MAFAP
SPAAA

Monitoring African Food and Agricultural Policies

Suivi des politiques agricoles et alimentaires en Afrique

ANALYSIS OF INCENTIVES AND DISINCENTIVES

FOR COFFEE IN UGANDA

DECEMBER 2012

SUMMARY OF THE NOTE

Product: Coffee
Period analyzed: 2005 – 2011
Trade status: Export in all years

- Coffee continues to play a leading role in the economy of Uganda, contributing 18% of the export earnings between 2000 and 2010, despite the vigorous efforts by Government to diversify the economy.
- Though large scale coffee producers are gradually emerging, the coffee sub-sector is almost entirely dependent on about 500 000 smallholder farmers.
- Domestic consumption of the commodity in Uganda is relatively small ranging from 4-10% of production. As such, coffee is primarily an export crop.
- Between 2005 and 2011, producer prices of coffee in Uganda follow export price trends very closely. Producers received 64 – 88 percent of the export price for FAQ beans.
- Uganda liberalized its domestic Robusta coffee market in 1992 and since then farmers have been free to decide how and to whom to sell their coffee.
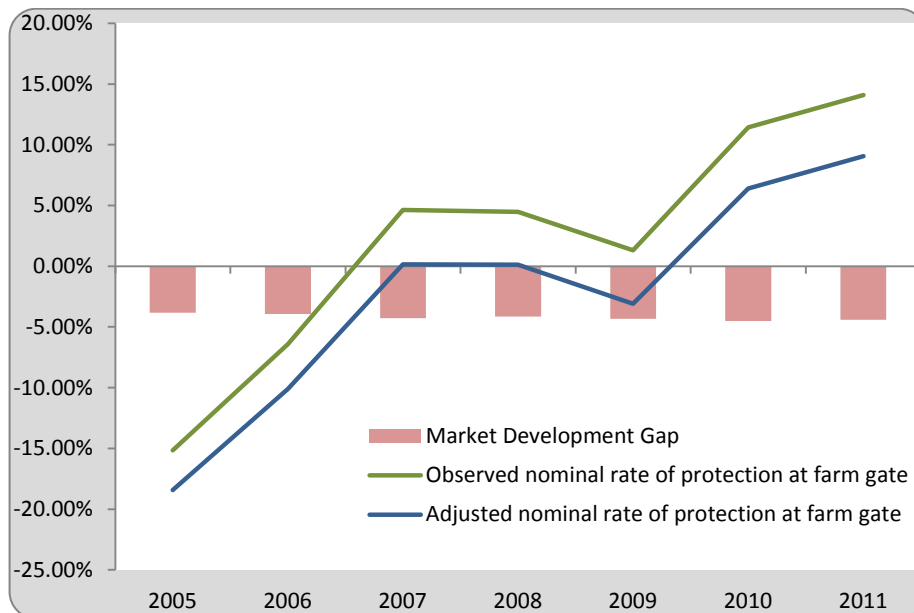
The coffee industry in Uganda has undergone major reforms since the early 1990s. Coffee market is completely liberalized. Producers' share of export prices increased significantly. The reforms have been successful at least at the export market where the export market appears to operate optimally. Given that coffee is relatively high value crop, the observed and adjusted nominal rate of protection, although negative in some years, do not seem to be excessive. As coffee markets are completely liberalized, these deviations cannot be attributed to policy but rather to a market development gap resulting from relatively excessive profit margins at export level and imperfect price transmission.

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1. PURPOSE OF THE NOTE

This technical note aims to describe the market incentives and disincentives for coffee producers in Uganda. For this purpose, yearly averages of farm-gate and wholesale prices are compared with reference prices calculated on the basis of the price of the commodity in the international market. The price gaps between the reference prices and the prices along the value chain indicate to which extent incentives (positive gaps) or disincentives (negative gaps) are present at the farm-gate and wholesale level. In relative terms, the price gaps are expressed as Nominal Rates of Protection (NRP). These key indicators are used by MAFAP to highlight the effects of policy and market development gaps on prices.

