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The Transmission of International Commodity Prices to Domestic Producers*

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Abstract

Using detailed data from three simultaneous surveys of producers, traders, and exporters, this paper examines the transmission of international coffee prices through the domestic value chain in Uganda. We find that fluctuations in the international coffee price are reflected in prices paid by exporters and large traders. However, prices paid at the market level need not reflect prices actually received by farmers. This apparent lack of price transmission may be due to seasonal changes and to the fact that producers are more likely to sell at the farm-gate when prices go up. We also find some evidence that the number of itinerant coffee buyers increases when prices rise.

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1. Introduction

Many agricultural commodities originating in the tropics are produced by small farmers. The prices producers receive for their products ultimately depend on international commodity prices, which are known to be very volatile (e.g. Deaton & Miller 1996, Gilbert 1993, Newbery & Stiglitz 1981). Many studies have documented the fact the producers typically receive a small fraction of the international price. This difference is typically explained by high transport and transactions cost and by monopsonic rents captured by private traders or public marketing boards (e.g. Akiyama, Larson, Varangis & Baffes 1999, Coulter & Poulton 1999, Staatz, Dione & Dembele 1989). Our focus here is not so much on gap between producer and international price but rather on the transmission process by which changes in international prices affect prices actually paid to producers. Poor producers are indeed known to be risk averse (e.g. Binswanger 1980, Bromley & Chavas 1989). Unpredictable price fluctuations therefore represent a sizeable welfare loss for them.

Work on the integration of agricultural markets in poor countries has typically relied on co-integration analysis to test whether price series move together (e.g. Dercon 1995, Fafchamps & Gavian 1996, Baulch 1997, Shively 1996, Badiane & Shively 1998). Such work is normally based on commodity prices collected weekly or monthly over a long period of time in a limited number of physical markets. Markets located in producing areas are taken to measure the price received by producers. Little work has been done, however, to document the prices producers actually receive over time and to compare these prices to those reported by traders and exporters. This paper fills this lacuna.

Using original survey data collected at all levels of the value chain, this paper examines the process by which changes in international commodity prices are reflected in domestic prices. We show that the transmission mechanism is different from what is typically assumed. A rise

in the international price is readily reflected in export and wholesale prices, all the way down to the first processing stage. Unit trade margins remain constant in absolute terms when the international price rises, suggesting that coffee trading is reasonably competitive.

Since absolute trade margins appear to be constant, one would expect producers to receive an increasing share of the international price as the latter rises. Survey results indicate that the opposite occurs. This seems to be due to the combination of two related phenomena. First, when the price rises, more farmers sell their coffee at the farm-gate, hence receiving a lower price than they would have obtained if they had sold in the nearest market. This issue is investigated in details by Fafchamps & Hill (2003). Secondly, a rise in coffee prices appears to induce more traders to enter the business and to roam the countryside in search of coffee. Since each entering trader incurs fixed costs of entry, this pushes total costs up. As a result of these two phenomena, the gap between producer price and wholesale price increases.

One possible interpretation is that this phenomenon is made possible by farmers' ignorance of price movements. If this is correct, one would expect the phenomenon to be temporary as producer prices eventually rise when farmers learn the new price. An alternative interpretation is that when the price increases farmers are more willing to pay for the convenience of farm-gate sale. Alternatively, they may fear that if they sell their coffee in the nearest market town, they may be tempted to spend the money on unnecessary purchases. In both these cases, the increased margin may subsist until the coffee price falls again and farmers revert to travelling to the nearest market to fetch a slightly higher price than at the farm-gate.

This paper is organized as follows. In Section 2 we introduce the context in which the study takes place, namely Robusta coffee production in Uganda. The data sources used in the empirical analysis are discussed in Section 3. The empirical analysis is presented in Section 4.

2. The context

2.1. The coffee value chain in Uganda

Coffee is Uganda's largest export good comprising 26 percent of total export good earnings in 2000/2001 (The Bank of Uganda 2001). It is estimated that coffee growing provides direct and indirect, partial employment to nearly 5 million people in Uganda (Kempaka 2001). Robusta coffee accounts for nearly 90% of all coffee produced in Uganda.¹ The remainder is made of Arabica coffee, which is grown in highland areas in the East, on the slopes of Mount Elgon, around the Rwenzori Mountains in the West, and in West Nile. In contrast, Robusta is predominantly grown in lowland areas in central Uganda.

Although the bimodal pattern of rainfall Uganda receives allows for coffee harvesting throughout the year, there are two main harvest seasons: October to March, concentrated in the months of November to January; and May to August, concentrated in the months of June and July. The West of the country experiences its main harvest between May and August, with a fly crop from October to March, whilst the central and Eastern regions experience their main harvest from October to March, with a fly crop earlier in the year.

Ugandan coffee producers are typically smallholders, with less than 2 hectares of cultivated land. The average size of a smallholding is about 0.19 hectares (APSEC 1999). Uganda is still a comparatively low cost producer of Robusta coffee at US\$ 424 per tonne; its main competitor, Vietnam, has production costs estimated at about US\$520 per tonne. However, Uganda coffee production is also characterized by a very low technological level, with a low use of purchased inputs, limited use of modern farming methods such as irrigation, and the increasing incidence of coffee wilt disease. Existing traditional Robusta trees have a potential yield of only 800 kg/Ha of dry cherries (known as "kiboko"), as opposed to three times as much for Asian producers cit

¹Robusta coffee is thought to be a native plant of Uganda while Arabica is native to Ethiopia.

(e.g. Uganda Coffee Trade Federation 2001, APSEC 1999).

