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JEOPARDIZE EXPORT QUALITY?  
CAMEROONIAN COCOA, 1995-2000**

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## ABSTRACT

### Does Market Liberalization Jeopardize Export Quality? Cameroonian Cocoa, 1995-2000\*

A frequently encountered argument against the liberalization of markets for tropical crop commodities is that this may jeopardize export quality. We look at this argument in the specific case of Cameroonian cocoa exports. The Cameroonian experience is important because an alleged decline in cocoa quality has often been cited as illustrating the dangers of market liberalization. That claim is not supported by examination of the unit value of cocoa imports into the European Union which demonstrates constant relativities over time in the unit value of cocoa imports from major west African producers. We argue that, in a liberalized environment, export quality is determined by the preferences of market participants and the technology of quality production. In Cameroon, changes in transport technology resulted in a diminished demand for premium grade cocoa while increased competition from cocoa buyers resulted in a transfer of some processing functions from farmers to intermediaries. There is no evidence of any significant quality problems arising from market liberalization. We conclude that government does not need to regulate in order to ensure a normal commercial outcome. Concerns about export quality should not be an issue in the continuing African market liberalization debate.

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## 1. Introduction

Market liberalization is the most important change in many tropical agricultural commodities over the past decade. Historically, internal markets, particularly in many African countries, were regulated by marketing board or *caisse de stabilisation* mechanisms, with the overt purpose of reducing the variability of farm prices. In certain instances, these schemes enjoyed a measure of success, particularly where the macroeconomic environment was one of stable exchange rates, but more usually they served as taxation mechanisms. They also absorbed resources through rent extraction and retarded the response to the secular declines in prices.<sup>1</sup> Often, the intervention organizations ended up insolvent and, partly through domestic and partly through donor pressure, they have been either abolished or stripped of their powers. At the same time, all the limited number of economically interventionist international commodity agreements (ICAs), which had the objective of smoothing international price variability, have either collapsed or seen their economic clauses lapse.<sup>2</sup>

Liberalization was often promoted by multilateral and national aid agencies, in particular the World Bank, the European Union (EU) and USAID, but were also in certain cases instigated solely by national governments. These programmes were motivated by a number of distinct concerns, including:

- to reduce the absorption of resources by parastatal intervention agencies;
- to increase the efficiency of commodity marketing;
- to raise prices received by farmers and hence to stimulate increased levels of production;
- to promote the development of modern agribusiness industries.

These objectives have been met with varying degrees of success, but at the same time, a number of problems have emerged. Among these is the concern that market liberalization may result in a decline in export quality and, *ceteris paribus*, a decline in the prices obtained by farmers. Worries about possible quality deterioration have been advanced as a reason for retarding liberalization – discussing liberalization of the Togolese cocoa and coffee markets, Akiyama (2001, p104) reports that “the primary sticking point in the negotiations [with the World Bank] was the government’s fear that liberalization would cause the quality of Togo’s coffee and cocoa to deteriorate”.

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<sup>1</sup> See Knudsen and Nash (1990) and Gilbert (1998).

Why should market liberalization result in insufficient attention being paid to crop quality? Two inter-related reasons are frequently advanced:

- a) Countries obtain reputations for higher or lower quality. These quality reputations are public goods. As such, individual producers and exporters have an incentive to free-ride on the national reputation, which can only be enforced by national export quality standards.
- b) It is generally held that, for many crops including cocoa and coffee, quality is primarily determined by the farmer. This suggests the traditional view that quality controls are most efficiently imposed at farm or village level. This is facilitated by the existence of a monopsony purchasing organization. Competition among buyers is an important element in market liberalization. Typically, therefore, up-country controls are replaced by controls at the point of export (ie the port). But at this point it can be expensive to raise quality levels, and this generates a significant incentive to bypass controls.

The consequence of these two effects, it is suggested, is that free-riding and corruption increase, quality controls are less numerous and less effective, and overall export quality declines.

Against this, it can be argued that producers, exporters and importers alike have adequate incentives to maintain minimum quality standards. Product which fails to meet deliverable standards must either be sold at a discount for internal consumption or be expensively reprocessed. Exporters will wish to ensure that they avoid these discounts or costs. The competitive process should result in resources being devoted to the quality improvement until the additional cost of further improvement becomes equal to the additional quality premium. On this view, if export quality does fall following a market liberalization, this would indicate that the state marketing organization was previously insisting on too high a quality level, effectively generating a subsidy from producers (who consumed resources in reaching these quality levels) to consumers (who did not pay the full cost of the qualities they were purchasing).

In evaluating the reputation argument, it is important to distinguish between the objective of ensuring that exports reach normal commercial quality levels and that of

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<sup>2</sup> Gilbert (1996) discusses the reasons for the lapse/collapse of the active international commodity agreements – ie those in cocoa, coffee, natural rubber, sugar and tin. That paper predicted the 1999 demise of the International Natural Rubber Agreement controls. See also UNCTAD (1998).

establishing or maintaining the origin as a premium brand. By definition, only a small number of origins will ever be able to command a premium over the remainder, and the costs of attaining this status need to be weighed against the size of the premium. For most producing countries, the quality issue is that of ensuring a normal commercial standard, not of attaining a quality premium.

The concern that liberalization risks jeopardizing quality has been widespread across the entire range of tropical crop products but has perhaps been particularly acute in the cocoa, coffee and cotton industries. With regard to cocoa, the chaotic liberalization of Nigerian export crop markets in 1987 certainly did adversely affect quality, but this was the result of the poor sequencing of reforms – specifically, the Nigerian failure to liberalize the foreign exchange market prior to undertaking agricultural liberalization.<sup>3</sup> We believe that this was a particularly Nigerian experience which is unlikely to be informative about experience elsewhere. In coffee, the Common Fund for Commodities (2000, p.108) states “One of the main criticisms of liberalisation has been that it has led to a fall in coffee quality. This has been especially true in the period following liberalisation, but is not universally true.”<sup>4</sup> In cotton, Shepherd and Farolfi (1999) claim that where liberalization has resulted in the opening of new ginneries, as in Tanzania, competition between these ginneries has resulted in the mixing of different varieties with adverse effects on quality, but they add that these effects do not appear so pronounced in Uganda.

In this paper, we look in detail at the effects on quality of the market liberalization undertaken in a particular country, Cameroon. We focus on cocoa, where quality concerns were most widely voiced. Cameroon liberalized its cocoa and coffee industries in a number of stages between 1989 and 1995, allowing us to now observe the complete process. Furthermore, the Cameroonian cocoa experience is widely cited as an example of the dangers posed by liberalization to export quality. According to two World Bank economists,

“The quality of Cameroonian cocoa was problematic even before the reforms. These problems became particularly severe after 1990, for two reasons. First, many of the new domestic buyers and exporters showed little regard for quality,

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<sup>3</sup> The consequence was that agricultural exports became a route for obtaining foreign exchange. This resulted in the domestic price of both these products and the export businesses being bid up by those who wished to export naira - see Gilbert (1998) and Varangis and Schreiber (2001).

and second, the quality control provided by the ONCC was both ineffective and unreliable. As buyers and exporters sought to maximize their profits, low- and high-grade beans were increasingly mixed together. Cameroonian farmers paid less attention to drying and fermentation in order to take the opportunity to sell quickly to local buyers. It has been suggested that even buyers who would like to buy high-quality cocoa bid for low quality beans for fear of losing out to a competitor". Varangis and Schreiber (2001, pp. 50-51)<sup>5</sup>

One possibility is that this latter view is simply incorrect, with the consequence that even the World Bank has fallen for mischievous anti-liberalization propaganda. Established exporters, who enjoyed a protected position under the regulated system but who have subsequently ceded market share to multinationals and their local agents (see Gilbert, 1998), have been among the most vocal critics of liberalization and have been quick to claim a link to the apparent decline in cocoa quality.<sup>6</sup> Nevertheless, it would be arrogant to suppose that, because some criticisms of liberalization may be motivated by political or self interest, that they therefore lack any factual basis.

In what follows, we argue that in a liberalized regime, export quality is determined by the interaction of the demand for quality as well as by the quality level that governments seek to provide. In cocoa, where market power resides with the small number of multilaterals which dominate the international trade, farmers should be seen as quality-takers as much as they are price-takers. This view implies that, in the free market, cocoa quality is primarily determined in Europe and north America, not in west Africa or Indonesia. Whether or not liberalization results in a rise or a fall in export quality depends largely on whether, in the pre-liberalization regime, governments were enforcing a higher or lower level of quality than that for which the market is willing to pay. Many of the observations made by Varangis and Schreiber are correct, but the conclusions they and others draw from these observations are misleading.

In section 2 of the paper we provide a brief background on the cocoa industry, and in section 3 we give details of the liberalization process in Cameroon. Section 4 looks at the

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<sup>4</sup> That conclusion was in part based on research summarized in Gilbert *et al* (1999). These authors surveyed the experience in nine (mainly African) coffee-producing countries which had recently liberalized. They reported quality concerns in seven of these countries.

<sup>5</sup> ONCC is the post-liberalization regulation agency – see section 3.

<sup>6</sup> The situation is very similar in coffee and cocoa, with many exporters dealing in both crops

determination of commodity quality and the consequences of regulation within a simple supply-demand framework. In section 5, we consider some informal evidence on cocoa quality in Cameroon. Section 6 looks at the evidence more formally using data from two sources: origin discounts and premia on the London cocoa terminal market, and the unit values of cocoa imports into the EU. In section 7, we use econometric methods to analyze these data. Section 8 concludes.