The note starts with a brief review of the commodity's production and consumption as well as trade and policies affecting the commodity. It also provides a detailed description of how the key components of the price analysis have been obtained. Using this data, the MAFAP indicators are then calculated and interpreted in light of existing policies and market characteristics. The analysis is commodity and country specific and covers the period 2005-2010. The indicators have been calculated using available data from different sources for this period and are described in Chapter 3.

The outcomes of this analysis can be used by those stakeholders involved in policy-making for the food and agricultural sector. They can also serve as input for evidence-based policy dialogue at the country or regional level.

This technical note is not to be interpreted as an analysis of the value chain or detailed description of production, consumption or trade patterns. All information related to these areas is presented merely to provide background on the commodity under review, help understand major trends and facilitate the interpretation of the indicators.

Additionally, all information presented in this note is preliminary and still subject to review and validation.

2. POLICY CONTEXT

PRODUCTION

Coffee continues to play a leading role in the economy of Uganda, contributing 18% of the export earnings between 2000 and 2010, despite the vigorous efforts by Government to diversify the economy. Though large scale coffee producers are gradually emerging, the coffee sub-sector is almost entirely dependent on about 500 000 smallholder farmers, 90 percent of whose average farm size ranges from less than 0.5 to 2.5

hectares (UCDA[1], 2012). The coffee industry employs over 3.5 million families through coffee related activities.

Two types of coffee: Arabica and Robusta are grown in Uganda in the ratio of 1: 4. *Robusta* Coffee is grown in the low altitude areas of Central, Eastern, Western and South Eastern Uganda up to 1,200 meters above sea level while Arabica coffee is grown in the highland areas on the slopes of Mount Elgon in the East and Mount Rwenzori and Mount Muhabura in the South Western Region (1500-2,300 m above sea level) (Figure 1). Coffee is mostly grown in mixed stand where it is intercropped with food crops such as bananas and beans which ensure households' food security. It is also grown among shade trees that result into sustainable coffee production, with minimal use of agro-chemicals (fertilizers, pesticides and fungicides). Coffee farmers in Uganda use a low input system and producer households strongly rely on family labor.

Uganda produced, on average, 2.4% of total world production during the period 2006-2011 (International Coffee Organization (ICO), 2009). Figure 2 presents the recent trends in coffee production in Uganda. During 2009, marketed production[2] totaled 195,871 m/tones, an equivalent of 3.3 million 60-Kilogramme bags of coffee (MAAIF, 2010). This consists of 153,822 tones of Robusta coffee and 42,050 tones of Arabica. Overall, there was a decline of 14.3 percent in the quantity of coffee procured in 2010 as compared to 2009 due to a big decline (20.5%) in the production of Robusta Coffee which is more grown than Arabica.

In 2010, the total acreage under coffee was estimated at 182,875 Ha, an increase from 178,125 ha in 2009. The projected figure for 2011 is 187,264 ha. The increase in acreage notwithstanding, coffee production in the last three years portrayed a negative trend largely due to effects of climate change with prolonged droughts at the critical time of bean development. In addition, labor shortage is being experienced in the traditional coffee growing areas.