The majority of Ugandan producers sell their coffee in the form of dry cherries locally known as kiboko. These cherries are then milled by the middlemen who buy the coffee. Milling involves separating the cherry from its husk. The cherry is then sorted and exported to be roasted in the coffee houses in Europe. One Kg of kiboko yields on average 0.54 Kg of Fair Average Quality coffee cherries, known as FAQ coffee. It is only after milling that the quality of the coffee is known to the trader. Well looked-after, healthy trees produce a ratio of 0.6 Kg of FAQ coffee for 1 Kg of kiboko. Old and diseased trees produce kiboko with a lower ratio that can reach as low as 1:0.4. After the coffee has been milled transported to Kampala, it is sorted by exporters. Broken cherries, withered cherries, stones and husks that may have entered the mix are discarded and the coffee is graded for export. It is then called export grade coffee.

2.2. Government policy

Much has been written on the gap between producer prices and export prices for agricultural commodities. The privatization of agricultural trade has been advocated primarily as a way of ensuring that smallholders receive a fair price for their products. Yet public intervention in agricultural markets was initially justified as a way to counter the monopolistic practices of private traders. Four decades after the independence of Uganda, the debate rages on.

Prior to the market liberalization of the early 1990's, farmers sold their harvested coffee to the primary cooperative society if they belonged to one, or to a private buyer. The primary society or store-person, after collecting reasonable quantities, would sell the coffee to a huller operator (owned by a cooperative or private individuals). The huller would mill the coffee and sell it to the Coffee Marketing Board (CMB), which in turn would grade and export it.

The coffee industry suffered many problems. The industry was subjected to over taxation

both explicitly and implicitly. Explicitly, there was the coffee export tax whose rate ranged between 40 and 100%. Implicit taxes arose as a result of a low producer price offered to farmers, fixed at 20% of the export price. Payment to cooperatives and private millers for coffee deliveries by the CMB was usually delayed, thereby adversely affecting farmers. The prices paid at each level were pre-determined. Prices were set during the budget presentation annually in June and they remained in force for the rest of the season, irrespective of the price movements on the international coffee markets. While the farmers' price was stable, it was very low.

In 1990, the Ugandan government took the decision to fully liberalize both the internal and external marketing of coffee. The aim of the reform was to maximize the volume and value of coffee exports and to reduce marketing costs through efficiency improvements in the value chain. The Uganda Coffee Development Authority (UCDA) was established to take on the regulatory, promotional, and quality assurance roles of the CMB. The liberalization process freed the entire marketing of coffee, allowing Cooperative Unions and private individual companies to compete for the external market. Today, exporters are free to use any mode of sale when negotiating prices with overseas buyers. Traders, processors or exporters can buy coffee from anybody, process and sell to anybody. Most coffee now leaves Uganda Free On Truck (FOT) in Kampala.² The competition and quick turn-around of finances due to FOB/T Kampala sales enhanced the financial position of exporters. This is passed to farmers via prompt and remunerative payment. There is vertical integration within the industry with exporters moving down the coffee chain to procure coffee directly from the farmers (Nsibirwa 1999).

As a result coffee farmers are currently free to decide how, to whom, and at what price to sell their production. Individual transactions at the farm level are quite small as farmers most of the times sell as individuals. Only in a few cases do they sell as a group through a cooperative

²This means that the coffee is deemed delivered when boarded on the buyer's truck in Kampala. The Ugandan exporter is paid immediately upon presentation of the bill of lading to its bank.

society or private farmers' association. Small farmers mostly sell to small middlemen who act as aggregators either for bigger independent middlemen or for exporters and their agents. Large-scale farmers in contrast often process the coffee themselves and sell it directly to exporters or to their agents rather than selling to a middleman. Small middlemen tour the countryside using bicycles and motorcycles. They buy small quantities of coffee from individual farmers and then process it and sell it either to bigger middlemen or to exporters and their agents. Big middlemen try to ally themselves with a specific exporter and negotiate a margin with him.

Nearly all sales transactions carried out by exporters are FOT Kampala. This is especially true for local exporters, slightly less so for multinationals sourcing coffee in Uganda. There are two main types of sales contracts. Prompt sales contracts, which are executed in thirty days, and forward sales contracts, which are executed in ninety days or more. The latter are typically used when prices are low or when big volumes are involved.

It is widely believed that liberalization enhanced efficiency, transparency and the overall competitiveness of Uganda coffee on the world market. It did so by allowing entry by anyone who had the capacity and resources to participate in the internal marketing and export of coffee, by dropping the dual exchange rate system after full liberalization of foreign exchange operations, by permitting pre-financing arrangements and the formation of joint venture companies, and by abolishing export taxes. In addition, transportation of coffee to the ports was eased by allowing trucks to compete freely with rail. The mandatory floor price below which no exports would be effected was also abolished, and the licensing process for new entrants in both the internal and export marketing of coffee became less stringent. According to UCDA figures, producer prices increased sharply after liberalization in absolute terms as the share of the border price farmer receive increased to an average of about 60%.

Although liberalization and privatization have had a number of positive effects on the coffee

sector, they have brought their own set of challenges. There has been a quality loss as the responsibility for drying the coffee has passed from the farmer to the trader. The emerging concentration of the export industry has increasingly driven out local capacity, with the fear that it would reduce competition. The privatized value chain has also resulted in a nonexistent delivery mechanism for inputs and credit to farmers. These points have for instance been made by Nsibirwa (2001), Bonger, Ddumba-Sentamu & Nabumba (1999), and Buchanayandi & Kiwanuka (1996).

Given this policy environment, this paper focuses on two related problems relevant to the welfare of Ugandan farmers. The first problem is how to further increase the share of the export price received by farmers. The second problem is the increasing volatility of the world market prices to which producers and traders are subjected. It is feared that this volatility represents a major source of risk for small farmers. The removal of fixed prices by the CMB indeed exposed the coffee sub-sector to the vagaries of the volatile international price movements. Many fear that small farmers are affected most by this as exporters and traders tend to pass on the fluctuation impacts almost immediately. The risk of price fluctuations between the beginning of the coffee season and harvest time is feared to have major consequences for individual farmers' welfare. The purpose of this paper is to document the way international price variations are passed on through the value chain.