## **2. The Cocoa Industry**

Cocoa is a tropical tree crop, production of which is concentrated in west Africa and Pacific Asia. Côte d'Ivoire is the largest producer of cocoa beans with approximately one third of world production and over 40% of world exports. Indonesia is the second most important cocoa exporter. In west Africa, Ghana, Nigeria and Cameroon are also major producers and together the four major African exporters are responsible for over 50% of world production and nearly 70% of world cocoa exports.

Cocoa beans are pressed or ground to make cocoa liquor, which in turn yields cocoa butter and cocoa powder. Cocoa butter, combined with varying quantities of liquor, is the raw material for manufacture of chocolate while cocoa powder is largely utilized in the production of confectionery products. Although neither chocolate nor chocolate products are frequently distinguished by country of origin (contrast coffees from different origins) cocoa beans of different perceived qualities do trade at premia and discounts. Quality is important in three respects:

- i) Shipments which contain a high proportion of defective or moldy beans, and also those in which there is too much variation in bean size, will be relatively expensive to process. However, this will not affect the flavour or quality of the resulting butter or powder.
- ii) The quantity and types of different fats in the beans is important. High fat content gives increased butter production and beans from different origins can give a butter with higher or lower melting temperatures.
- iii) Flavour depends primarily on the fermentation process. Poor fermentation can result in over high content of free fatty acids. In areas where beans are artificially dried, use of unsuitable ovens can give rise to an undesirable smoky flavour.

Despite these differences in bean quality, cocoa butter is a near homogenous product and is priced against the terminal market bean price. Cocoa powder, by contrast, is marketed in a

large number of different forms to suit different end-uses. It can be made to order and is typically priced on a list basis as a manufactured good.

Cameroonian cocoa has a number of characteristics which make it attractive on the world market: a good bean size (85/90 in Cameroon as compared with 108/110 in Côte d'Ivoire), high butter content (55-57% fat in Cameroon compared with 54-55% in Côte d'Ivoire), a reddish-brown cocoa powder favoured by grinders because of its strong classic chocolate flavour,<sup>7</sup> a bitter and spicy flavour (high theobromine content) and a very acceptable degree of acidity (Lebailly, 1997). Offsetting these advantages, butter from Cameroonian beans tends to exhibit a low degree of thickness due to a high content in polyunsaturated triglycerides, and in wet years, such as 1996-97, farmers have been obliged to dry beans in ovens rather than under the sun, and this can impart a smoky flavour. The low butter thickness and the astringency of the powder, (properties which derive from the Trinitario Amelonado genotype), normally result in the blending of Cameroonian beans with those from other origins in butter manufacture. For this reason, Cameroonian beans are most prized in the cocoa powder sector rather than for the manufacture of cocoa butter. The taste of smoke is not an important negative factor in cocoa intended for chocolate production since the cocoa butter used for chocolate production may be steam-deodourized. Nonetheless, this is not a routine procedure and cocoa grinders need to be aware of the possibility of smokiness and be prepared to deodourize if they use Cameroonian beans. By contrast, it is impossible to remove any smokiness from cocoa powder so this does constitute a serious problem for that segment of the market.

Cocoa grinding is subject to considerable economies of scale and has become highly concentrated both in terms of plants and firms. Three multinational companies dominate the European grinding industry and two, both with European operations based in the Netherlands, take the largest share of Cameroonian cocoa exports.<sup>8</sup> These large grinders sell butter and powder to the chocolate manufacturers and confectioners, many of which are relatively small and serve local or regional markets. Many small cocoa pressing plants are ceasing to grind their own beans preferring instead to purchase cocoa liquor from the larger processors who

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<sup>7</sup> This factor may be less important than in the past. According to Thery (1996), powder manufacturers are now able to produce the entire range of colours with beans from Côte d'Ivoire, using Cameroon beans as base.

are able to take advantage of the economies of scale in processing and transportation. The economies of scale in cocoa processing are driven by two factors:

- a) grinding costs rise less than proportionately with plant size; and
- b) the lower costs associated with transportation of cocoa “beans in bulk” favours large sea, river or canal-based plants.

The combination of these two factors gives an increasing advantage to large modern plants accessible to water-based transport.

Developments in transport technology were a significant new factor in the cocoa industry during the nineteen nineties. The traditional method of transporting cocoa beans from origins was in jute bags using liners, but this mode of transport has been largely replaced by transportation in container vessels. Beans are transported in containers either bagged or loose. The most recent development has been the use of bulk grain carriers to carry beans, initially from the Côte d’Ivoire but now also from other African origins, to Europe. Jute bags each contain 60-65 kg of cocoa beans, depending on origin; a container will carry up to 25 tons of beans; but loose shipment is in quantities of 3,000 to 10,000 tons. Consequently, only the largest processors can make use of loose shipment. Cameroonian cocoa exports are now largely bulked loose in containers. This technological development has allowed three aforementioned multinational trading companies to dominate the Cameroonian cocoa export trade.<sup>9</sup> We will argue that these technological developments are important in understanding the evolution of cocoa quality.

### **3. Cocoa Market Liberalization in Cameroon**

The west African cocoa market liberalization process is set out in Gilbert (1998) and Varangis and Schreiber (2001). The standard crop marketing structure adopted in countries with a British colonial history was of monopoly-monopsony marketing boards. In the ex-French colonies, by contrast, ownership of the crop remained with the private sector, but the state intervened by setting producer and export prices, by issuing export licences, and by

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<sup>8</sup> 66.4% of Cameroonian bean exports went to the Netherlands in 1998-99, the most recent year for which data are available – International Cocoa Organization, *Quarterly Bulletin of Cocoa Statistics*, **26** (3), Cocoa Year 1999/2000.

<sup>9</sup> There is a much larger number of registered exporters. However, cocoa is bulked together in Douala for shipping by one of the three multinational companies, in certain cases through local agents, with the result that the indigenous export companies have been effectively reduced to local

stabilizing prices through a *caisse de stabilisation*. In cocoa, Ghana and Nigeria operated marketing boards, while Côte d'Ivoire operated a *caisse* system. Marketing boards and *caisses* were absent in non-African cocoa producing countries.

Cameroon, which combines ex-British and ex-French colonial territories, adopted a hybrid model of which the central organization was the ONCPB (*Office National de Commercialisation des Produits de Base*). The ONCPB acted as a *caisse de stabilisation* in the sense that it set both farmgate and export prices, but did not physically intervene in the market. Exporters and cooperatives tended to have monopsony buying rights in historically defined territories. The ONCPB acted to stabilize prices across different producing regions, intra-annually and across years. However, it invested much of its surpluses in illiquid fixed investments some of which were of doubtful profitability.

The dominant feature of almost all primary commodity markets during the nineteen eighties was the marked secular fall in (real and nominal) price levels. Cocoa was no exception. In Cameroon, failure to adjust producer prices downwards in the face of falling world market prices resulted in insolvency of the ONCPB in the late eighties, in the sense that the Central Bank was unable to make available the balances from accumulated stabilization surpluses in order to support producer prices at the pre-announced levels. This situation resulted from the coincidence of low prices for oil, coffee and cocoa, three of Cameroon's four main exports (the fourth being tropical timber). The EU was the lead donor for the cocoa and coffee sectors but was unwilling to use the limited STABEX budget to provide the level of support which would have been required to maintain producer prices over an extended period. Since insolvency of the ONCPB ruled out continuation of the *status quo*, a sequence of reforms was initiated.

First the farm price of cocoa for the 1989-90 campaign was reduced by 40%, and, at the same time, the ONCPB shed a large number of employees. A study was also initiated in 1989 on further reforms to the marketing system and this resulted in the second reform of June 1991. The ONCPB was closed and replaced by the ONCC (*Office National du Café et du Cacao*), which was intended to be a smaller organization with reduced powers. This had responsibilities reduced to intra-year stabilization and quality control. However, ONCPB left very substantial arrears with exporters and with the banking system. The ONCC system set

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trading companies. The multinationals ensure the required minimum quality levels and, in certain cases, also finance the indigenous companies. (Gilbert, 1998; Gilbert and Tollens, 1999).

up in 1991 was based on that used in Côte d'Ivoire. The ONCC set a reference price, but exporters bought directly from producers and sold to the market. Exporters required a licence, but this was no more than a formality. The reference price for each campaign was set as an average over prices already obtained by exporters and of exchange futures prices. Internal prices were set by subtracting "incompressible costs" from this reference price (a version of the Ivorian barème system). Farmgate prices were therefore a residual, with the ONCC obtaining any excess that exporters obtained over the reference price, but compensating them for any shortfall. Producer prices were reduced by a further 12%.

Donor agencies remained dissatisfied with the results of the 1991 reform and this led them to push through a further reform in 1994. The 1991 agreement had envisaged an ONCC of 60 persons, but more than double this number remained employed; quality control procedures were seen as corrupt; accounts were mismanaged; and intra-year stabilization did not work.<sup>10</sup> The donors argued for complete suppression of the ONCC, seen by some as the "caisse noire" of the Cameroonian governing party, but agreed to its continued existence provided its functions were limited to international representation and the compilation of statistics. This third stage of the Cameroonian liberalization coincided with the effects of the January 1994 devaluation of the CFA franc from 50 CFA to 100 CFA per French franc. The effects of the devaluation complicate evaluation of the impact of the liberalization.