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[1] Uganda Coffee Development Authority (UCDA) is the coffee regulatory body of Uganda.
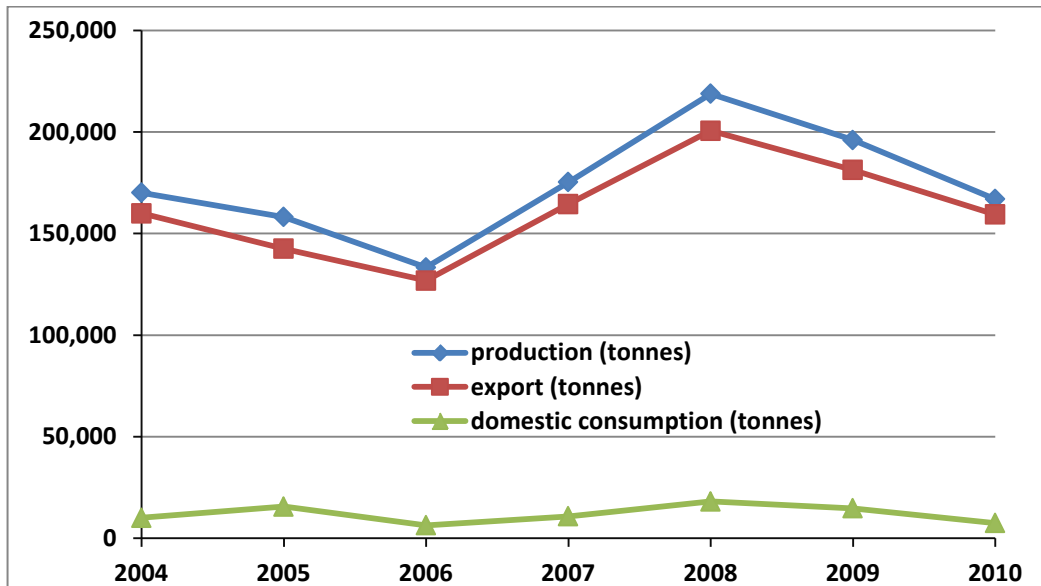[2] It is worth noting that in the case of coffee, quantities procured are used as a proxy to production.

Figure 1: Map of Uganda.

Source: http://www.lonelyplanet.com/maps/africa/uganda/map_of_uganda.jpg.

Figure 2: Recent trends in coffee production, export and domestic consumption in Uganda

Source: UCDA monthly reports (various issues), MAAIF (2011) and FAOSTAT (2012).

CONSUMPTION

Figure 2 and Table 1 compare domestic consumption of coffee in Uganda to production and export. Domestic consumption of the commodity in Uganda is relatively small ranging from 4-10% of production (Table 1). As such, coffee is primarily an export crop. Although promotion of domestic consumption has figured prominently in the UCDA *Annual Reports,* its objective is not clear. If the objective of increasing domestic consumption (currently estimated at about 7,500 tons) is to enhance rural incomes, this is unlikely to be achieved because domestic coffee processors will pay the same price as exporters and hence producers will receive the same price regardless of whether their coffee is consumed in Kampala, Rome or Beijing (Baffes, 2006). On the other hand, if the objective is to counter declines in international prices of coffee by reducing Uganda's supply to the international market, attainment of that objective is also questionable. Given Uganda's relatively small coffee market, even large increases in domestic coffee consumption will not have any significant impact on global consumption and hence no effect on world price.

MARKETING AND TRADE

Uganda ranks fourth after Burundi, Ethiopia and Honduras in terms of contribution of coffee exports in total export earnings in the period 2000-2010 with an average share of 18% during this period (ICO, 2012). The post-1997 coffee price decline has had a negative effect on production and exports (Baffes, 2006). However, production kept declining even when prices recovered until 2006 and has recently been declining (Figure 2). Although coffee contributed as much as $400 million annually to total merchandise exports during the mid-1990s, it currently (2010) contributes about $280 million (MAAIF, 2011). Understandably, the sector's poor performance raised concerns among policy makers.

However, despite the declining foreign earnings compared to the mid-1990s, coffee remained the main foreign exchange earner for the country. Its share in total export earnings declined marginally from 17.9 percent in 2009 to 17.5 percent in 2010. Despite a significant decline in quantity exported, coffee export earnings in 2010 increased by 13.1 percent as a result of higher global prices although there was an overall 14.3 percent decline in the quantity of coffee produced in 2010. Coffee exports in 2010/11 were 156,000 MT valued at US$ 338 million.

European Union is the main market for Uganda coffee export accounting for over 70% of total exports followed by Sudan importing over 10% of Ugandan coffee and USA with 3% of coffee exports of Uganda (Figure 3) (UCDA, 2011). However, the export market of Uganda is quite diverse with a total of 16 importing countries. The export market is controlled by 29 national and multi-national companies with ten companies controlling about 85% of the export market. The leading company (Ugacof (U), Ltd) controlled 15% of the coffee export in 2011 (UCDA, 2011). The top ten importing companies held a market share of 73.4% in 2011.