3. The data

Armed with a better understanding of the context in which coffee production takes place in Uganda, we now turn to the empirical analysis. The data used in our analysis come from various sources. Data on coffee prices over the last ten years come from two sources. The international data comes from the International Coffee Organization and the monthly average

of indicator prices is used. The Ugandan data is the average price paid to farmers and processors collected by the Ugandan Coffee Development Authority.

Detailed data on exporters, traders and producers during 2002 comes from surveys conducted in Uganda at the beginning of 2003. The data were collected by a team from the Uganda Bureau of Statistics in collaboration with the Centre for the Study of African Economies at Oxford University. Funding was provided by the World Bank. The general purpose of the survey was to look at the effect of commodity price fluctuations on producers and the potential for risk management schemes. Data were collected on all Robusta coffee exporters. Detailed interviews were also conducted with traders and producers in four districts producing most of Robusta coffee in Uganda: Mukono, Luwero and Masaka in the central region, and Bushenyi in the western region. These four districts combined account for about 50 percent of all Robusta coffee produced in Uganda.

3.1. Producer Survey

Data on production decisions, coffee sales, household characteristics, and risk preferences were collected for coffee producers selected from the four districts identified . The survey builds on a national household survey conducted in 1999/2000, which we used to identify coffee farmers.³ A random sample was drawn from coffee producing households in the 1999/2000 survey. They were revisited in early 2003 and asked many of the original survey questions through face-to-face interviews.⁴ Additional questions were asked on risk preferences, expectations about the future value and variability of the coffee price, and details of recent coffee sales.

³A stratified two-stage sampling design was used in the 1999/2000 survey. The country was divided into enumeration areas, typically the LCI (local council level one – essentially a village), which constituted the first stage sampling unit. The second stage sampling unit was the household. Ten households were selected from each enumeration area randomly selected at the first stage. Stratification took place at both sampling stages – all enumeration areas were stratified into urban, other urban, and rural, and households within the rural areas were further stratified into small scale farmers, large scale farmers and non-farming households.

⁴The purpose of this procedure was to create a small panel for future analysis.

The Uganda Bureau of Statistics (UBOS), the data collection body responsible for the 1999/2000 survey, also conducted the 2003 survey. An advantage of this approach was that members of personnel, including enumerators, who had been involved in the 2000 survey also became involved in conducting the 2003 survey. Researchers were trained and the questionnaires tested before the survey commenced. Editing of questionnaires was done before research assistants and supervisors left the field. This allowed corrections to be made carefully and accurately, and respondents to be revisited where clarification was needed. In two of the survey districts (Masaka and Bushenyi) qualitative questions were also asked to the respondents to allow triangulation of results from the more quantitative questions of the main survey.

UBOS conveyed upon the survey a sense of legitimacy which allowed the enumerators to receive cooperation from the respondents in nearly all cases. Introduction letters stating the purpose of data to be collected were given to the district administrative officers concerned and the data collection team worked entirely with the local council leaders in those selected villages within sub-counties and towns. These both reduced the problem of non-cooperation and suspicion among the respondents. In only one instance did the respondent refuse to cooperate.

As the period between the baseline and the follow up survey was relatively short, there was little attrition resulting from dead and migrated households. Most households were still in existence within the village and it was relatively easy to trace them. Some farmers identified as coffee producers on the basis of their response to the 1999/2000 survey were no longer farming coffee. In these cases data were still collected but only the relevant sections of the questionnaire were completed.

3.2. Trader Survey

A sample of just over 100 traders was chosen in the four selected coffee growing districts. The survey asked questions on characteristics of the traders; the structure of their trading business; factors that affect costs; access to information; their trading flows and networks; their transport, communication, storage and cost structures; credit transactions; relative profitability and investment activities and diversification of income sources. The sampled traders included both small traders (trading on bicycles and motorcycles) and bigger traders who owned sizeable stores and milling plants. This enables us to capture information on the interrelated link between small, medium and big traders.

As there are many more small traders than big traders, the sample was stratified to ensure a sufficiently large number of big traders in the sample to be able to draw inference. Large traders indeed handle much of the coffee that goes through the chain. We also expect a greater heterogeneity among big traders than among small traders. The latter are believed to operate all in much the same way. They typically operate on bicycles and motorcycles, aggregating coffee with the small working capital they have, selling it immediately to a big trader, and then buying and aggregating coffee again.

Given the transient nature of many small traders, it was not possible to list all of them. Listing took place only for the big traders, that is, those who own a milling plant and sizeable stores. A random sample of big traders was then drawn from the resulting list. Small traders were randomly selected by interviewing one smaller trader delivering coffee to a sampled big trader at the time the interview with the bigger trader was being conducted. This strategy was pursued to solve the problem of not having a full list of traders whilst still wanting to construct a random sample and to ensure that there was a 50:50 mix in the final sample of big to small traders.

Exporters who have buying centers in the districts are not included in the trader survey to avoid duplication as these are accounted for in the exporter questionnaire (see below). To avoid attrition due to movements of traders in and out of the survey area, listing was conducted with the aid of a local guide (someone knowledgeable of the coffee industry in a region) only a few days prior to interviewing. The scope and purpose of the survey was explained to the traders by the local guide as listing was done.

3.3. Exporter Survey

All coffee exporters in Uganda have to be registered with UCDA.⁵ We interviewed all registered exporters of Robusta coffee. The survey asked questions on: characteristics of the enterprise and the trader; commercial relationships and networks; factors that affect costs; financial resources; trading activities and business (hedging instruments); variable market costs; supplier credit and payment method; price information and contract and property rights. The exporters were the hardest group to elicit a response from, but eventually questionnaires were completed for twenty of the twenty three exporters. Three refused to cooperate.