Prior to the 1989 liberalization, ONCPB controlled quality both up-country and at the export port (Douala). Since 1989, up-country purchasing and processing of beans has been unregulated and quality controls only take place in Doula. ONCPB quality controls at export level consisted in ensuring that official control norms have been implemented, maintenance of statistical data on the quality of exported commodities, controlling the quality of packaging and the conformity of marking, controlling the effective phytosanitary treatment of commodities, warehouses and shipways, controlling commodity warehousing facilities, controlling the conformity of shipments, checking on deliveries to domestic processing units, and training quality control controllers. These functions passed to ONCC in the 1994-95 reform. However, as part of those reforms, the government withdrew the responsibility for quality control from ONCC in 1997 and transferred it to three private firms.<sup>11</sup>

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<sup>10</sup> Compensation was paid on exports contracts and not deliveries, leaving exporters the flexibility of choosing which export contracts they regarded as having completed.

<sup>11</sup> Two European and a third local. A number of other companies have subsequently registered.

In case of a lot being rejected at export level, there are three possible solutions (Lebailly, 1997):

- a) repackaging - the poor quality product is mixed with a good quality product to obtain an average quality product;
- b) delivery at a discount to the domestic processor SIC-CACAOS for domestic processing;
- c) shipping the low quality product by whatever means possible, including fraudulently.

Each of these routes imposes costs on the trader concerned.

#### **4. The Economics of Commodity Quality**

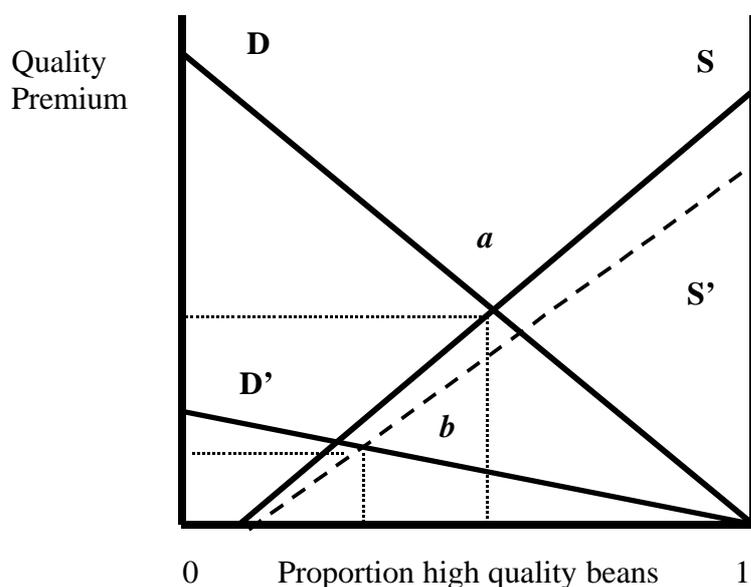
In a regulated market, quality control may either consist of imposition of minimum quality standards or simply of a system for quality classification. Quality classification is also important in a liberalized market, but buyers and sellers will trade higher or lower quality product depending on the market quality premia. Quality may therefore be seen to be an attribute of the product, but an attribute which has its own price.

It is often held that quality can only be effectively regulated at the farmgate, and regulated systems therefore tend to impose minimum quality levels at that stage. This was the case in the pre-liberalization regime in Cameroon. Port controls also often impose minimum quality levels, but may also involve classification of the product in terms of standard and premium grades. In both cocoa and coffee, minimum export standards are typically enforced by diversion of sub-standard beans to domestic processing plants to which they are sold at a significant discount to the fob price. On what follows, we separate the quality determination process into the determination of export quality and the determination of farmgate quality. We model this as a sequence of two partial equilibrium processes.

We first consider export quality before and after market liberalization. Quality is typically a continuum in a number of dimensions. In order to simplify trade, a number of discrete quality grades are identified which attain specified minimum levels in each dimension. In what follows, we simplify by supposing just two exportable grades – a standard quality and a premium quality. These correspond to Fair Fermented (FF) and Good Fermented (GF) in the cocoa trade. The high quality (GF) grade requires additional

processing, and the cost of attaining this grade will depend on the quality of the original material.<sup>12</sup>

For simplicity, suppose the total crop is independent of the quality premium. This implies a rising supply curve for high quality beans and is illustrated by the line *S* in Diagram 1. There is a declining demand curve for quality reflecting the fact that payment of any specified quality premium will only be justified in certain uses, or perhaps only by certain users. Equality of supply and demand gives equilibrium at *a*.



**Diagram 1: Determination of Export Quality**

We shall argue in section 5 that liberalization was associated with (in the sense that it facilitated but did not directly cause) a flattening of the demand curve for quality, illustrated in Diagram 1 by the shift from *D* to *D'*. The supply curve probably also shifted down to *S'* for a reason we will discuss later. The equilibrium shifts to *b*, where the quality premium is lower than in the pre-liberalization equilibrium *a*. On the assumption that the demand curve shifted by more than the supply curve, the quantity of high quality beans also declines.

<sup>12</sup> In Cameroon, non-exportable beans are classified as Hors Standard (HS) and are processed by the single local processing plant. The HS discount is determined by the cost of regrading and discarding the defective beans so that the FF standard is attained. There is no evidence that the proportion of HS beans changed over the Cameroonian liberalization process so we ignore these in the analysis. Our analysis may be extended to allow a third quality but diagrammatic exposition becomes more complicated.

However, if there had been no shift in the demand curve, the proportion of premium product would have risen.

We now turn to farmgate quality. Here there is no explicit classification, but minimum quality standard were imposed in the regulated regime. Cocoa beans may either be processed by farmers or intermediaries. The issue we explore is whether processing required to attain desired quality levels is undertaken by farmers or intermediaries. We simplify by supposing the quantities of standard and high grade products have been determined in the port equilibrium illustrated in Diagram 1.

In Diagrams 2 and 3 we illustrate the cost of producing a desired level of export quality, say the standard FF level. (The same argument would apply to the premium GF grade). Farmgate quality is measured along the horizontal axis where the levels 0 and 1 indicate respectively wet unfermented beans and FF export quality beans.<sup>13</sup> In Diagram 2,  $TC^f$  is the farmers total cost curve for producing FF beans and  $TC^i$  is the total cost curve for intermediaries.  $MC^f$  and  $MC^i$  are the corresponding marginal cost curves. The curves have been drawn on the assumption that certain processing activities (perhaps fermentation) are most cheaply carried out by farmers, while others (perhaps drying) are most cheaply carried out by intermediaries. The total amount of processing required is independent of who does it. We have assumed that neither farmers nor intermediaries has an absolute cost advantage in processing, but this assumption is not necessary.

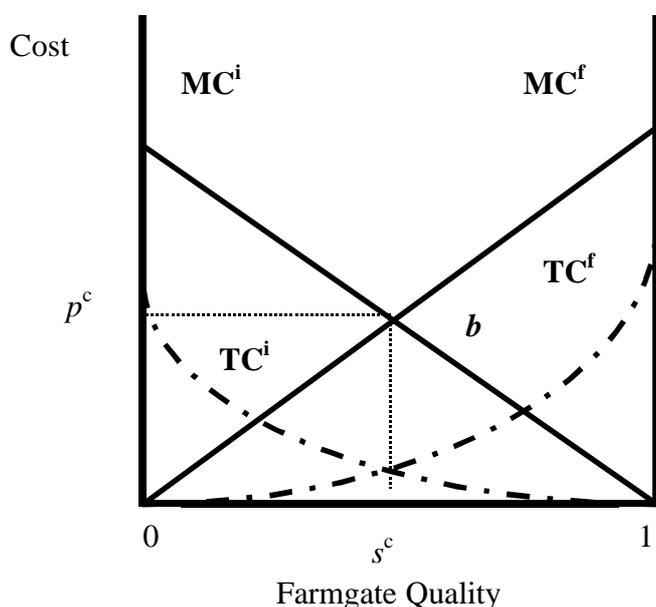
The competitive (post-liberalization) outcome is illustrated in Diagram 2. Competition gives an equilibrium at the point  $b$  where  $MC^f = MC^i$ .<sup>14</sup> Buyers pay a price  $p^c$  above the level for unprocessed beans. Farmers undertake a level of processing  $s^c$  and intermediaries  $1 - s^c$ . If buyers were to seek a high level of farmer processing, they would be obliged to pay more than it would cost them to pay intermediaries to undertake the marginal processing. On the other hand, a lower level of processing would result in them incurring processing costs in excess of the price they would pay to farmers. This quality level is also socially efficient in the sense that it minimizes total processing costs.

Diagram 3, which reproduces the two marginal cost curves from Diagram 2, characterizes the pre-liberalization position. As indicated above, we suppose that farmgate

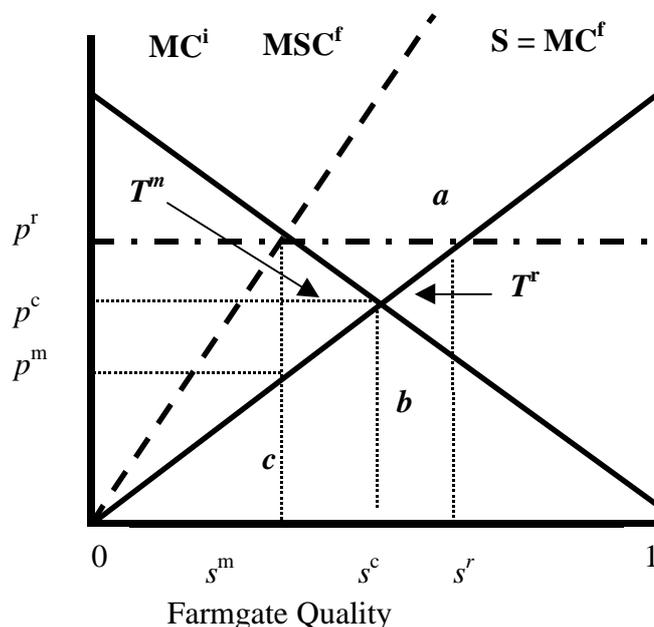
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<sup>13</sup> In Diagram 1, the horizontal axis measured export quality, here held constant, not farmgate quality. The two sets of diagrams do not directly relate to each other.

quality is regulated to impose a minimum farmgate quality level, shown by the horizontal line in Diagram 3. In this case, equilibrium is at  $a$  with the farmers undertaking processing  $s^f$  and receiving a premium of  $p^f$ . There is a welfare cost, relative to the competitive position, given by triangle  $T^f$ , which measures the additional cost of processing being borne by farmers rather than intermediaries. If this characterizes the pre-liberalization position, liberalization should be accompanied by a decline in farmgate quality with a greater proportion of processing undertaken by intermediaries.