Table 1. Coffee production, export and domestic consumption in Uganda (2004-2010)

	Production (tonnes)	Export (tonnes)	Domestic consumption (tonnes)	Export as a percent of production
2004	170,081	159,983	10,098	94%
2005	158,100	142,513	15,587	90%
2006	133,310	126,887	6,423	95%
2007	175,346	164,540	10,806	94%
2008	218,781	200,640	18,141	92%
2009	196,055	181,324	14,731	92%
2010	166,925	159,433	7,492	96%

Source: UCDA monthly reports (various issues), MAAIF (2011) and FAOSTAT (2012).

Figure 3. Market share of the main destinations of Ugandan coffee exports
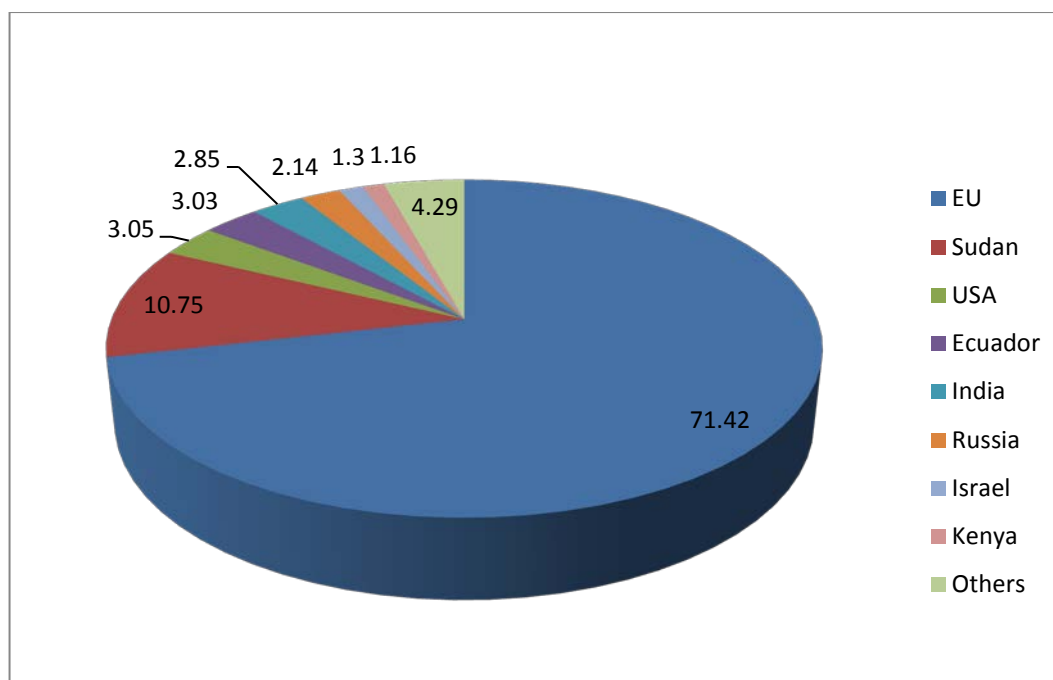
Source: UCDA (2011).

DESCRIPTION OF THE VALUE CHAIN AND PROCESSING

Figure 4 presents the typical Robusta coffee supply chain in Uganda[3]. We focus on Robusta coffee since it is the major type produced in Uganda (about 80%). After coffee harvest, farmers usually sun-dry the red cherry on the farm and sell their coffee as Kiboko (dry cherry). Most coffee sales are made at the farm-gate to small traders who tour the countryside on bicycles or motorcycles. These small-scale traders act as

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[3] The Arabica coffee marketing chain is generally similar to the Robusta.

aggregators either for bigger independent traders or for exporters and their agents (Hill, 2010). In the past, coffee mill owners used to buy the kiboko, dehull it and sell the rough hulled green bean (referred to as "FAQ" or fair average quality). This practice has now ceased to exist due to low profit margins and high price volatility. Instead, most mills provide dehulling services to Kiboko traders or producers at a fixed fee. After milling, the Kiboko traders occasionally sell directly to exporters but more often they sell at the mill to "FAQ" traders, who then sell to the exporters' district depots or to the exporters' yards in Kampala.