4. The transmission of international coffee prices to Ugandan producers

Having clarified how the surveys were conducted, we now turn to the transmission of international coffee prices through the domestic value chain. We begin by documenting the extreme volatility of international coffee prices. Figure 4.1 presents the evolution of the price for Robusta coffee over the last decade. The top line represents the price on the London commodity exchange. This is called the ICO price. Over the recent past, the ICO price has gone through

⁵It is believed that small quantities of Robusta coffee are exported by unregistered exporters towards neighboring countries (Tanzania, Sudan) for domestic consumption. It is also thought that some Robusta coffee crosses the border from DR Congo to be exported by Uganda. These informal border movements are ignored here as they are thought to represent a very small proportion of exports.

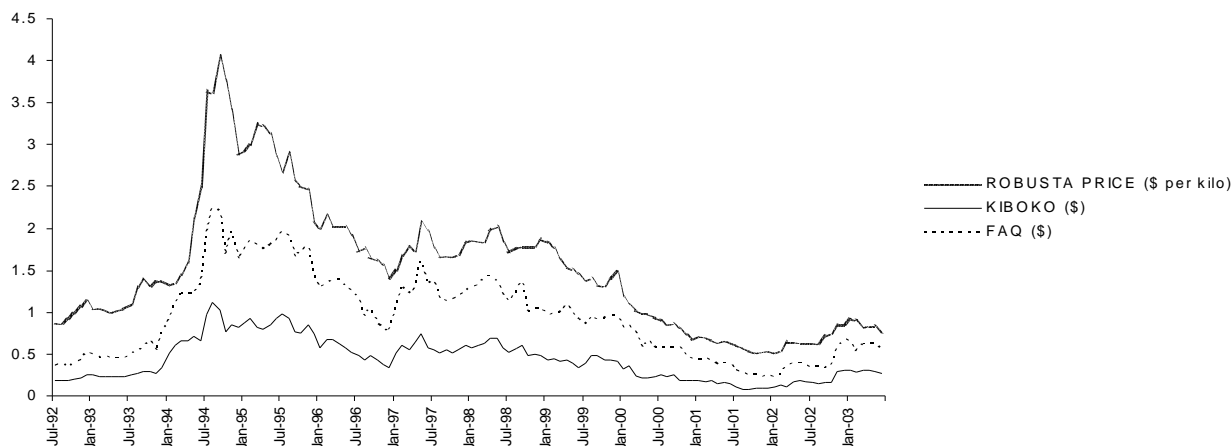


Figure 4.1: International and domestic coffee price movement, 1992 - 2002 (US dollar per kilo) massive fluctuations. For instance, over the last decade, it rose from around US\$1 per Kg in early 1992 to US\$4 in 1995. The price then fell below US\$1.5 by 1997 before falling further to US\$0.5 by late 2001. Fluctuations of a similar – if not larger – order of magnitude were observed in the 1980’s.

With the liberalization of coffee marketing in Uganda, these fluctuations have been largely reflected in domestic prices. Figure 4.1 also shows the Ugandan prices for FAQ and kiboko coffee as reported by the Uganda Coffee Development Authority (UCDA). To facilitate comparison, these prices have been converted to US\$. Over the last decade, both price series are reported to have moved in unison with international prices. As a result, kiboko prices – which is the form in which most coffee producers sell their output – fluctuated widely during this period, from a low of US\$0.09 per Kg in September 2001 to a high of US\$1.12 in August 1994.

In fact, it is surprising that kiboko prices did not fluctuate even more widely than reported. Transactions costs incurred by coffee traders and exporters – such as transport and processing – are unlikely to fluctuate as widely as coffee prices. There is also no reason for them to fluctuate proportionally to the price of coffee. As a result, if coffee trade is competitive and margins

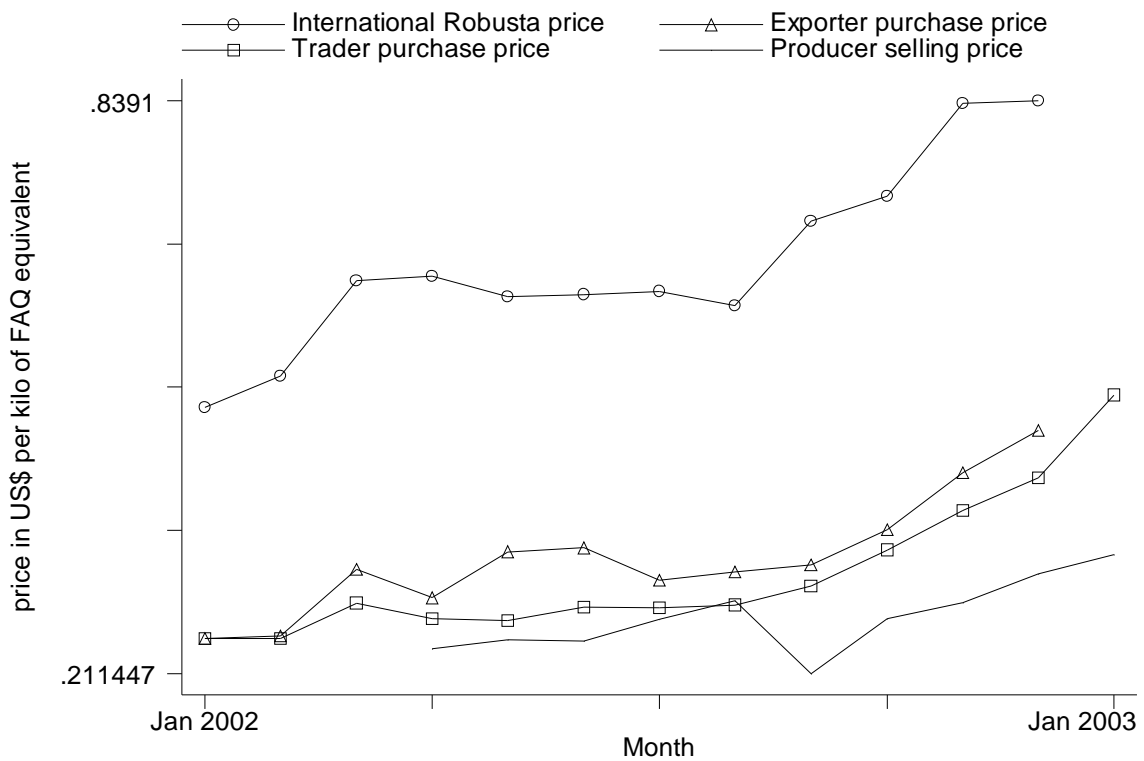


Figure 4.2: International, exporter, trader and producer prices for 2002 (USdollar per kilo of FAQ equivalent)

remain roughly constant over time, one would expect the share of international price received by producers to increase when the international price rises. This is not what the graph shows: movements appear to be proportional.

