Industry costs and their share in total cocoa revenues (share of industry items in total industry costs)**

Year	Total industry costs* (in thousand GHS)**	Industry costs as % of cocoa revenue	CODAPEC	High-Tech	Cocoa roads	Welfare programs* (scholarships, housing, WFCL fund, social security)	COCOBOD services/ divisions†	CSSDV Program + tree replanting**	CRIG**	Services delivered under COCOBOD budget	Industry costs/hae (GHS/HA)^
1996/97	3,932	0.04	—	—	—	—	—	—	—	1.00	3.74
1997/98	3,757	0.03	—	—	—	—	—	—	—	1.00	3.50
1998/99	1,008	0.01	—	—	—	—	—	—	—	1.00	0.74
1999/00	1,564	0.01	—	—	—	—	—	—	—	1.00	1.20
2000/01	8,774	0.03	0.67	—	—	—	0.10	—	0.23	0.33	5.85
2001/02	39,514	0.12	0.77	—	—	0.01	0.16	—	0.06	0.22	29.27
2002/03	51,724	0.07	0.54	0.15	0.03	0.02	0.18	—	0.09	0.27	43.28
2003/04	74,739	0.08	0.46	0.18	0.01	—	0.26	—	0.08	0.34	49.83
2004/05	89,614	0.10	0.50	0.14	0.00	0.09	0.20	—	0.07	0.27	44.81
2005/06	84,844	0.08	0.66	0.00	0.02	—	0.21	—	0.09	0.30	45.86
2006/07	211,500	0.20	0.50	0.30	0.01	—	0.13	—	0.05	0.18	115.26
2007/08	240,311	0.17	0.47	0.28	0.01	—	0.16	—	0.08	0.24	164.26
2008/09	458,537	0.19	0.27	0.47	0.01	—	0.11	0.03	0.05	0.17	251.60
2009/10	690,623	0.25	0.24	0.41	0.06	0.04	0.10	0.07	0.04	0.14	417.04
2010/11	735,382081	0.15	0.14	0.19	0.39	0.03	0.13	0.04	0.04	0.17	452.54

Source: Authors' estimates.

Notes: * Total industry costs shown in this table also include services provided by different COCOBOD's operation units (that is, CSSVD Program, Seed Production Unit, Cocoa Services Division, Bonsu Cocoa College, and Cocoa clinic).

** Figures under these items are shown from the years when different programs were launched by COCOBOD.

^Data on acreage under cocoa from (FAO 20??).

Several arguments can be put forth for COCOBOD's provision of service. First, it supplies some goods that are strictly public that would be otherwise undersupplied. Cocoa research falls into this category. The program to control pests and diseases is also public in nature because failure on the part of individual farmers to control pests and diseases on their farms jeopardizes neighboring farms. The expenditure on cocoa roads is an attempt to ring-fence public expenditure or to ensure that the taxes the cocoa growers pay are utilized to benefit them exclusively. Longer-term sustainability programs are implemented under the argument that they involve short-term losses or significant investments that would not be made because of credit market failures. Finally, seed and fertilizer supplies are used to encourage adoption of improved practices.

The share of industry costs in the industry revenues grew from 4 percent in 1996/97 to 25 percent in 2009/10 but declined to 15 percent in 2010/11. These services were provided through the COCOBOD budget until 2000, when the PPRC began to set aside funds before sharing the free on board (FOB) prices, although all the programs are managed by COCOBOD. COCOBOD credits CODOPEC and High-Tech programs with dramatic increases in recent years, but expenditures on these programs have grown dramatically, along with large surpluses left at the end of the year. The expenditures on these programs are several times larger than budgeted by PPRC. It can be argued, however, that if the PPRC was allocating the actual larger revenues, it would have budgeted more for these programs, but there is no indication that PPRC is consulted on the budgeting of surplus revenues.

The CODAPEC program accounted for nearly one-half of the industry costs until 2008/09, when the expenditures on the High-Tech program increased significantly (see Table 5.2). The welfare programs account for only about 3 percent of expenditures of services or industry costs. CRIG, which is one of the largest industry-funded research organizations in Africa, received about 4 percent of the revenues in recent years, down from about 8 percent as the industry revenues have grown significantly in the last few years. The industry costs or the cost of services delivered on behalf of farmers by COCOBOD now exceeds GHS 400 per hectare.