**Diagram 2: The Cost of Farmgate Quality under Competition**



**Diagram 3: The Cost of Farmgate Quality under Regulation and Monopsony**

Diagram 3 also illustrates the possibility of monopsony. This could arise either in the regulated regime if buyers are allocated territories, or as the consequence of a high level of market concentration in the liberalized regime.<sup>15</sup> The farmers' marginal cost curve  $MC^f$  is the supply of quality curve for the monopsony buyer. As in standard monopsony models

<sup>14</sup> In Diagram 2, we also have  $TC^f = TC^i$  at point  $a$ . This is a consequence of our symmetry assumption but does not apply more generally.

<sup>15</sup> This is a frequently expressed fear. In practice, concentration tends to remain low at the purchasing stage even when exporting becomes concentrated. This is because, although some large exporters do have purchasing operations, much of this activity is contracted out to small traitants, some of

(compare the demand for labour in a local labour market by a dominant employer), as the monopsonist moves along the supply curve, he bids up the price of quality against him. Equilibrium is at the point  $c$  which equates the marginal processing cost incurred by the intermediaries, given by  $MC^i$ , to the farmers' marginal supply cost for quality, given by the line  $MSC^f$ . Farmers receive the lower price  $p^m$ , and undertake a smaller proportion of the processing ( $s^m$  as compared with  $s^c$ ). The monopsonistic regime imposes a deadweight loss, measured by triangle  $T^m$ , and arising in this case out of processing costs being wastefully borne by intermediaries rather than farmers. If this were the correct characterization of the pre-liberalization position, liberalization should be associated with a rise in farmgate quality and in farmer processing.

In the case illustrated in Diagram 3 the regulated quality level is sufficiently low that the welfare loss from regulation ( $T^r$ ) exceeds that from monopsonistic exploitation ( $T^m$ ). This is always possible and provides a rationale for farmgate quality controls in a regime in which buyers (either private companies or a state marketing board) has monopsonistic power. However, there is no requirement for farmgate quality regulation in a competitive environment, and any regulation will impose efficiency costs.

In a full exposition, we would need to consider quality determination at the farmgate and the port as a joint process. The inefficiency associated with the regulated farmgate equilibrium  $a$  in Diagram 3 implies a downward shift of the supply curve in Diagram 1 to  $S'$ . This will imply an off-setting rise in the proportion of premium beans. The partial equilibrium analysis we have employed is justified if this shift is small.

Inevitably, the supply-demand framework we have employed has predictive value only in so far as we are able to specify the shifts in the relevant schedules resulting from liberalization. In the Cameroonian cocoa context, we have supposed a lower and more elastic export demand for premium quality cocoa, as the consequence of the change in transportation technology, and the abolition of a minimum farmgate quality standard as the result of the ending of ONCPB farmgate controls. Under reasonable assumptions, the model implies

- a) a decline in the proportion of premium quality cocoa in cocoa exports;
- b) a decline in the premium offered for premium quality cocoa; and
- c) a shift in processing from farmers to intermediaries.

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whom may be financed by the exporters. Purchasing of beans involves relatively little capital and is not subject to economies of scale.

In sections 5-7 we show that this is exactly what has taken place.

## 5. Informal Evidence

The first implication of our analysis is that we should see a decline in the proportion of premium cocoa exported as the result of the diminished elasticity of demand for quality induced by the move to containerized transportation. Support for this position may be derived from official statistics on cocoa grades export.

Prior to 1992, Cameroon classified cocoa into three classes (based on the FAO Codex Alimentarius): Grade 1, Grade 2 and Hors Standard (HS). Subsequently, the four way classification used by the Association Française du Commerce de Cacao (AFCC) has been used: Good Fermented (GF), Fair Fermented (FF), Fair Average (FA) and HS. The AFCC classification is regarded as more permissive than the FAO system but the two classification systems do not map precisely one into the other. However, one may approximate FAO Grade 1 to AFCC GF, FAO Grade 2 to AFCC FF and regard FAO HS as comprising AFCC FA and HS.

Table 1 shows the evolution of cocoa quality at export relative to these norms. The most notable feature is the substantial decline in the proportion of lots achieving the premium GF grade. This apparent decline in quality is coincident with the change from the FAO to the AFCC classification norms but there is evidence of a shift from the GF to the FF classification in the final crop year classified under the FAO system. But in any case, this shift took place when ONCPB-ONCC remained responsible for quality control prior to the main 1994-95 market liberalization.

	Old Norms		Current Norms						
	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
<b>Grade 1, GF</b>	76%	51%	10%	21%	18%	17%	12%	7%	14%
<b>Grade 2, FF</b>	19%	45%	82%	78%	79%	72%	71%	90%	86%
<b>HS (including FA)</b>	5%	4%	8%	1%	3%	11%	17%	3%	0%

Source: 1990-91 to 1997-999 ONCC/SQR; 1998-99 CICC *Cocoa-Coffee News Bulletin*

We contend that this change is largely explicable in terms changes in cocoa transportation technology – see Gilbert (1998). Historically, cocoa was sacked and transported in liners. This allowed exporters to distinguish premium quality cocoa from the

remainder. The shift to bulk container transportation of cocoa prevents exporters distinguishing different quality lots. In order to export at GF level, an exporter must transport the cocoa in sacks and this adds to his handling costs. The consequence is that it does not pay him to use GF cocoa in so many uses as prior to the change in transportation technology. On this argument, the shift to bulk transportation resulted in a downward shift in exporters' demands for premium (GF) quality cocoa from D to D' in Diagram 1. This will have resulted in a lower proportion of high quality beans and a lower quality premium – the move from *a* to *b*. Few exporters are willing to pay a premium for GF cocoa, and as a consequence, farmers are no longer willing to put in the additional time to ferment their beans to the extent required for the GF classification. Instead, most beans are sold at the FF level. This view, which is consistent with the statistics in Table 1, implies a homogenization of quality at the FF level and not an overall decline in quality. This homogenization effect is peculiar to cocoa, and did not take place, for example, in the export of Cameroonian coffee which is still largely transported in sacks.

Liberalization did not cause this process, which indeed started prior to the main Cameroonian liberalization in 1994. However, it may have played a permissive role in this process by facilitating improved market access by the multinational trading companies which have the size and resources to employ bulk transportation technology.

The second, related, implication of the analysis is that we should expect to see a decline in the premium offered for high quality cocoa by traitants. The informal evidence we can offer here is that, on a 1999 field trip to the coffee and cocoa-growing areas of Cameroon, the authors observed traitants advertising<sup>16</sup> premia for high quality coffee but not for high quality cocoa.

The third implication of our analysis is that we should expect to see a shift in processing from farmers to intermediaries. Here again, we offer only informal evidence. For example, Nzekoué and Labey (1997), who wish to complain about the effects of liberalization, report that cocoa is being sold by farmers with a lower level of processing. They assert “Avec la libéralisation de 1993, l’Etat s’est désengagé des opérations de commercialisation. Seul subsiste l’ONCC ... censé contrôler la qualité. Dans le même temps, la vente au plus offrant a entraîné une prolifération d’acheteurs non professionnels, peu préoccupés par la qualité du produit. On compte aujourd’hui près de 300 exportateurs. Le

paysan a cédé au manque d'exigence des acheteurs. "*L'appât du gain facile aidant, on se livrait à tous les abus: récolte avant maturité totale, fermentation incomplète, séchage défectueux, mélange de différents grades, etc.*", déplore un producteur". They go on to quote a buyer ("acheteur ambulante") as stating "*Avec la concurrence, je suis obligé d'acheter du cacao humide et de le sécher moi-même. J'ai aménagé six séchoirs en plein air. Si je ne le fais pas, c'est un concurrent qui le fera à ma place.*"<sup>17</sup>

A similar situation prevails in the coffee marketing chain. Tasse (1995), who also laments the effects of liberalization, asserts "Illustration de cette tendance, les difficultés de la Cacep, l'un des plus gros intervenants de la filière café-cacao. "*Cette année, nous allons exporter moins de 1200 t de café contre 20000 t en période normale*", soupire Sambilis Spiros, directeur de l'usine Cacep-Bare. "*J'avais dans les registres 3627 planteurs dans cette usine*", ajoute-t-il; "*c'est à peine s'ils sont 50 aujourd'hui.*" Faute des produits, Cacep s'est vu obligée d'être moins exigeante sur la qualité."<sup>18</sup> Cacep is an old-established exporter which had prospered under the regulated semi-monopsonistic regime. Many of these exporters accuse post-liberalization entrants to the marketing chain of paying insufficient evidence to quality. Gilbert and Tollens (1999) found no evidence to justify this accusation.