One possible reason for this state of affairs is that kiboko prices reported by UCDA are not really observed in the field but are computed on the basis of some proportional formula. To resolve this issue, we turn to the survey data we have collected at the level of producers, traders, and exporters. Price information reported in these surveys is summarized in Figure 4.2, together with the London commodity exchange price during the same period. The information collected covers the period 2002 and early 2003. Producer prices are not available for early 2002 because a shorter recall period was used in the producer survey to limit recall bias.

4.1. Exporter prices

We first focus on the ICO or London price and how it is tracked by exporter and trader purchase prices in Uganda. Figure 4.2 shows a gradual increase in prices over the period under consideration, with a slight acceleration in late 2001. The price at which exporters report buying Ugandan Robusta tracks the international price, although not perfectly. For instance, the sharp rise in the ICO price in September is not immediately matched by a similar increase in exporters' purchase price. This may be due to the fact that most exporters operate on 30 to 60 day contracts and are unable to reflect a rise in the ICO price immediately in their purchase price.

We see that some smoothing takes place in the price at which exporters buy from traders, with some of the short-term fluctuations in the ICO price not reflected in the exporter buying price. This is presumably because exporters resort to forward sales contracts and rely on hedging instruments that provide an element of insurance. Exporters also tend to accumulate stocks during parts of the year, as shown in Figure 4.3. From February to March sales exceed purchases, suggesting that stocks are being depleted. In contrast, from May to July, the time of the major harvest, purchases exceed sales, while sales again exceed purchases in August to November. By delaying or speeding up exports, exporters may be able to smooth somewhat the price at which they sell abroad.

The large gap between the purchase price offered by Ugandan exporters and the London ICO price is striking: on average over the period studied, it amounts to 54% of the London price. Unfortunately, we have no information regarding shipping costs between Kampala and European or American buyers, so that we cannot tell whether this margin is excessive or not. One possibility is that Ugandan exporters extract large rents. Unfortunately, we were unable to elicit information about the prices received by surveyed exporters. Moreover, some of them are

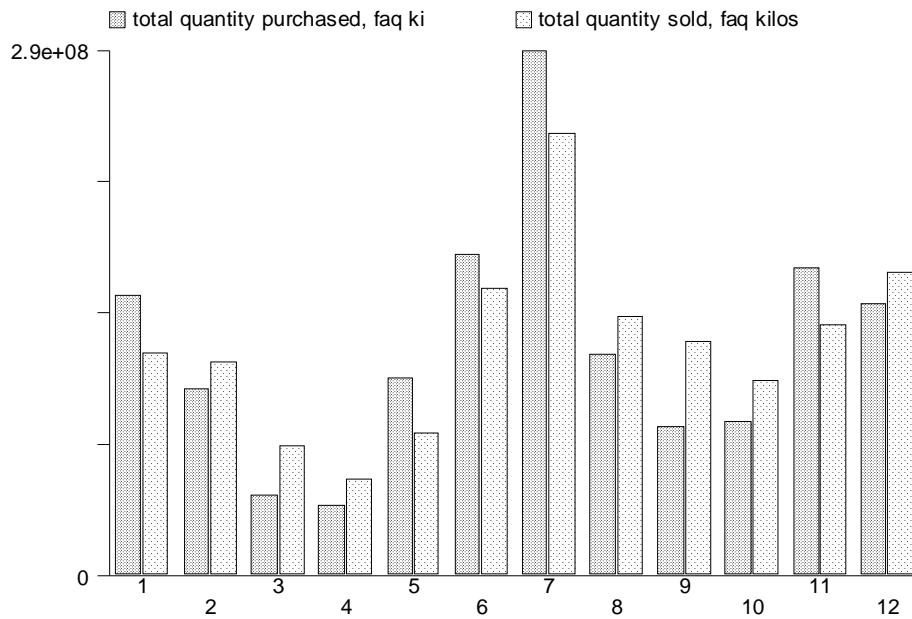


Figure 4.3: Figure 3: Monthly quantities bought and sold by exporters (FAQ equivalent kilos)

controlled by multinationals so that, even if we could collect price information, it may not mean much since these traders could easily disguise profits through under-invoicing. Nevertheless, the general feeling in Kampala is that there is ample competition among Ugandan exporters themselves – several have gone bankrupt – so it is unlikely that exporters as a group are capable of extracting large rents. Without further information, we cannot say that this is also the case for transport through Kenya and for shipping services in Mombasa. It is also conceivable that part of the gap reflects bribes and other illicit payments charged on transporters and custom clearing agents in Uganda and Kenya. This issue deserves further investigation.

The gap between exporter and trader purchase prices remains more or less constant over the period studied, except for a slight increase in absolute trader margin during the main harvest period in the west of the country in May and June. This may be due to congestion in transport services or to the greater distance from the main harvest region to Kampala. Otherwise, we find that price increases passed on by exporters are immediately reflected in the traders' purchase

price. This is not surprising: survey results indeed indicate that most traders do not operate on contract with exporters and that those who do have delivery contracts of 7 days or less.