Table 5.2—CODAPEC costs

Year	Number of hectares (ha) sprayed (black pod)	Ha sprayed (capsid)	F (kg/ha)	I (kg/ha)	Expenses on I (GHS)	Expenses on F (GHS)	Total costs/ ha	I cost/ha	F cost/ ha
2001/02	627,960	941,227	1	1	—	—	19	—	—
2002/03	1,626,991	—	7,790	—	—	—	17	—	—
2003/04	1,856,159	1,858,670	48	0	—	—	9	—	—
2004/05	2,307,935	2,296,203	0	0	21,698,925	443,020	10	9	0
2005/06	2,397,062	2,695,077	0	0	18,561,373	714,667	11	7	0
2006/07	935,250	1,485,578	1	1	6,831,188	5,255,987	44	5	6
2007/08	976,332	1,660,998	2	1	20,071,202	1,189,363	43	12	1
2008/09	1,020,432	2,106,929	1	1	55,868,604	1,569,110	40	27	2
2009/10	1,045,752	2,185,255	2	1	57,035,154	2,650,770	50	26	3

Source: COCOBOD (2002c, 2003c, 2004c, 2005c, 2006c, 2007c, 2008c, 2009c, 2010c).
Note: F = fungicide; I = insecticide.

The benefits from various programs of the COCOBOD, the CODAPEC and High-Tech in particular, are examined in a companion study by the International Institute of Tropical Agriculture (Gockowski 2012). Here we examine the unit costs and organization of CODOPEC, which often accounts for a third of the industry costs.

The public spraying of cocoa farms was first undertaken as far back as 1956. Mass spraying now called CODAPEC was reintroduced in 2001/02 to control capsids and the black pod disease. Currently,

cocoa farms are sprayed in 23 districts for black pod control only, in 36 districts for control of capsid bugs only, and in 24 to control both. Cocoa farms are sprayed three times (between June and October) for black pod disease and two times (between August and December) to control capsid bugs.

COCOBOD sends the required insecticides and fungicides that it procures through tenders and the funds required for spraying to the districts. The district task forces recruit spray gangs, distribute chemicals and supplies, and oversee the spraying. Local task forces plan and execute the program at village levels. Spray gangs of 10 for black pod control and 6 for capsid control overseen by a supervisor spray the farms, with one mechanic to maintain and repair the sprayers of 20 gangs. Farmers are expected to weed, prune, and remove the black pod and other diseased pods to prepare their fields for the sprays. They are also expected to supply water required for spraying and monitor the application on their farms.

In 2009/10, the program reported spraying more than 3.2 million hectares to control capsids and black pod. Presumably some hectares are sprayed more than once, as the area exceeds the total area under cocoa production. The costs of treatment for capsids and black pod differ significantly. Per-hectare cost of insecticide was GHS 26.0, while for fungicide it was barely GHS 3.0. The costs of spraying cannot be disaggregated, but by dividing the total costs of the program by the total area sprayed, the cost incurred per hectare per spray turns out to be GHS 50. This suggests that the administrative costs of organizing one spray on a hectare of land may range from GHS 10 to 25.

COCOBOD credits CODAPEC with having contributed to a dramatic increase in cocoa production, but the program is beset with problems that are widely acknowledged. The problems that it has faced since the beginning include inadequate numbers of spray gangs, absence of information on farm sizes and area to be sprayed, extortion by gangs, inaccurate reporting of chemical used by gangs; farmers failing to prepare the fields for spraying, delays in payments, and insufficient allocation of required inputs. The availability of pesticides for sale in input stores in Ghana and in neighboring countries with the inscription “Packed for CODAPEC, Not for Sale” is a clear sign of the difficulties in implementing this program.

In a recent survey, 30 percent of the farmers suggested that their farms were not sprayed (Anang et al. 2011). Farmers felt that the number of gangs employed is not adequate and that the gangs do not bother to look for and target the infestations, as they have incentives to cover as much area as possible. The study also suggested that mistakes may have been made in choosing the areas of different treatments.

COCOBOD implements all of the programs without adequate information on cocoa producers or the area under production in different districts. It has taken measures to overcome these deficiencies, but the problems persist. In 2005, it planned for a nationwide survey to gather information on cocoa-producing areas, but it still may not have the required information. Local task forces have been established to distribute the chemicals directly to farmer groups, but without adequate information on how much to provide and to whom, the program continues to be subject to political influence.

6. SUMMARY AND CONCLUSIONS

Administered Pricing

The policy of administered pricing on the recommendations of a stakeholder committee in a partially liberalized sector delivers nearly 60 percent of the export prices to Ghanaian cocoa producers. Initial pressure to liberalize the sector came externally from multilateral organizations. Because cocoa is a pillar of the Ghanaian economy, substantial internal pressure now exists to manage the sector efficiently. Following years of government commitments, producers and other stakeholders have developed high expectations; a reduction of producer prices in absolute terms would be a huge risk for any administration. Additional political pressure to minimize smuggling and to fulfill other commitments has made managing the sector a critical policy issue.