Once a sufficient quantity of green bean has been bought at the exporter district buying centre, the export coffee is then transported by truck to Kampala. The rough-hulled coffee then undergoes export processing which involves cleaning, sorting, grading, and drying. In the majority of cases, where exporters do not have their own export transport, freight companies are contracted to send the export green bean by truck or ferry/rail to Mombasa and then by sea to export destinations. Most coffee is exported in 60kg bags, which are stuffed into 20 ft or occasionally 40 ft containers.

It has often been claimed that Uganda's marketing chain is poorly structured, including the decreasing number of coffee exporting firms which may have led to oligopsonistic behavior and the large number of small coffee traders. These claims were rejected by Baffes (2006). For instance, from only one exporter in 1990 (the Coffee Board), within a 3-year period, 55 exporters were active in the sector, and a high of 78 exporters were reached in 1995. More recently this number has declined to about 25, which has been attributed to as indicative of oligopsonistic behavior. However, most of the exporting firms that exited the industry represented only a small share of exports and post-1993 period shows a very low level of market concentration for most years (Baffes, 2006). This finding is consistent with an earlier study which examined coffee export concentration issues in Uganda in a more comprehensive manner (Nsibirwa 2002).

It is claimed that the large number of small traders involved in the sector is unnecessary layer of trading activity which adds excessive costs to the industry. However, this is unavoidable since the Ugandan coffee sector consists primarily of smallholders, thus necessitating several levels of aggregation before adequate coffee quantities are collected to reach exporters' processing facilities (Baffes, 2006). Competition at all levels of the supply chain is intense (NRI/IITA, 2002). Market participants are playing a crucial and economic role in at least one of the following essential activities; bulking, transporting, product transformation, financing and risk taking.

The introduction of a coffee auction has been often argued as a way to increase marketing efficiency, especially price transparency (Baffes, 2006). Given that an auction would be owned and managed by the private sector, the key issue is whether there are policy-related impediments preventing the private sector from introducing it. It appears that such impediments do not exist. The coffee auctions of Moshi (Tanzania) and Nairobi (Kenya) are often cited as successful cases; both, however, have the requirement that all coffee must be marketed through them.

Between 2005 and 2011, producer prices of coffee in Uganda follow export price trends very closely (Figure 5). Producers received 64% of export price in 2005 and as high as 88% of the export price for FAQ beans in 2011. This suggests that exporters in Uganda receive small margin of profit, given transportation and processing costs. Other work has shown that changes in the international Robusta coffee price are in general passed from exporters to traders and producers. Price increases in the international coffee price were passed on to domestic traders, but not fully to coffee farmers (Fafchamps and Hill, 2008). However, with this exception, the price received by coffee farmers was found to track the international coffee price. Fafchamps and Hill (2007) also analyze price transmission mechanisms in Uganda. They find that a rise in the international price is readily reflected in export and wholesale prices, down to the first processing stage, but that growers receive a smaller share of the international price when it rises. In other words, when the international price rises, all domestic prices follow except for the price paid to producers, which rises by less than the full amount of international price increase.

Figure 4. Typical Robusta Coffee Supply Chain in Uganda
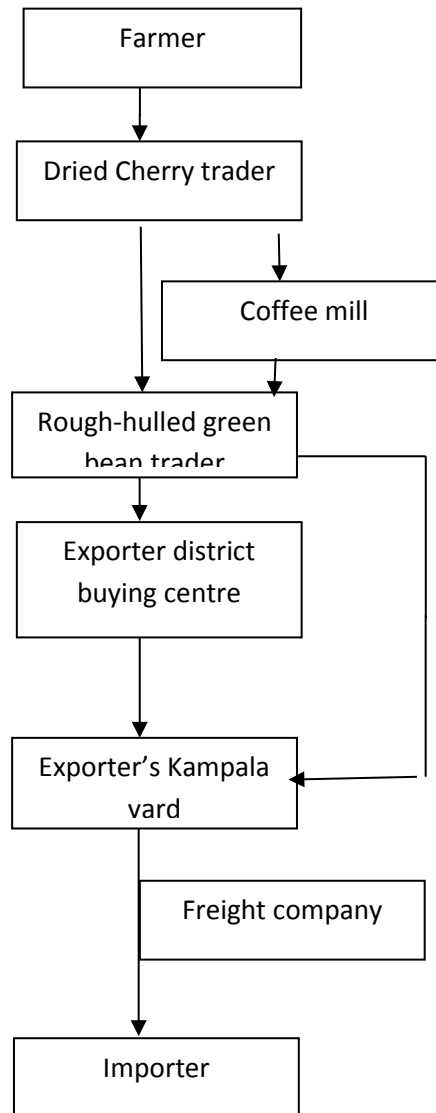
Source: The natural Resource Institute and IITA (2002).