4.2. Producer prices

We now turn to the lower part of the graph in Figure 4.2 which shows the price actually received by producers. Although we observe a slight increase in the latter part of 2002 and early 2003, this increase is not proportional to the increase in traders' purchase price. There are several possible answers to this puzzle, which we examine in turn.

We begin by noting that the trader purchase price shown in Figure 4.2 represents the average price over all traders. Not all traders buy directly from producers, however. Many buy from millers or smaller traders, presumably at a higher price to cover handling and travel costs. To correct for this, we separate trader prices into prices paid for milled (FAQ) coffee, which traders typically buy from millers and other traders, and prices for unmilled (kiboko) coffee, which traders typically buy from farmers. Monthly purchase prices for FAQ and kiboko are reported in Table 4.1.

The prices displayed are calculated through regression analysis. The FAQ equivalent price of each Kg of coffee bought is calculated assuming an average of 0.54 Kg of FAQ for one Kg of kiboko. The price is then regressed on month dummies for each type of coffee bought – kiboko and FAQ. A weighted regression technique is used, weighting each observation by the quantity of FAQ equivalent coffee it represents. This is done so that the reported monthly average remains representative, given the likely correlation between transaction size and purchase price.

A similar correction is needed for the price reported by producers. The producer price that was presented in Figure 4.2 is an average over all producers. This average does not control for seasonal changes in the geographical composition of reported prices. As we have seen in

	Traders buying FAQ		Traders buying Kiboko		t-test on diff. in coefficients
	Coefficient	Std. Error	Coefficient	Std. Error	
January 2002	-0.263	0.029**	-0.146	0.032**	0.18
February	-0.284	0.020**	-0.150	0.020**	0.11
March	-0.236	0.017**	-0.176	0.021**	6.48**
April	-0.253	0.014**	-0.171	0.015**	6.90**
May	-0.257	0.018**	-0.169	0.017**	4.20*
June	-0.247	0.016**	-0.170	0.019**	5.14*
July	-0.242	0.016**	-0.160	0.016**	4.45*
August	-0.246	0.018**	-0.150	0.018**	1.84
September	-0.229	0.025**	-0.152	0.021**	2.28'
October	-0.289	0.023**	-0.141	0.017**	5.04*
November	-0.140	0.023**	-0.103	0.017**	2.56'
December	-0.010	0.022**	-0.050	0.020**	0.00
Luwero	0.580	0.019**	0.448	0.014**	
Masaka	0.591	0.013**	0.427	0.015**	
Mukono / Kayunga	0.576	0.018**	0.457	0.015**	
Bushenyi	0.563	0.014**	0.453	0.015**	
No. of observations	346		382		
R-squared	0.5289		0.4906		

Table 4.1: Results from regression on trader purchasing prices

Section 2, some coffee growing areas in Uganda have their main season in May to August while others have their main season in November to January. To the extent that these regions are located at different distances from Kampala, producer prices are likely to differ as a result of the differential in transport costs. Producer prices may also vary depending on whether farmers sell at the farm-gate or travel to the nearest market to sell their coffee. In the latter case, they obtain a slightly higher price, the difference between the two reflecting the travel and search costs for itinerant traders who buy directly from farmers. Fafchamps & Hill (2003) show that Ugandan farmers are more likely to sell at the farm-gate when prices rise. This effect alone may account for the fact that the average price received by producers does not increase as fast as the price paid by traders.

To correct for these possible effects, we regress the price received by producers on month dummies, geographical dummies, a farm-gate sale dummy, and type of coffee sold dummy.

	Producer Price	
	Coefficient	Standard error
May	.027	.036
June	.014	.026
July	.067	.030*
August	.035	.026
September	.011	.026
October	.044	.030
November	.084	.035*
December	.072	.028*
January 2003	.046	.055
Dummy for kiboko sold at the farmgate	.118	.015**
Dummy for kiboko sold at the market	.100	.020**
Dummy for FAQ sold at the market	.199	.015**
Luwero	.171	.029**
Masaka	.107	.028**
Mukono / Kayunga	.135	.024**
Bushenyi	.121	.027**
Number of observations	400	
Number of clusters	128	
R-squared	0.2871	

Table 4.2: Results for regression on producer price

Results are presented in Table 4.2. They show that producer prices indeed vary systematically across regions and type of sale. Monthly dummies from Table 4.2 estimate producer prices after correcting for the other effects.

Corrected trader and producer prices are presented in Figure 4.4. The price is shown for a farmer based in Mukono/Kayunga district, selling kiboko at the farm-gate.

Controlling for geographical location and type of sale explains much of the difference in prices observed above. However, it still leaves a worrisome divergence in the price reported by producers and traders towards the end of the year. As these schedules are constructed using regression analysis, it is easy to determine whether the two schedules are actually different from each other for the latter half of the year, by looking at the standard deviation associated with the predicted value for each month. Figure 4.5 shows the same graphs as in Figure 4.4 with a confidence interval marked for each point on the trader kiboko purchase price schedule and the