Lack of Incentives

Apart from political pressure to maintain the producer share, the current pricing system lacks a mechanism to encourage efficiency among marketing agents, particularly because pricing is administered in the spirit of sharing FOB price. Although the marketing agents are not fully maintaining their share in the revenues, the unit costs are increasing. Nonetheless, it appears that the government has managed, to some extent, to increase or maintain producer share. This has largely been facilitated by growing sector revenues from rising prices and increasing production.

Growing Services

Producer shares of export prices would have been even higher in recent years had industry costs not increased dramatically. The costs of services provided by the Ghana Cocoa Board (COCOBOD) are double the levels recommended by PPRC. Large surpluses left with COCOBOD appear to have encouraged over-the-budget spending on industry costs. To achieve greater accountability to stakeholders, producers in particular, and to carefully evaluate the benefits from public expenditures, the role of PPRC needs to be expanded to include oversight of the use of surplus revenues. However, the prevailing belief that any windfalls in the sector should benefit all stakeholders dilutes producer claim to surpluses.

Partial Liberalization

The partial liberalization, which permitted licensed buyers to procure cocoa from producers at no less than announced pan-territorial and pan-seasonal prices, probably did little to reduce marketing costs. This is understandable given that the margins of buyers are determined administratively rather than through competition. Though the share of marketing costs in sector revenues is declining, costs per ton of performing marketing functions in both nominal and constant terms are increasing, although there should be significant economies of scale in some operations, including that of COCOBOD. The margins per ton paid to licensed buying companies (LBCs) have been increasing in real terms over the last few years. Cost increases are particularly noticeable in the case of haulage, the rates for which are set by PPRC.

Participation by Local Firms

Following partial liberalization a large numbers of firms, mostly local companies, have begun to market cocoa internally. These companies are able to participate because COCOBOD can supply funds raised in global markets at lower costs than the companies would incur if they borrowed locally. The previously public PBC and other local firms compete effectively with foreign firms, even though only a few account for the bulk of cocoa procured from farmers. Although COCOBOD supplies funds at reasonable costs, LBCs are unable to turn the funds around rapidly because of inefficiencies in the system. Local firms are

therefore obliged to borrow from other sources at higher costs, spending significant portions of their margins on meeting financing costs.

Inefficiency in Public Components

Inefficiencies within the operations of both COCOBOD and its subsidiaries cause considerable delays in certification and transport of cocoa from depots to ports and in the payment for cocoa delivered by LBCs. These delays impose substantial financial costs on LBCs. Improving infrastructure and streamlining the operations of COCOBOD and its subsidiaries offer an opportunity to reduce marketing costs. However, it is not clear what will motivate them to reduce the operational deficiencies that have persisted for years despite healthy growth in the sector. The kind of political will that led to the initial reforms appears necessary to streamline the operations of the organizations in the absence of further reforms to introduce competition.

Producer Access to Markets

The introduction of licensed buying has not benefited farmers through price competition. The LBCs are reluctant to compete with each other because their profit margins are too small to generate sufficient savings to pay producers higher-than-declared prices. Producers, however, continue to enjoy access to buyers at declared prices, although LBCs prefer to operate in high-production areas. COCOBOD pays for transporting the cocoa from producers, and the previously public PBC continues to operate its widespread purchasing network. Producers benefit from prompt payments and occasional gifts from LBCs. Also the buyers' incentives to compete for cocoa by offering COCOBOD subsidized fertilizers on credit have resulted in increased supply and use of fertilizers on cocoa farms, a program that COCOBOD was finding difficult to scale up because of poor recoveries.

Quality Control

Cocoa quality is obtained on trees through good husbandry and maintained through postharvest practices that include timely harvest, proper fermentation, drying, and sorting of beans. Quality is largely achieved on the farm by the producers themselves. Ghana's quality control program promotes the adoption of quality-enhancing good practices on farms and regulates the quality of beans traded by the LBCs. The Quality Control Company's (QCC's) elaborate procedures begin with assessment at the up-country depots. This is followed by testing of samples for dryness, grade, and category at depots and ports. It is virtually a certification system with traceability, though certification is limited to the physical attributes of beans.

Effect of Liberalization

The introduction of partial liberalization appears to have affected the quality of cocoa produced by increasing the content of purple beans, which the cocoa board attributes to poor fermentation. Producers appear to be neglecting proper fermentation as they face a number of private buyers competing to buy cocoa, allegedly with less regard for quality than before. While the market does not regulate or penalize purple bean content, COCOBOD continues to monitor the situation.