Figure 5. Recent trends in producer and export prices of coffee in Uganda
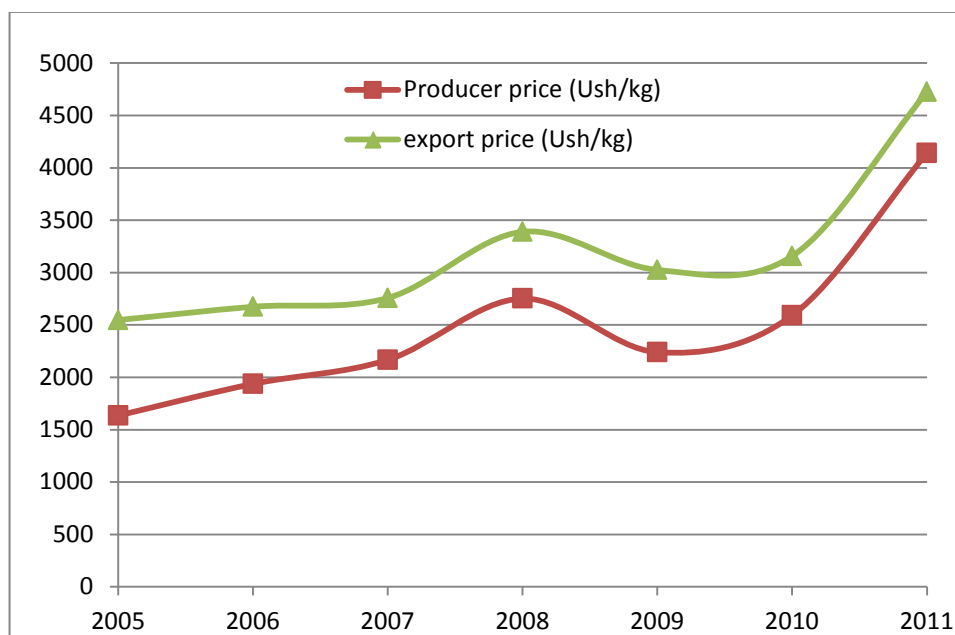
Source: CDO (various years).

PROCESSING

The ripe coffee fruits (cherries) go through a number of operations aimed at extracting the beans from their covering of pulp, mucilage, parchment and film to improve their appearance. The resulting clean coffee, Fair Average Quality (FAQ), can then be roasted and ground to obtained the coffee powder for human consumption. There are two main techniques used to obtain the clean coffee. Wet processing is done for the choice Arabica coffees produced at high altitudes. The coffees so produced are generally described as 'mild'. Dry processing produces coffee for mainly the Robusta described as 'hard'. The resulting clean dry coffee beans are in both cases referred to as FAQ. The FAQ is then sorted according to size using perforated sieves and by specific gravity (UCDA, 2012).

Over 95 % of the total annual coffee production is exported as green beans. Secondary processing, also known as export grading, transforms the clean coffee (FAQ) into the various coffee grades that meet the international standards. The process involves cleaning the FAQ, drying the coffee if wet, followed by size grading using perforated screens of the desired size. The sorted beans are the gravimetrically sorted to have uniform specific density before bagging off and loaded into containers for transportation to the ports.