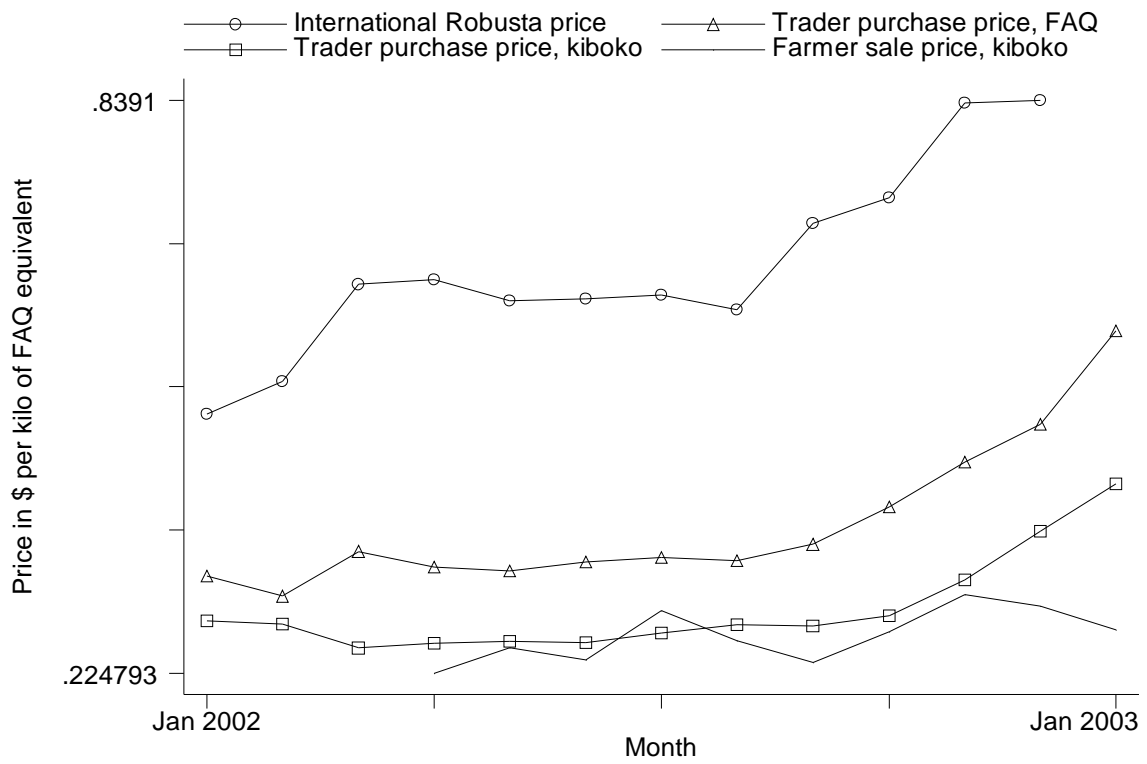


Figure 4.4: International robusta price and corrected trader and producer prices (US dollars per kilo of FAQ equivalent)

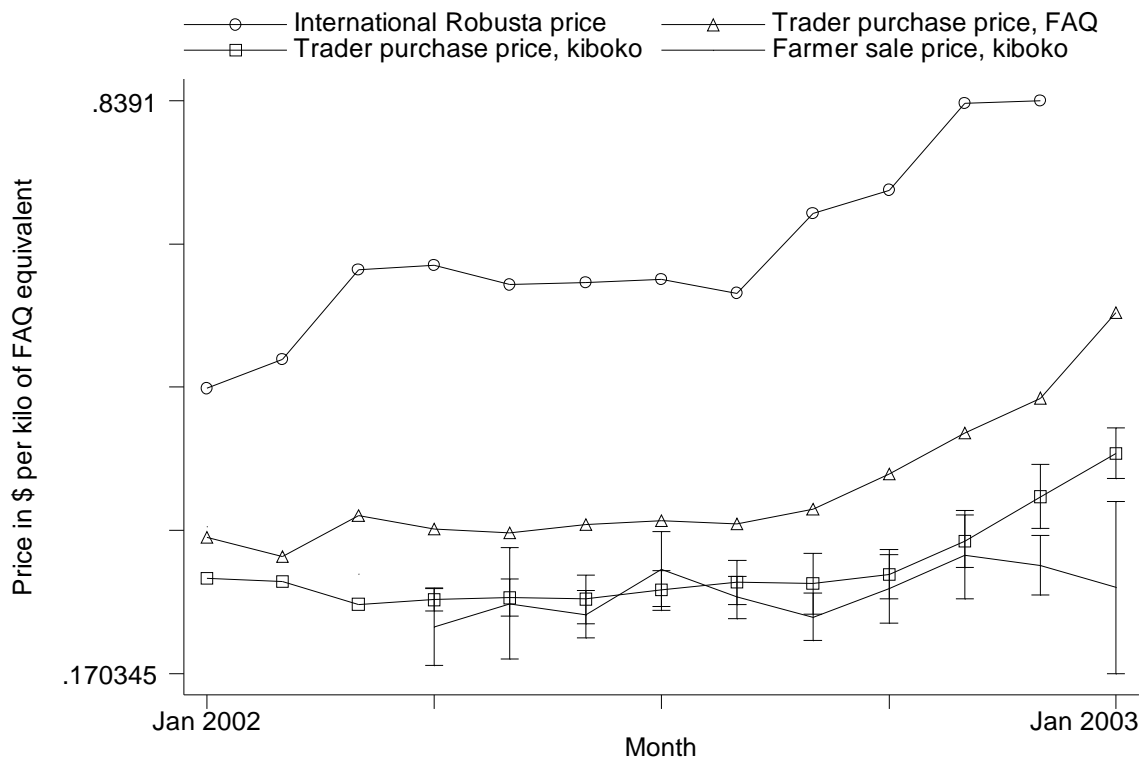


Figure 4.5: International robusta price and corrected trader and producer prices with confidence intervals marked (US dollars per kilo of FAQ equivalent)

producer kiboko sale price schedule. Testing to see whether we can reject the null hypothesis that the predicted producer price is equal to the predicted trader price for the last quarter, we see that the null hypothesis can be rejected for December and January against the alternative hypotheses that the predicted producer price is less than the predicted trader price, and that the two prices are not equal (Table 4.3).