Benefits from Quality Control

Supplying large quantities of beans with superior physical attributes, combined with uniform packing and labelling, traceability, and reliability, is attributable to centralized marketing, which has given Ghana a reputation for quality and earns Ghanaian cocoa a premium of 4 to 6 percent. Ghana's reputation for supplying consistently high quality is an important factor, enabling the country to sell up to 70 percent of its crop and to raise funds in global markets to support the operations of local companies. The costs of

maintaining quality in terms of the physical attributes of beans is less than 2 percent of the revenue, making it a worthwhile investment.

Streamlining Quality Control

Although the quality control system pays for itself, unit costs are rising and opportunities exist for further streamlining of operations. First, because the current sampling procedures are quite elaborate, it is unlikely that they are strictly followed. It is important to explore sampling protocols that provide the same level of reliability with higher rates of compliance. Second, the current quality procedures that require clearance at several stages in the movement of cocoa from depots to ports and the incentives of LBCs to move cocoa quickly through the system lead to opportunities for rent seeking. The LBCs complain of delays and the need to make extra-legal payments. The government should consider opening up-country certification to private agencies that compete with each other to certify cocoa without delay. The traceability mechanisms that the QCC now has in place should enable monitoring private agencies at the district level.

Reduced Taxes

The government has been able to increase and maintain producer shares to some extent by reducing the rate of taxation from nearly a third of the export prices to one-twentieth over the last 15 years. The government may have reduced tax rates to meet a commitment, but fulfilling this obligation was made easier by a decreased dependence on cocoa taxes for revenue and rising revenues from the sector that have compensated for declining rates. New sources such as the petroleum taxes have reduced the share of cocoa taxes in government revenues.

Use of Revenues

The withholding of revenues to cover industry costs is tantamount to taxation, except that the expenditures are ring-fenced to benefit only the cocoa producers. Who among the producers is benefiting and whether the goods and services are provided cost-effectively are issues of concern. Few industry cost expenditures are public goods; cocoa research and efforts to reduce the worst forms of child labor are examples. Less than about 7 percent of the funds goes into research and welfare programs such as farmer housing and scholarships. The rest (93 percent) goes into supporting increased production and productivity in the short and long term. The total expenditure on behalf of farmers in 2011 amounted to more than 450 Ghanaian cedis (GHS) per ha (US$231). While some public goods need to be funded, it is important to consider whether some of the objectives would be more effectively met by giving producers 20–25 percent higher prices, at least in the longer run.

Provision of Services

Even if public provision of many of the services can be justified, it would be useful to consider alternative ways of provision. This study did not examine the benefits from major programs such as Cocoa Diseases and Pest Control Program (CODAPEC) and High-Tech, but the unit costs of the services provided suggest the need to consider other options. The organization of CODAPEC and High-Tech and the documented problems in their implementation suggest that considerable room exists for improving cost-effectiveness. COCOBOD's management of all aspects of these programs, including the transport of inputs, results in considerable inefficiencies. For example, LBCs complain that fertilizers are not received on time, and producers complain of not receiving the sprays they are entitled to. It is worth considering whether it would be better to give farmers vouchers or resources to buy chemicals and organize sprays on their own, wherever the private sector can be expected to develop adequately. The board should consider experimenting with various options rather than waiting for a consensus. COCOBOD implements a massive program to benefit cocoa producers without adequate information. It should urgently develop and

make use of information on producers and their farms if it wishes to remain in the business of delivering services that benefit individuals.

Introduction of Markets

Although the cocoa sector is partially liberalized, all prices, including producer prices and the cost of haulage, are determined administratively. The producers would benefit if the LBCs competed with each other by offering higher-than-announced prices. In any case, margins for the LBCs are determined administratively as a fixed share of the export price. One option to introduce elements of competition in the sector is to pass on additional functions to LBCs and have them compete to deliver cocoa at the lowest cost to COCOBOD. The additional functions could be secondary evacuation of cocoa from depots to ports, the price of which is now set administratively, and certification of cocoa at LBC depots, which could be done by private agents if certification were to be opened to them.