POLICY DECISIONS AND MEASURES

Uganda's coffee industry went through the typical ups and downs of many African commodity subsectors Baffes (2006). The first coffee-related institution, the Coffee Industry Board, was established in 1930 to address quality control issues. The Department of Crops was created in 1946 whose main responsibility was to encourage the expansion of Robusta coffee. In 1953, the functions of the Industry Board were

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expanded to include price setting responsibilities while in 1959 its responsibilities (this time under a new name, Coffee Marketing Board) were further expanded to include marketing activities including coffee buying. Following independence in 1962, the Coffee Board assumed full control of the Robusta coffee industry. In 1969, under the government of Milton Obote, a coffee act was passed that gave the Coffee Board full responsibility of all aspects of the coffee industry, including a monopoly in exports. This marketing structure remained virtually unchanged until 1990, when the coffee sector was subjected to policy reforms. These reforms consisted in dismantling state controlled marketing boards (for coffee, lint, and other products) to liberalize commodity markets and create opportunities for the private sector to perform the marketing function much more efficiently than government parastatals.

Uganda liberalized its domestic Robusta coffee market in 1992. Since then farmers have been free to decide how and to whom to sell their coffee (Hill, 2010). Both internal and export marketing are regulated through The Coffee Regulations, 1994, a statutory instrument (Supplement No. 30 dated 16th November, 1994) which stipulate the requirements which have to be met including minimum standards of coffee traded at all post harvest levels within the coffee supply chain (Uganda Gazette, 1994). The Regulations provide for registration of players dealing in internal and export marketing of the coffee, inspection and quality control including issuance of quality certificates, grade analysis, mode of coffee export sales, publication of indicative prices of various grades of coffee to all sector participants, repatriation of foreign exchange, books, records and accounts, administrative guidelines, offences, penalties as well as arbitration in case of disputes between the sellers and buyers. It also provides for amendments in case the Regulations need revision (UCDA, 2012).

In order to decentralize operations at the district and lower levels, a Memorandum of Understanding (MOU) between Uganda Coffee Development Authority (UCDA) and local governments was signed in 1998 to allow local councils to collect registration fees from coffee buying stores the proceeds of which would be utilized to develop coffee at the grass root. The local councils are obligated to notify UCDA the number of buying stores registered in a particular year.

Consistent with its commitment to all liberal trade policy, Uganda has emphasized that coffee export sector remains as open as possible. Uganda has no coffee export taxes, charges or levies except the 1% fee on all coffee exports paid to UCDA. Given this observation, it is imperative to argue that exporters of Uganda's coffee grain are largely regulated by the importing countries.

Of relevance to coffee production is the exchange rate policy addressed by Bank of Uganda (BOU). The BOU continued to pursue a flexible exchange rate policy regime, whereby it intervenes in the foreign exchange market primarily to dampen short term volatility in the exchange rate (BOU, 2011). Dampening short term volatility is important to avoid its possible adverse impact on trade. Net sales of foreign exchange amounted to US$ 37.7 million over the review period. Overall the shilling depreciated against the

US dollar by 5.1% in 2009/10, from an average rate of U Sh 1,903.03 per US$ in 2008/09 to U Shs 2028.88 per US$.

3. DATA REQUIREMENTS, DESCRIPTION AND CALCULATION OF INDICATORS

To calculate the indicators needed to estimate incentives or disincentives to production (NRP, NRA) as well as the Market Development Gaps (MDGs), several types of data are needed. They were collected and are presented and explained hereafter.

The analysis in this note focuses on Robusta coffee. The analysis assumes two points along the value chain: farm-gate and export markets in Kampala. According to the value chain description (Figure 3), a wholesale market doesn't exist and exporters buy coffee from traders either directly or through their buying centers.

TRADE STATUS OF THE PRODUCTS

As shown in Figure 2, coffee is primarily and export commodity with 90 - 96 percent of production is for export. As such, Uganda is considered in this analysis as a net exporter of coffee to world market.

BENCHMARK PRICES

Observed

As Uganda is a net exporter of coffee. The benchmark price for coffee is the FOB price. The actual unit export price of coffee is considered as the most relevant benchmark price for Ugandan coffee. This is obtained from monthly price series reported by UCDA. These export prices represent weighted average of all qualities of coffee for each year. The benchmark price ranges from U Sh 2,546,835 (US$ 1430) to U Sh 4,723,949 (US $ 1970) per ton during 2005-11 (Figure 5).