The foregoing evidence is suggestive but cannot be conclusive. This motivates us to analyze the prices which importers pay for Cameroonian cocoa on the basis that if the quality of Cameroonian beans fell relative to those from other origins, this will be reflected in the relative prices of cocoa from the various origins in the importing countries.

## **6. Evidence from Relative Prices**

We have asserted two effects: a standardization of cocoa quality at the AF level, together with an associated decline in the GF premium, and a shift in quality processing from farmers to intermediaries. The former effects, which we claim are the result of a change in transportation technology, should be common to all origins and should therefore entail no long run change in relative cocoa prices. With regard to the latter effect, if intermediaries did indeed take over quality production functions from farmers, this will have had no effect on relative fob prices, and hence also none on cif prices in Europe. If however, the decline in

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<sup>16</sup> By means of a board erected on the roof of the traitant's pick-up truck.

<sup>17</sup> Italics in original. We acknowledge that this does not, by itself, imply that intermediaries have taken over these functions.

farmgate quality is reflected in a decline in export quality, we should expect to see a decline in the relative price received by Cameroonian exporters.

There are two sources of information we can consider in making such comparisons:

- a) the relative unit values of cocoa imports into consuming countries; and
- b) the premium or discount received by Cameroon on the terminal markets relative to those received by comparable origins.

The terminal market data have often been cited in the cocoa trade as showing a decline in the quality of Cameroonian exports. However, to the best of our knowledge, import unit value data have not previously been analyzed in this context.

The EU is the main destination for all west African cocoa exports. We use monthly data from the COMEXT databank (part of EUROSTAT) for the period January 1988 to March 2001. The figures give the quantities and the euro (previously ecu) value of cocoa imports recorded at European customs services on the standard EUR.1A customs document. This document is completed on the basis of the invoiced tonnage and value of each shipment. The ratio of the euro value to the tonnage gives the euro unit value, which we may interpret as the cif import price.

Import unit value data have the merit of recording prices actually paid, but tend to be noisy on account of heterogeneity in quality and because they show the net outcome from purchasing and certain hedging decisions. In particular, invoiced values will depend on the date at which the price was fixed, and this may result in an imperfect correlation with the terminal market price at any particular lag – see section 7. Monthly unit values for cocoa imports for Cameroon, Côte d’Ivoire, Ghana and Nigeria are charted in Figure 1. Visually, these appear to exhibit a common trend, removed in Figure 2 which graphs the relative unit values of Cameroon, Ghana and Nigeria in each case as a percentage of the Ivorian unit values. None of the three charted relative unit values shows any evidence of a trend.

Our second source of information are the premiums and discounts negotiated relative to the LIFFE terminal market price for trades intermediated by the London cocoa trade. Here, we have a weekly series commencing in January 1992 and extending to November 2001.<sup>19</sup> The series relate to six month forward transactions and are reported in sterling. These premia

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<sup>18</sup> Italics in original. It is possible that the reported 1,200 tons should read 12,000 tons.

<sup>19</sup> LIFFE is the London International Financial Futures Exchange, now part of Euronext, which took over the London Commodity Exchange in 1996. We are grateful to E.D.&F. Man for these data.

and discounts reflect perceived quality differences for cocoa deliverable on the London market, and also possibly risk premia associated with perceived performance risk. For the regression analysis reported below, we have converted the sterling differentials to euros (ecus prior to 2000) using the six month forward sterling-euro exchange rate.<sup>20</sup>

The advantage of these terminal market data is that they are market price quotations. The disadvantage is that they relate to beans traded through or tendered on the London terminal market, and these may not be representative of the beans exported from the origin in question. This problem is acute for Cameroon and Ghana since, for different reasons, cocoa from these two origins is typically not delivered to or obtainable from the London terminal market. Gilbert (1998) reported that, in 1995, 68.4% of deliveries to the LIFFE market were Ivorian and 21.6% Nigerian. By contrast, Cameroon accounted for only 0.7% and Ghana for only 0.3% of deliveries.<sup>21</sup> Approximately 90% of Cameroonian beans are purchased directly in Douala by the three major European cocoa grinders and are shipped in bulk to their European facilities. Cocoa traded in the London market is likely to be exported in bags by one or other of the remaining independent exporters. Some of this may be premium quality cocoa, but some may also be lower quality beans declined by the two major Dutch-based exporter-grinders. Furthermore, the LIFFE differentials include a performance risk element which will not apply to the major exporters where the export transaction has been internalized. In these circumstances, it is neither clear that the LIFFE differentials are very representative of actual prices for Cameroonian cocoa or that they are given much weight in the pricing decisions of the three major exporters. We investigate this issue in section 7.

Our complete sample of quality differentials for the four major west African origins is graphed in Figure 3. The figure shows Ghanaian cocoa trading at a premium to the terminal market of between £10/ton and £110/ton while Côte d'Ivoire and Nigeria are generally close to parity. The consistent Ghanaian premium testifies to the considerable investment made by the Ghanaian Cocoa Board in maintaining a premium quality export brand. The Cameroonian experience is more complicated, with Cameroonian beans earning a premium comparable to Ghanaian beans in 1992 and 1995, but otherwise trading at a differential close to or below those of Ivorian and Nigerian beans. It is notable that the sterling Cameroon differential,

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<sup>20</sup> Source: Datastream. For the period 1992-96, during which Datastream only reports a spot ecu rate, we calculate the forward premium using the CIP arbitrage condition in conjunction with six month sterling and ecu interest rates.

relative to that of Côte d'Ivoire and averaged over crop years, correlates positively ( $r = 0.53$ ) with the quality percentages listed in Table 1 scored as +1 for GF, 0 for FF and -1 for HS.

The absolute level of the terminal market differentials are determined by the attractiveness of delivering to or taking delivery from an exchange warehouse. In weak market conditions, such as those experienced in 1997 and 1998, brokers may deliver surplus beans into the market and premia and discounts will reflect the quality of these beans relative to the cheapest-to-deliver beans (typically Ivorian over this period). In periods such as this, the discount of Cameroonian, Ivorian and Nigerian beans relative to the market price reflects the costs of grading to meet exchange specifications and the possibility that some lots will be rejected and require regrading. In tight market conditions, such as those prevailing in 2001, brokers will not wish to pay these expenses and will prefer to deliver directly to users. They may also need to take some deliveries from exchange warehouses where, however, they will find only the least good beans remaining. In these circumstances, it is these relatively low quality beans that the terminal market prices while newly picked beans from all origins will trade at a premium to the terminal market price.<sup>22</sup> For these reasons, quality differentials are better reflected by differential relativities, which we again take using Côte d'Ivoire as base – see Figure 4.

Figures 2 and 4 suggest conflicting interpretations. The relative EU import unit values graphed in Figure 2 do not show the post-liberalization experience in Cameroon to have differed from that pre-liberalization. By contrast, visual inspection of Figure 4 does suggest that Cameroon has obtained less good prices, relative to the LIFFE market, over recent years than historically. If we compare the relative unit values and terminal market differentials for the four pre-liberalization years 1991-92 to 1994-95 with the four post-liberalization years 1996-97 to 1999-2000 (dropping 1995-96), the terminal market differentials data suggest Cameroon lost an average of €30/ton (approximately €3m per annum) while the unit value data suggest a much smaller figure of €5/ton (approximately €½m per annum). In section 7, we employ econometric tools to resolve this issue.

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<sup>21</sup> We have been unable to obtain more recent data.

<sup>22</sup> This implies that the terminal market underprices relative to commercial transactions in periods of tight supply. This underpricing was of the order of 5%-7% in 2001.

## 7. Econometric Analysis

We wish to analyze whether there is a trend in (a) Cameroonian relative cocoa unit values and (b) the Cameroonian relative cocoa market differential on LIFFE, and (c) how these findings relate to each other. Since there is no reason to expect any trend to be deterministic, we test for the presence of stochastic trends. The first such tests we perform are ADF unit root tests.<sup>23</sup> If a time series is (weakly) stationary, its mean and variance are constant over time, and hence it cannot exhibit either a deterministic or a stochastic trend. Instead, the series will revert back towards its mean. If the series does not mean-revert, it is said to exhibit a unit root, and is non-stationary.

We use the ADF methodology to test the null hypothesis of the presence of a unit root in the (logarithms of the) four unit value series and the four LIFFE differentials. We also use the same methodology in relation to the (logarithms of the) three relative unit value series and the three relative terminal market differentials, where in each case the relativity is with respect to the Ivorian series. In the event that the data fails to reject a unit root in the absolute (unit value or differential) series but rejects a unit root in the relative series, we may conclude that the two absolute series are cointegrated, and share a common trend.<sup>24</sup>

The results, given in Table 2, confirm the non-stationarity of the four unit value series, but also the stationarity of the three relative unit value series. These tests confirm the visual impression from Figure 2 that there is no trend in any of the three relative cocoa unit value series.<sup>25</sup> The table also shows all four LIFFE differentials to be non-stationary, as is visually

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<sup>23</sup> The Augmented Dickey-Fuller (ADF) test is a standard test for the presence of a unit root. The test is based on the regression  $\Delta y_t = \gamma_0 + \sum_{j=1}^k \gamma_j \Delta y_{t-j} + \delta y_{t-1}$ . The ADF test rejects the null

hypothesis of a unit root if the coefficient  $\delta$  is sufficiently negative, implying mean reversion.

However, the  $t$ -statistic on this coefficient follows the non-standard Dickey-Fuller distribution and not the Student distribution - see Banerjee and Hendry (1992).