APPENDIX: SUPPLEMENTARY TABLES

Table A.1— Ghana cocoa quality control processes

Where and who	Sampling	Tests/operations	Attributes tested for or developed	Action
Cocoa farm / producer	Entire crop	Harvest mature and ripened but not overripe pods; ferment and dry cocoa as recommended; and remove foreign matter such as placenta, flat beans, and separately clustered beans	Well-fermented and dried beans, free from foreign matter and of uniform size	Preparation for sale
Society sheds / purchase clerks	All bags presented by farmers for sale	Manual and visual inspection for dryness; isolation of bags with inferior quality; bulking of beans for uniformity using sieves if necessary and weighing of bags	Well-fermented and dried beans	Sales completed and weight recorded on farmers' passbooks
Up-country depots / Quality control assistants	All bags in a lot of 30 Samples are drawn from three sides of all bags in a lot of 30 bags using a sampling horn. The samples are bulked and thoroughly mixed. From this *box sample*, 100 gm of beans are sampled. The beans in the box sample are heaped and divided into four quarters. Two opposing quarters are taken out and the rest of the beans are subjected to a similar process until about *300 beans* are left. They are then put in approximately equal quantities into three sampling bags. Beans are squeezed out of the three bags sequentially to cut 100 beans if one bag is graded or 300 if two or more.	Check for moisture content using Aquaboy moisture meter Bean count Cut test	Moisture content, lack of uniformity, presence of black beans, and foreign matter Category Grade	Lots that do not meet the criteria are rejected. No further tests are conducted. Bags are sealed. All bags get markings to indicate the grade, LBC, the lot number. and the inspector who graded the lot. Certificate of Inspection of Cocoa (Qc form 1) is issued.

Table A.1— Continued

Where and who	Sampling	Tests/operations	Attributes tested for or developed	Action
Up-country depot (prior to evacuation) / QCC district director	If graded bags are not immediately evacuated, within the waiting period the district director can double-check grading. This may be done for about 30 percent of the produce.	Moisture test; bean count and cut test	Moisture content, category, and grade	If the results are significantly different from the certificate issued earlier, unsealing takes place. The lot is either rejected or different category and grade are given.
	Sampling as before: all bags; box sample, 100 gms; and 300 beans.			Evacuation Certificate (QC form 1B) is issued.
Take-over centers on arrival of truck with about 600 bags / QCC	Every bag	Moisture test and visual inspection of bags for infestation	Moisture content, infestation, and lack of uniformity	Unacceptable lots (truckloads) are sent as *discrepant* for reconditioning by the LBCs. Otherwise, OK is given for downloading the bags.
	Sampling from two sides of each bag from a lot which is now a truckload of 600 bags; box sample; 100 gms; and 300 beans	Bean count, cut test and residue analysis	Category, grade and residue levels	Purity Certificate (QC form 6) is issued. Cocoa Marketing Board is advised to take over the beans. Lots with different residue levels are identifiable by colored tags.
	A small sample for residue analysis			
Take-over centers—prior to shipment / QCC	Entire stock	The stocks are covered and fumigated. Fogging is done to control adult insects.	Insect infestation	Only after adequate fumigation, at least 7 days, the stock is released for shipment. If the stock are not shipped within 10 days, they are uncovered to aerate and fumigated again, depending on the length of storage.
Take-over centers—just before shipment /QCC	Samples taken from every bag in a lot, which is now a container that holds 200 bags, or 250 when poured	Moisture, bean count, and cut tests	Dryness, category, and grade	
Containers at port / QCC	containers	Containers are sprayed with insecticides and kept closed overnight; lined and covered with craft paper depending on transport in bags or by bulk; desicants are hung; fogging is done.	Control moisture buildup and infestation during shipment	Sealed by the shipper

Source: COCOBOD 2006e.

Table A.2—Cocoa revenues and expenditures (1996/97–2010/11)