An increase in the number of traders active in the market when the price is high might explain this divergence in the price farmers and traders report when the price is high. An increase in the number of middlemen in the market may not only result in an increase in competition but in an increase in the number of hands through which the coffee passes before it reaches the traders that sell to the exporters. If this were the case, it would be expected that the number of smaller

	Ha: producer price < trader price	Ha: producer price = trader price	Ha: producer price > trader price
October	t = -0.6860 P < t = 0.2474	t = -0.6860 P < t = 0.4947	t = -0.6860 P < t = 0.7526
November	t = -0.4496 P < t = 0.3269	t = -0.4496 P < t = 0.6538	t = -0.4496 P < t = 0.6731
December	t = -2.6004 P < t = 0.0050	t = -2.6004 P < t = 0.0101	t = -2.6004 P < t = 0.9950
January 2003	t = -3.9019 P < t = 0.0001	t = -3.9019 P < t = 0.0002	t = -3.9019 P < t = 0.9999

Table 4.3: Test results for Ho: mean (predicted producer price) - mean (predicted trader price) = 0

Date at which business started	Proportion (%)
Before liberalization (pre 1991)	20.4
1991-1993	11.6
1994-1996	35.9
1997-1999	21.4
2000-2002	10.7

Table 4.4: Entry of traders into business

traders in the market increases as the price rises. Work suggesting that farmers are more likely to sell coffee at the farm-gate when prices are higher would concur with this view.

The data is limited in the extent to which it will allow us to test the hypothesis that more traders are active in the market when the price is high, as data was collected from traders listed and sampled at only one point - when the price was high. However from the data that was collected, two things can be noted that concur with the hypothesis suggested. Many of the coffee traders interviewed started trading coffee when the prices were high between 1994 and 1996 (Table 4.4). Very few traders have entered the market in the last few years when the prices have been much lower. The majority of traders have traded for some time, suggesting that although the sample was interviewed at a time in which prices were increasing, most of them were not new comers to the business.

Given this, it is interesting to note their periods of trading activity over the last 12 months and how this corresponds to the price changes during this time. The proportion of traders

Trader who...	Season 1(central)		Season 0 (west)		Pooled
	...buys FAQ	...buys kiboko	...buys FAQ	...buys kiboko	
Dummy for high season	5.837 (5.31)**	12.219 (5.62)**	4.781 (2.37)*	12.855 (6.05)**	10.235 (9.02)**
Price	62.475 (9.29)**	99.586 (7.49)**	15.596 (1.27)	68.267 (5.25)**	59.934 (9.02)**
Dummy for season area					-0.192 (-0.18)
Dummy for trader type					0.423 (0.40)
Constant	-8.734 (-3.59)**	-19.645 (-4.85)**	6.890 (1.42)	-7.431 (-1.70)'	-12.184 (-3.32)**
No. of obs.	13	13	13	13	52
R-squared	0.930	0.912	0.242	0.793	0.752

Table 4.5: Regression results for number of traders

trading at each month over the previous 12 months was regressed against the price of coffee in those months and whether or not it was coffee season in the area in which the trader operates. Five regressions were run, one for each type of trader in each agro-climatic region (central and west) and one in which the data were pooled. The results are shown in Table 4.5.

The pooled results suggest that an increase in price does result in an increase in the number of traders active in the market. For traders in the central district, it is hard to separate the effects of seasonality and price as the price rose as the season started in this area. Although the results suggest that price does have an effect for both types of traders, the data from the west where the season was on at a point when the prices were very low is perhaps more convincing. Here we see that for the larger traders the price does not make a difference to the number active in the market, but for the smaller traders in the area price does make a difference. Both agro-climatic regions show that a rise in the price makes a much more significant difference for smaller traders than for larger traders.

5. Conclusion

We have examined the transmission of international coffee prices to Ugandan Robusta growers. Most of what we know about the transmission of prices to small African growers comes from data collected at the market level (e.g. Dercon 1995, Shively 1996, Badiane & Shively 1998, Fafchamps & Gavian 1996). This paper innovates by combining price information collected in three simultaneous surveys covering all levels of the value chain in Uganda.

As in previous studies, we find that fluctuations in the international coffee price are reflected in prices paid by exporters and traders. Combining producer surveys with trader surveys nevertheless produces a picture that is different from previous studies as it shows that prices paid at the market level need not reflect prices actually received by farmers. Indeed, during the study period, fluctuations in international prices were not fully reflected in producer prices. We were able to attribute part of this apparent lack of price transmission to seasonal changes on the regional origin of Robusta coffee within Uganda, and to the fact that producers are more likely to sell at the farm-gate when prices go up, thereby lowering the price actually received by producers. We also found some evidence that the number of itinerant traders purchasing coffee from farmers increases when the coffee price goes up. This is consistent with farmers' selling at the farm gate (Fafchamps & Hill 2003). These findings are reminiscent of research results on the US (e.g. Fu, J & Fletcher 1988, Fletcher & Terza 1986, Edelman, Schmiesing & Olsen 1990) and Australia (McLeay & Zwart 1998) showing that farmer characteristics influence the choice of sale mechanism.

The analysis presented here indicates that international commodity prices are reflected relatively rapidly in domestic prices paid by exporters and large traders. Domestic trade margins appear relatively stable in absolute levels: the gap between the purchase price paid by exporters and that paid by large traders is fairly small and constant over time. While exporters are seen

to accumulate some inventories during the harvest period, there is no evidence of hoarding or long-term storage. These features suggest a fairly competitive and smooth operation of the liberalized coffee value chain from large domestic traders to exporters.

In contrast, we find a large difference between the price paid by exporters and the international coffee price. Without information on freight and handling charges, it is unclear whether this difference is due to oligopolistic rents captured by Ugandan exporters, excessive cost of transport to and shipment from Mombasa, or normal shipping charges. The magnitude of the difference nevertheless suggests that the price received by Ugandan coffee growers could possibly be raised by reducing transport and handling charges between Uganda and its European and American consumers.

We also find that, while the price paid by large coffee traders in the districts tracks the international price fairly closely, the same cannot be said of the prices reported by farmers themselves. We investigated this issue in detail and found that part of the discrepancy can be explained by harvest season effects. We also find some evidence that the number of small traders touring the countryside in search of coffee rises when the price increases. This leads to a higher proportion of farmers selling at the farm-gate instead of travelling to the nearest town to sell, a move that tends to depress the actual price received by farmers. This suggests that it may be possible to increase the price received by producers by encouraging them to pool their quantities for delivery to the nearest market center. These issues deserve further research.

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