<sup>24</sup> The lag parameter  $k$  in the ADF test should be as small as possible as is consistent with white noise residuals on the DF regressions. Three lags proved sufficient for the unit value tests which employ monthly data, but we needed six lags for the tests on the weekly LIFFE differentials data.

<sup>25</sup> We also performed the same tests on data for Cameroonian and Ivorian coffee unit values. The ADF(3) values for the log unit value series for Cameroon and Côte d'Ivoire were respectively -1.87 and -1.57, while that of the relative unit value series was -3.84 (sample May 1988 to December 2000). This allows us to accept the hypothesis of a unit root in both unit value series but to reject the presence of a unit root in the relative unit value series, both at the 95% and the 99% levels. Use of these data to analyze quality in the coffee market is more problematic than in the cocoa market, because of the heterogeneity of coffee beans. Côte d'Ivoire produces only robusta beans, while Cameroon, although predominantly a robusta producer, also exports some more valuable arabica beans. The EU unit value series do not distinguish between robustas and arabicas.

apparent from Figure 3, but only confirms the Ghanaian and Nigerian relative differentials as being stationary. There is therefore statistical evidence of trending behaviour in the relative Cameroonian bean differential.<sup>26</sup>

<b>Table 2</b>				
<b>ADF Stationarity Tests</b>				
	<b>ln(unit value) ADF(3)</b>		<b>LIFFE differentials ADF(6)</b>	
	<b>absolute</b>	<b>relative</b>	<b>absolute</b>	<b>relative</b>
<b>Cameroon</b>	- 2.43	- 4.79 **	- 1.14	- 2.39
<b>Côte d’Ivoire</b>	- 2.25	-	0.20	-
<b>Ghana</b>	- 2.52	- 4.16 **	0.95	- 3.48 **
<b>Nigeria</b>	- 2.46	- 5.22 **	- 0.18	- 4.95 **

\* indicates significance at the 95% level, \*\* at the 99% level.  
Sample: May 1988 to March 2001 (unit values); January 1992 – November 2001 (differentials).

The ADF tests reported in Table 2 would be sufficient if we were to focus solely on the Cameroonian and Ivorian unit values, but are insufficient with four series. In particular, the choice of Côte d’Ivoire unit value series as numeraire might be arbitrary. The ADF tests on the import unit values indicate the existence of three cointegrating pairs from four variables, and this implies a single common trend. Similarly, the ADF tests on the LIFFE differentials data suggests two cointegrating pairs. We can test formally for these combinations using the Johansen (1991) procedure which is based on the rank of the so-called static matrix implied by a Vector AutoRegressive (VAR) model. The rank of this matrix is asymptotically equal to the number of cointegrating vectors, ie the number of distinct stationary combinations of the VAR variables.<sup>27</sup> The ADF tests indicate that the rank should be three for the unit value data and two for the differentials data.

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Evidence of a change in relative unit values would be consistent with a changed balance between the two varieties as well as with changes in quality.

<sup>26</sup> We also tested for trend stationarity, ie stationarity relative to a deterministic trend. The ADF(6) statistic for Cameroon is -3.39 which marginally fails to reject at the 5% level. However, five lags would suffice in this case. This gives an ADF(5) statistic of -3.54 which is significant at the 5% level.

<sup>27</sup> Consider the ADL(k) model (ie Autoregressive Distributed Lag model with k lags) as

$$\Delta y_t = \Gamma_0 + \sum_{j=1}^k \Gamma_j \Delta y_{t-j} + \alpha \beta' y_{t-k-1}$$

The claim that there is a single common trend is then

<b>Table 3</b>						
<b>Johansen Rank Tests</b>						
	<b>ln(unit value)</b>			<b>LIFFE differentials</b>		
<b>Rank</b> <b><math>\rho^*</math></b>	<b>Log-likelihood</b>	<b>Trace test</b>	<b>Tail probability</b>	<b>Log-likelihood</b>	<b>Trace test</b>	<b>Tail probability</b>
0	762.99	111.72	0.00%	- 6429.61	125.03	0.00%
1	787.37	62.95	0.00%	- 6392.14	50.10	0.00%
2	805.24	27.21	0.00%	- 6374.43	14.97	6.50%
3	816.16	5.37	2.05%	- 6367.49	0.79	37.3%
4	818.85			- 6367.09		

Sample: as Table 2.

The results are given in Table 3. The first block of three columns relate to the four unit value variables and are based in a VAR(3) representation. The tests clearly reject a rank of less than three (ie more than one common trend). However, the trace test also rejects a rank of three or less at the 95% but not the 99% level. A rank of four would imply that all four unit value series are stationary, which would contradict the results of the ADF tests reported in Table 2. However, we may strengthen this test by imposing the condition of a unit cointegrating vector.<sup>28</sup> This was the condition imposed in applying the ADF methodology to the relative unit value and differential series and reported in columns 2 and 4 of Table 2. This gives a log-likelihood of 815.24. The combined test of cointegration plus a set of three cointegrating vectors gives a  $\chi^2(4)$  likelihood ratio of this set of restrictions of 7.22, associated with a tail probability of 12.47%. The combined hypothesis is therefore acceptable at the 95% level and the Johansen test confirms the more simple ADF tests.

In the second block of three columns of Table 3, the Johansen procedure is applied to the differentials data using a VAR(4) representation. A rank of two or less is rejected at the 10% but not the 5% level, while a rank of three or less is unambiguously rejected. This is exactly in line with the results of the ADF tests reported in Table 2. Overall, therefore, the

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formulated as the hypothesis that  $\rho = \text{rank}(\alpha\beta') = k-1$ . For any proposed rank  $\rho^*$ , Johansen's trace test sets the null  $H_0: \rho \leq \rho^*$  against the alternative  $H_1: \rho > \rho^*$  – see Johansen (1991).

<sup>28</sup> We impose the known  $\beta'$  matrix  $\beta' = \begin{pmatrix} 1 & -1 & 0 & 0 \\ 0 & -1 & 1 & 0 \\ 0 & -1 & 0 & 1 \end{pmatrix}$  where the columns of the  $\beta'$  matrix relate to

Cameroon, Côte d'Ivoire, Ghana and Nigeria in that order.

unit root analysis confirms the visual impression obtained from Figures 2 and 4. The relative EU import unit values show no sign of any change in the price paid for Cameroonian cocoa over the liberalization period, while the LIFFE differential data do indicate a lack of homogeneity over the same period.

In order to resolve the apparently different implications of the two datasets, we regressed the monthly EU import unit values on lagged values of the LIFFE differentials, aggregated onto a monthly basis and converted into ecus/euros, over the common sample (April 1993 to March 2001 after allowance for lags). The unit values and differentials are both measured taking Côte d'Ivoire as base. As noted in section 6, the relationship between import unit values and LIFFE prices will depend on the number of months ahead import prices were set. This is likely to differ across importers, who will have different hedging practices, across exporters, who may insist on different arrangements, and over time. Regression estimates will average across these different arrangements, and so must be regarded as, at best, approximations. We have regressed the three relative unit value series on a lagged dependent variable, and lagged relative differentials with lags of up to 15 months. We have not restricted the unit values to depend only on the differentials for that country. To simplify presentation, we have set the vast majority of insignificant lag coefficients to zero. The resulting estimates are undoubtedly suffer from pre-test bias, but since we make no pretense that they are in any sense structural, we do not regard this as important.<sup>29</sup>

Estimates are given in Table 4. The table also gives Lagrange Multiplier (LM) omitted variable tests on the three differential lag distributions. The Ghanaian and Nigerian equations are similar and in each case show the respective import unit values as depending on both the Ghanaian and Nigerian LIFFE differentials at short (one and three month) and long (fourteen and fifteen month) lags. The importance of the Nigerian differential in Ghanaian unit value equation reinforces the suggestion made in section 6 that, because of the low volume of Ghanaian cocoa tendered on the London market, these quotations may not be representative of actual prices paid for Ghanaian cocoa. The significance of the coefficients

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<sup>29</sup> An alternative procedure would have been to estimate an unrestricted VAR(15) and to examine the derived impulse functions.

relating to the fourteen and fifteen month lags testifies to the practice of some cocoa importers in fixing prices over one year ahead.<sup>30</sup>

<b>Table 4</b>			
<b>Regression Results</b>			
	<b>Cameroon</b> <i>CMUV<sub>t</sub></i>	<b>Ghana</b> <i>GHUV<sub>t</sub></i>	<b>Nigeria</b> <i>NIUV<sub>t</sub></i>
Intercept	83.47 (7.25)	67.68 (8.75)	90.54 (10.20)
Lagged dependent variable	0.1915 (0.0690)	0.2019 (0.0969)	0.0818 (0.1000)
Lagged Ghanaian differential <i>GHDIF<sub>t-1</sub></i>		0.0882 (0.0465)	
Lagged Ghanaian differential <i>GHDIF<sub>t-15</sub></i>		0.1790 (0.0524)	0.0917 (0.0404)
Lagged Nigerian differential <i>NIDIF<sub>t-1</sub></i>		0.3901 (0.1711)	
Lagged Nigerian differential <i>NIDIF<sub>t-3</sub></i>	0.3232 (0.1573)		
Lagged Nigerian differential <i>NIDIF<sub>t-14</sub></i>			0.3943 (0.1600)
Cameroon liberalization dummy, lagged 15 months	- 2.973 (1.237)		
August 1999 dummy	50.99 (5.20)		
LM test: <i>CMDIF<sub>t-r</sub></i> ( $r = 1, \dots, 15$ )	$F_{15,76} = 0.55$ [90.2%]	$F_{15,76} = 0.57$ [88.9%]	$F_{15,77} = 1.03$ [43.3%]
LM test: <i>GHDIF<sub>t-r</sub></i> ( $r = 1, \dots, 15$ )	$F_{15,76} = 0.90$ [56.6%]	$F_{13,78} = 0.94$ [51.5%]	$F_{14,78} = 1.09$ [38.0%]
LM test: <i>NIDIF<sub>t-r</sub></i> ( $r = 1, \dots, 15$ )	$F_{14,77} = 0.71$ [75.4%]	$F_{14,77} = 1.18$ [30.5%]	$F_{14,78} = 0.56$ [88.5%]
<i>Estimated total pass-through</i>	40.0%	82.4%	52.9%
R <sup>2</sup>	0.5955	0.3336	0.1506
standard error	5.77	6.58	5.92
Durbin-Watson statistic	1.99	1.89	2.00
Notes: Sample: April 1993 – March 2001; standard errors in “(.)” parentheses; right hand tail probabilities in “[.]” parentheses. All variables are measured in euros and are measured relative to the corresponding Ivorian variable. The estimated total pass-through is the sum of the coefficients on the differential variables divided by one minus the coefficient on the lagged dependent variable.			