Year	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/2011
Acreage under cocoa cultivation (FAOSTAT)	1,050,000.00	1,074,970.00	1,364,530.00	1,300,000.00	1,500,000.00	1,350,000.00	1,195,000.00	1,500,000.00	2,000,000.00	1,850,000.00	1,835,000.00	1,463,000.00	1,822,500.00	1,656,000.00	1,625,000.00
Gross FOB /tonne (US$) achieved	1,466	1,662	1,626	1,127	978	1,166	1,818	1,561	1,472	1,487	1,668	2,104	2,688	2,928	3,216
GH¢/US$ Exchange rate achieved	0.19	0.23	0.23	0.44	0.70	0.72	0.83	0.87	0.90	0.91	0.91	0.98	1.21	1.42	1.42
Gross FOB /tonne (GH¢) achieved	282	381	374	499	685	840	1,515	1,355	1,325	1,348	1,513	2,065	3,252	4,157	4,557
Quantity purchased (MT) (annual report)	322,488	409,359	397,775	436,946	389,771	340,562	496,846	736,975	599,318	740,458	614,532	680,781	710,642	632,024	1,024,541
Sector Revenues															
Gross Revenue (annual report)	92,332,600	147,654,000	141,857,300	228,991,500	260,964,600	327,495,100	728,562,300	992,199,800	888,502,500	1,100,691,700	1,076,000,394	1,411,702,318	2,464,455,036	2,790,149,437	4,206,177,456
Sales: exports + domestic delivery	268,200	300,350	331,050	355,750	307,075	290,509	469,442	726,652	595,434	732,717	622,714	673,219	654,060	526,760	923,000
Industry costs (Expenditure on public goods)															
Disease/Pest Control – CODAPEC	-	-	-	-	5,835,999	30,418,718	27,813,191	34,100,000	44,836,384	56,400,000	106,778,607	113,438,547	123,905,205	162,565,019	104,402,721
Swollen shoot disease control programme													15,182,859	14,093,831	10,170,951
High tech	-	-	-	-	-	-	7,500,300	13,300,000	12,525,001	-	63,782,403	66,783,125	216,602,378	280,489,581	140,546,138
Cocoa Roads		-	-	-	-	-	1,500,000	891,500	-	1,500,000	1,500,000	1,500,000	5,000,000	40,000,000	284,000,000
Scholarship Fund						500,000	1,000,000	1,200,000	1,500,000	1,500,000	1,500,000	2,000,000	2,500,000	10,000,000	2,400,000
Cost of Elimaination of WFCL								-	6,700,000	-	-	-	-	2,000,000	2,000,000
Stabilisation Fund	-	-	-	-					-	-	-	-	19,045,000	34,172,047	29,271,136
Farmers' Housing Scheme	-	-	-	-					-	-	-	-	-	868,000	1,270,431
Tree Replanting & Rehabilitation	-	-	-	-					-	-	-	-	-	35,000,000	20,244,930
Social Security for Farmers	-	-	-	-					-	-	-	-	-	15,000,000	13,616,150
Total industry costs	**-**	**-**	**-**	**-**	**5,835,999**	**30,918,718**	**37,813,491**	**49,491,500**	**65,561,385**	**59,400,000**	**173,561,010**	**183,721,672**	**382,235,442**	**594,188,478**	**607,922,458**
Direct marketing costs															
Crop Finance	2,746,302	3,331,600	3,512,200	58,297,500	7,857,400	7,890,000	15,098,603	20,216,698	22,669,100	19,127,500	14,168,527	21,958,677	21,186,744	67,279,124	37,774,827
Buyers' Margin (LBCs)	8,707,176	12,969,517	14,116,613	15,931,825	24,677,385	23,653,347	57,942,134	77,496,273	57,875,743	79,729,246	71,833,650	90,074,290	134,607,479	162,301,831	331,711,832
Haulage Cost (Dist. Depots & Reg. Warehouses)	2,268,677	4,095,637	3,852,733	4,389,154	5,896,291	6,986,055	20,385,520	34,743,405	25,531,671	36,176,018	33,495,729	39,481,939	57,947,772	74,169,576	146,331,122
Storage & Shipping (storage & Marketing by CMC)	2,472,166	1,364,515	1,403,493	1,434,750	3,608,600	4,676,600	6,543,700	7,884,512	6,948,700	9,875,353	9,000,000	21,304,885	39,575,174	19,027,400	46,217,045
Jute Sack & Related Items								4,900,000	44,500,000	8,200,000	10,500,000	14,500,000	19,702,475	19,800,000	40,036,250
Anti-smuggling funds	-	-	-	-	-	-	-	200,000	105,000	105,000	60,000	100,000	100,000	350,000	2,741,800
QCC (Grading, quality control, and grants)	211,875	340,996	350,042	2,503,848	3,625,077	4,316,132	4,398,578	10,512,683	7,461,467	14,808,417	15,006,583	25,835,371	40,804,466	44,919,868	64,156,757
Scale Inspection & Phyto-Sanitory	69,600	-	-	-	80,000	55,634	80,000	137,200	120,000	19,695	150,000	169,000	214,500	195,300	338,099
Total direct marketing costs	**16,475,796**	**22,102,265**	**23,235,081**	**82,557,077**	**45,744,752**	**47,577,768**	**104,448,535**	**156,090,771**	**165,211,681**	**168,041,228**	**154,214,488**	**213,424,162**	**314,138,610**	**388,043,099**	**669,307,731**
Cocobod expenditures	**9,153,678**	**10,753,900**	**11,885,600**	**69,959,400**	**31,481,929**	**29,451,365**	**48,121,300**	**65,839,662**	**70,128,765**	**74,470,974**	**91,109,519**	**124,809,909**	**175,937,146**	**275,702,443**	**35,284,328**
Total maketing costs	**25,629,474**	**32,856,165**	**35,120,681**	**152,516,477**	**77,226,681**	**77,029,133**	**152,569,835**	**221,930,433**	**235,340,446**	**242,512,203**	**245,324,007**	**338,234,071**	**490,075,756**	**663,745,542**	**704,592,058**
	144	245	270	276	466	742	937	937	906	937	930	1,246	1,817	2,928	3,552
Producer proceeds + bonus	38,698,560	73,684,620	89,499,375	98,312,850	143,182,377	215,507,634	439,808,079	680,964,900	539,386,200	686,722,963	579,153,393	838,722,192	1,188,193,424	1,542,138,560	3,278,531,200
Bonus					6,945,936	4,148,219	15,791,965	16,119,975	-	17,830,530	32,154,665	42,443,106	50,873,352	23,543,771	-
Producer proceeds	38,698,560	73,684,620	89,499,375	98,312,850	136,236,441	211,359,415	424,016,114	664,844,925	539,386,200	668,892,433	546,998,728	796,279,086	1,137,320,072	1,518,594,789	3,278,531,200
Net balance before transfers to government	28,004,566	41,113,215	17,237,244	(21,837,827)	34,719,542	4,039,616	98,370,895	39,812,967	48,214,469	112,056,534	77,961,983	51,024,383	403,950,414	(9,923,143)	(384,868,260)
Transfers to government (duty)	26,594,250	39,048,703	20,993,100	17,881,400	29,960,000	33,526,600	78,390,300	99,720,000	64,119,000	61,600,000	92,055,200	46,252,800	85,473,828	153,933,253	
Balance after transfers to government	**1,410,316**	**2,064,512 -**	**3,755,856 -**	**39,719,227**	**4,759,542 -**	**29,486,984**	**19,980,595 -**	**59,907,033 -**	**15,904,531**	**50,456,534 -**	**14,093,217**	**4,771,583**	**318,476,586 -**	**163,856,396**	