<sup>30</sup> It is believed that a major UK importer which traditionally uses Ghanaian and Nigerian beans follows this practice. It is unattractive to tender Ghanaian cocoa on the terminal market because the quality of Ghanaian beans is much higher than that specified in the LIFFE contract.

The Cameroonian unit value equation differs from this pattern, with the only dependence arising from a short lag on the Nigerian differential. A liberalization dummy (one from January 1996) enters significantly with a lag of fifteen months.<sup>31</sup> This implies a small loss of €3.65/ton consequential on liberalization – close to the €5/ton estimate made in section 6. The LM test clearly rejects the presence of the relative Cameroonian differential as a determinant of the Cameroonian unit value. Indeed, it is notable that the Nigerian differential appears to give a better guide than the Cameroonian differential in relation to the price actually paid for Cameroonian beans. This, together with the significance of the Ghanaian and Nigerian differentials as determinants of the import unit values from these two origins, supports the suggestion, made in section 6, that the LIFFE differential for Cameroonian cocoa relates to unrepresentative packages of beans. The correlation, noted in section 6, between these differentials and the grading results reported in Table 1 suggests that a high proportion of the low quality beans which evade export quality controls feature in the small number of lots of Cameroonian beans traded on the London market.

The implication of this analysis for the quality debate is that the EU unit value data appear to provide a more reliable measure of the price paid for, and hence the quality of, Cameroonian beans than do the more frequently quoted terminal market differentials. The unit value data suggest only a very modest price loss following liberalization. This loss is consistent with the homogenization of Cameroonian cocoa exports following the development of containerized transport and the consequentially diminished incentive to produce high specification (GF) grade cocoa documented in section 5. It is arguable that this homogenization, or at least the speed at which it took place, was an indirect consequence of liberalization, but that is simply because the change in technology induced a shift in the demand curve for high quality cocoa as outlined in section 4.

## 8. Conclusions

It is often claimed that market liberalization of developing country produce markets jeopardizes quality. This claim has been made of cocoa, coffee and cotton market

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<sup>31</sup> The dummy is set to one from the approximate start of exports in the 1995-96 crop year. The precise lag length is not well-determined, but the evidence suggests that the decline took place approximately one year later. The equation also contains a dummy which takes the value 1 in August 1999,  $-1/6$  in October 1999 and January 2000, and  $-1/3$  in November 1999 and December 1999. This appears to be a timing effect, perhaps arising from a major hedging transaction.

liberalizations across the African continent. Here, we have looked at the particular experience in the Cameroonian cocoa sector which liberalized in three stages between 1989 and 1995.

There have been widespread complaints of quality deterioration in relation to Cameroonian cocoa. In particular, there is informal evidence that the increased competition for cocoa at the “farmgate” and the cessation of up-country controls has resulted in farmers selling less well prepared cocoa beans. However, this can be consistent with maintenance of FF quality at export if the internal cocoa trade devotes resources to the processing which previously would have been undertaken by the farmers. This processing will typically involve additional drying and grading, but may exceptionally involve some fermentation. This is the implication of the model explored in section 4. It is a market outcome – efficient internal traders are able to out-bid their less efficient competitors and provide these processing services at a sufficiently low cost to ensure an adequate profit margin. Less efficient traders, typically the established exporters, complain both about the quantities and qualities they are able to purchase.

The claim that the quality of Cameroonian cocoa has deteriorated since liberalization receives apparent support from the movement of the Cameroon premium-discount relative to the London cocoa terminal market. However, we argue that the terminal data are unreliable for Cameroonian cocoa since this is seldom tendered on the market but is, instead, exported directly to a small number of major processors. More reliable data on European Union import unit values show random variation about near constant relativities for the four major west African cocoa exporters. On this basis, we conclude that any change in cocoa quality over this period must be common to all four origins, and cannot be due to the liberalization in one particular exporting country.

There are three principal routes by which liberalization may have affected cocoa quality in Cameroon:

- a) Up-country quality control has been abandoned in favour of reliance on controls at the export port.
- b) Liberalization has resulted in increased competition throughout the supply-chain. This competition may have resulted in increased processing by intermediaries.
- c) Loose transportation of cocoa in bulk containers has largely replaced liner transportation of cocoa in sacks.

We believe that these factors have had two effects on cocoa quality in Cameroon. First, bulk transportation has resulted in a homogenization of cocoa exports with the consequence that there is now no longer an incentive for farmers to produce the premium GF grade. In one sense, this does constitute a decline in quality, but it is one generated by market forces (there is now a lower demand for GF cocoa) and may also be expected to have been common across all cocoa exporting countries. This is consistent with the statistical constancy of the cocoa unit value relativities. In any case, it is not a cause for concern. Second, increased competition in buying, together with the absence of up-country controls, has implied that farmers are now often selling less well-prepared cocoa beans than previously. However, this is because private sector buyers are willing to purchase these beans and to undertake processing which was previously required of farmers. Farmgate (up-country) quality controls, which may be rationalized on the pre-liberalization regime as a means of controlling monopsonistic exploitation of farmers, are unnecessary in a competitive environment. Importantly, changes in farmgate quality do not translate directly to export quality which, instead, is determined by the willingness of European importers to pay for quality in relation to the costs of providing quality.

This account emphasizes that, within a liberalized context, quality is determined by market factors. We believe that this has been true in the Cameroonian cocoa industry. This should not be taken as implying that government has no role in the process. If a market is to function efficiently, buyers and sellers must be able to rely on market institutions, and these include attestations of quality. These may in principle be provided either publicly or privately, and in this regard, different models appear to work well in different countries. Government or its agencies may also have a role in promoting a national brand. Extension, which has public good aspects, is also important and can lessen commercial costs of attaining desired quality levels.

These qualifications are important, but our main conclusion is that government does not need to regulate in order to ensure a normal commercial outcome. The Cameroonian cocoa liberalization experience is important because it has often been cited as illustrating the dangers of market liberalization. Concerns about export quality should not be an issue in the continuing African market liberalization debate.

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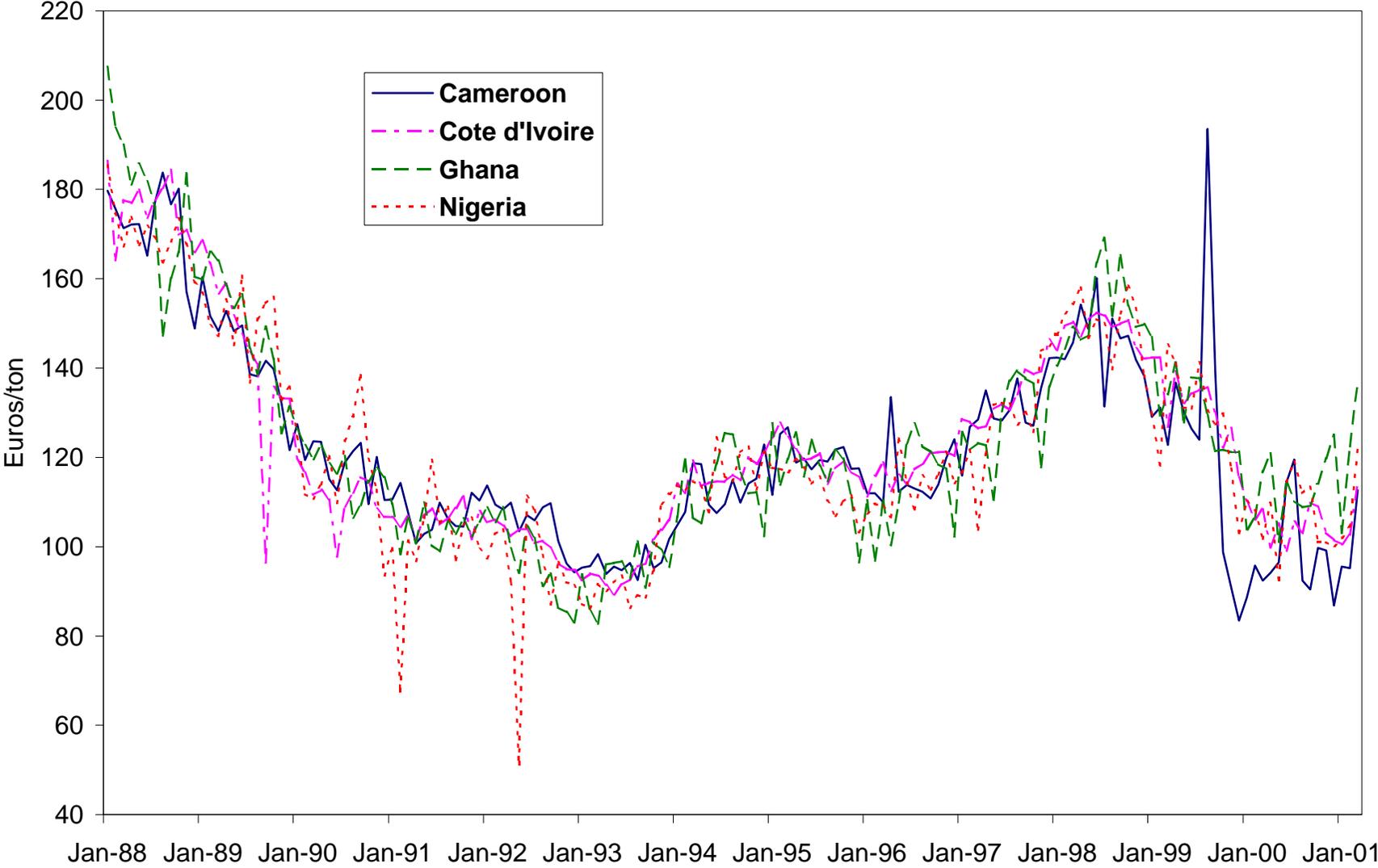
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**Figure 1: West African Cocoa Unit Values, EU Imports, 1988-2001**