Source: COCOBOD (1996, 1997, 1998, 1999, 2000b, 2001a, 2001b, 2002a, 2002d, 2003a, 2003d, 2004a, 2004d, 2005a, 2005d, 2006a, 2006d, 2007a, 2007d, 2008a, 2008d, 2009a, 2009d, 2010a, 2010b) and Quartey (2011, 2012).

Table A.3—COCOBOD expenditure

Year	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/2011
Cocobod expenditure*															
Recurrent expenditure															
Head Office	5,222,155	6,996,541	10,877,361	68,395,802	27,816,329	17,918,391	31,537,720	38,621,143	43,202,175	42,836,240	40,899,159	62,204,663	87,909,358	135,679,011	- 110,158,174
CSSVD						4,590,300	5,920,000	9,842,300	12,786,238	12,036,225	19,728,412	28,468,554	38,615,874	48,290,649	58,458,352
SPU					903,975	1,569,964	3,219,855	4,416,990	4,957,386	5,430,607	6,891,302	9,394,306	13,030,114	21,783,685	22,573,791
CSD	3,284,088	2,876,011													
CRIG	647,434	881,348	1,008,239	1,563,599	2,033,825	2,435,110	4,770,326	5,815,029	6,197,266	7,747,055	11,065,084	18,409,562	24,080,297	25,340,423	28,821,978
BONSU COCOA COLLEGE								5,173,500	111,400	230,000	254,027	316,913	575,044	1,020,102	304,053
COCOA CLINIC															
Capital Expenditure					727,800	2,937,600	2,673,400	1,970,700	2,874,300	6,190,847	12,271,535	6,015,912	11,726,459	43,588,574	35,284,328
Total	**9,153,678**	**10,753,900**	**11,885,600**	**69,959,400**	**31,481,929**	**29,451,365**	**48,121,300**	**65,839,662**	**70,128,765**	**74,470,974**	**91,109,519**	**124,809,909**	**175,937,146**	**275,702,443**	**35,284,328**

Source: COCOBOD (2002b, 2003b, 2004b, 2005b, 2006b, 2007b, 2008b, 2009b) and Quartey (2011, 2012).

Table A.4—PPRC recommendations

PPRC TECHNICAL COMMITTEE ASSUMPTIONS

Year/Item	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Predicted FOB /tonne (US$)	1,350	1,450	1,650	1,150	850	950	1,650	1,650	1,440	1,450	1,500	1,670	2,300	2,400	3,300
GH¢/US$ Exchange rate	0.18	0.23	0.24	0.26	0.65	0.72	0.84	0.88	0.91	0.90	0.91	0.92	1.13	1.46	1.42
Predicted FOB /tonne (GH¢)	236.25	333.50	400.95	304.18	552.50	680.20	1,386.00	1,452.00	1,307.95	1,310.80	1,365.00	1,536.40	2,599.00	3,504.00	4,686.00
Predicted Crop Size	350,000	350,000	350,000	420,000	360,000	430,000	390,000	500,000	700,000	550,000	600,000	650,000	650,000	700,000	700,000
Actual FOB /tonne (US$)	1,466	1,662	1,626	1,127	978	1,166	1,818	1,561	1,472	1,487	1,668	2,104	2,688	2,928	3,216
GH¢/US$ Exchange rate	0.19	0.23	0.23	0.44	0.70	0.72	0.83	0.87	0.90	0.91	0.91	0.98	1.21	1.42	1.42
Actual FOB /tonne (GH¢)	282	381	374	499	685	840	1,515	1,355	1,325	1,348	1,513	2,065	3,252	4,157	4,557
Actual Crop Size	322,488	409,359	397,775	436,946	389,771	340,562	496,846	736,975	599,318	740,458	614,532	680,781	710,642	632,024	1,024,541
Allocation to industry costs															
Budgeted Data															
Deductions Chargeable to FOB (Budgeted)															
Disease/Pest Control						11,000,000	24,200,000	34,100,000	44,500,000	30,000,000	46,491,223	62,051,463	80,905,705	162,565,019	104,402,721
Scholarship Fund					2,000,000	500,000	1,000,000	1,200,000	1,500,000	1,500,000	1,500,000	2,000,000	2,500,000	10,000,000	2,400,000
Jute Sack & Related Items								4,900,000	6,700,000	8,200,000	10,500,000	14,500,000	19,702,475	19,800,000	40,036,250
Swollen shoot Disease Control Programme					12,500,000								15,182,859	14,093,831	10,170,951
Cost of Elimaination of WFCL (09/10)														2,000,000	2,000,000
Cost of High Tech (09/10)												50,000,000	65,500,000	69,430,000	140,546,138
TOTAL					**14,500,000**	**11,500,000**	**25,200,000**	**40,200,000**	**52,700,000**	**39,700,000**	**58,491,223**	**128,551,463**	**183,791,039**	**277,888,850**	**299,556,060**
Recommended sharing of net FOB															
Distribution of Net FOB/tonne(GH cedis)															
Producer Price	120.00	180.09	225.00	225.00	343.18	438.37	900.00	946.40	900.00	899.98	915.00	950.00	1,632.00	2,208.00	3,200.00
GoG/Cocobod	70.65	103.30	118.40	29.23	68.94	94.10	217.23	219.46	153.68	139.96	122.76	133.85	288.37	310.70	317.06
Crop Finance		4.30	7.54	0.00	17.93	19.60	30.39	27.43	23.67	23.66	23.61	24.79	32.89	35.11	36.87
Buyers' Margin (LBCs)	27.00	31.68	36.09	36.41	56.34	69.92	118.00	110.55	96.39	105.53	116.00	127.60	189.90	250.00	304.50
Haulage Cost (Dist. Depots & Reg. Warehouses)	7.04	10.01	10.03	9.13	15.37	18.95	29.86	42.52	36.98	41.12	46.89	50.53	71.57	105.00	125.14
Storage & Shipping (storage & Marketing by CMC)	7.65	3.34	3.53	3.53	9.23	10.85	16.78	10.70	9.24	12.14	15.00	18.00	25.25	34.00	45.11
Grading/Quality Control	0.66	0.83	0.88	0.88	1.17	1.50	8.85	14.26	12.45	15.98	28.00	33.60	46.32	53.55	62.62
Scale Inspection & Phyto-Sanitory					0.12	0.16	0.26	0.30	0.25	0.25	0.25	0.26	0.46	0.31	0.33
Stabilisation Fund													29.42	61.68	28.57
Farmers' Housing Scheme														1.24	1.24
Tree Replanting & Rehabilitation														25.99	19.76
Social Security for Farmers														21.43	13.29
Total	**233.00**	**333.55**	**401.46**	**304.18**	**512.28**	**653.46**	**1,321.38**	**1,371.63**	**1,232.67**	**1,238.62**	**1,267.51**	**1,338.63**	**2,316.19**	**3,107.01**	**4,154.49**

Source: COCOBOD (1996, 1997, 1998, 1999, 2000b, 2001b, 2002d, 2003d, 2004d, 2005d, 2006d, 2007d, 2008d, 2009d, 2010b) and Quartey (2011, 2012).

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