**Figure 2: Cocoa Unit Values Relative to Cote d'Ivoire**

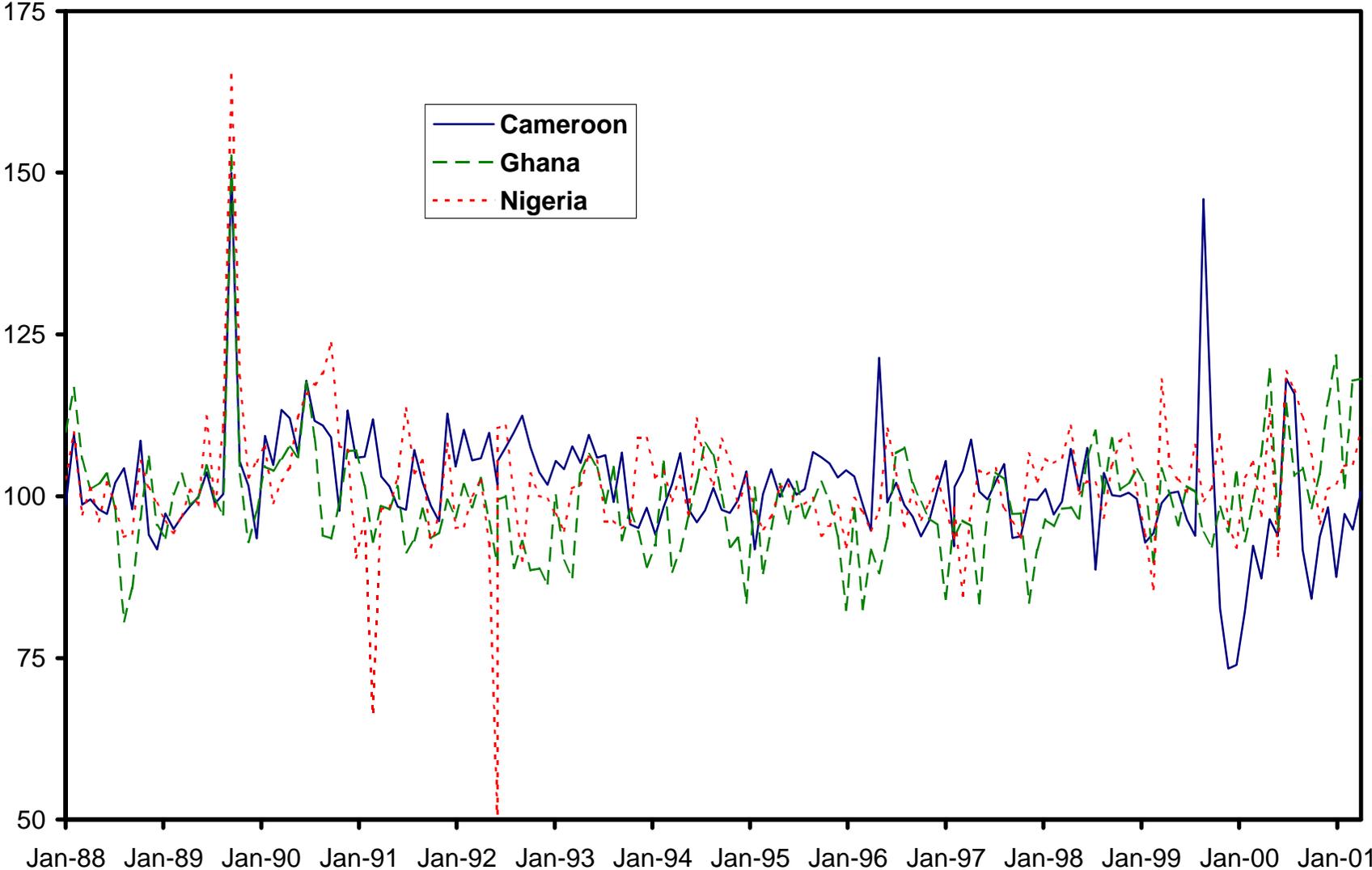
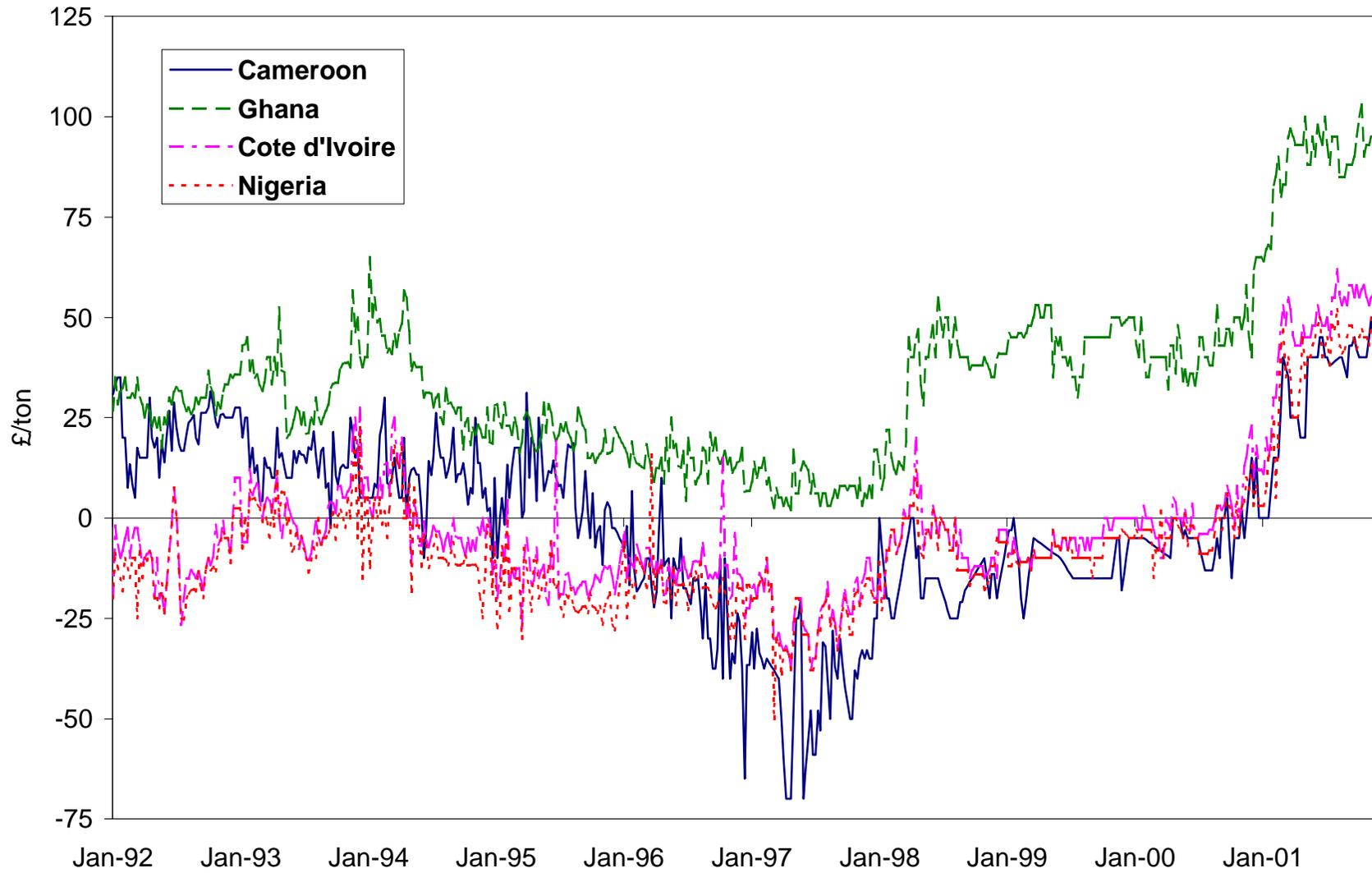


Figure 3: LIFFE Cocoa Differentials, 1992-2001



**Figure 4: LIFFE Cocoa Differentials Relative to Cote d'Ivoire**