Adjusted

In this analysis, no adjustment to the reference price is considered.

DOMESTIC PRICES

Observed

Observed farm-gate prices for Robusta FAQ beans are obtained from UCDA monthly reports and data from the International Coffee Organization web site. Annual average farm gate prices during 2005-2011 were computed from the monthly series (Figure 5). The nominal Robusta coffee prices range from USh 1,635 in 2005 to USh 4,142 per kg of FAQ beans in 2011.

As over 90 percent of Uganda production of coffee is for export, it is naturally that there is no active wholesale market for coffee in Uganda. Coffee is usually exported through direct sales by processing companies and therefore these exporters receive the full export price less the CDO tax of 1 percent on coffee exports for FOT shipments of their coffee. Therefore, coffee price at the point of competition is assumed to be 99 percent of export price. Table 2 compares the estimated price at the point of competition and farmgate prices for Robusta. The estimated price at the point of competition is converted to local currency using the average exchange rate.

EXCHANGE RATES

Observed

The exchange rate between the Ugandan shilling and US dollars has been taken from the IMF database on exchange rates. The average of the exchange rate for each year has been calculated from the monthly data reported in that database. These represent the observed exchange rate (Table 2).

Table 2. Farmgate prices and the price at the point of competition and exchange rate in Uganda (2005-2011)

	farmgate price (U Sh/kg)	price at the point of competition	exchange rate
	(U Sh/kg)	(U Sh/kg)	(U Sh/US$)
2005	1635.5	2521.4	1781.0
2006	1937.6	2647.1	1831.4
2007	2166.9	2730.0	1723.5
2008	2751.9	3355.4	1720.4
2009	2240.0	2995.2	2030.5
2010	2591.3	3125.9	2177.6
2011	4141.7	4676.7	2410.2

Note: the price at the point of competition is estimated as the full export price of coffee less the CDO export tax.
Source: CDO (various issues); IMF (2012).

Adjusted

Since Uganda is adopting a free market exchange rate policy, market exchange rate is assumed to reflect real exchange rate. For the years considered, this assumption is close to reality as exchange rate misalignment is likely to be minimal since the foreign exchange market in Uganda has been fairly liberal.

MARKET ACCESS COSTS

Observed

The analysis assumes the flow of Robusta coffee from production areas in Central, Eastern, Western and South Eastern Uganda to the export markets in Kampala[4]. This covers the movement of the commodity from farmers to dry cherry traders, mills, rough-hulled green bean trader to exporter district centers to exporters in Kampala.

Observed access costs from the farmgate to the point of competition includes the buying and storage costs, factory costs, general overheads, pre-processing costs, export processing and marketing costs and profit margins. The observed access costs are extrapolated from cost data reported by the Bank of Uganda (2008, 2010) for coffee years 2007-2010. This data is based on surveys data from Central, Eastern and Western regions of the country. Table 3 presents the observed costs of Robusta for 2005-2011. These access costs cover the cost of all market functions involved in moving the commodity between the two points in addition to profit margins. Implicit in these differences are all policy effects and market development gaps. The profit margin for coffee processing and export is computed as the difference between export price and farmgate prices of coffee plus marketing and processing costs. The estimated profit margins range from 2.5 to 28.7 percent and average 12.6 percent. In this analysis, observed profit margin is assumed to be 12.6 percent of investment costs (farmgate prices of coffee plus marketing and processing costs). For the observed access costs from the point of competition to the border, only the CDO tax is relevant. The CDO charge is treated as an export tax.

Adjusted

Adjusted marketing costs of Robusta in Uganda between the farmgate and the point of competition is the identical to the observed access cost except that a normal profit margin of 10 percent is assumed. The adjusted access costs to the border are zero since the export tax (CDO charge) is not considered as relevant cost here.

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[4] Export prices are often declared ex-Kampala either as free on rail or free on truck (FOT). When the price is FOB (free on board), transportation is usually arranged by the multi-national subsidiaries in-country (Sayer, 2002). Therefore, the relevant border point consistent with the reference price in this case is the export market in Kampala.

Table 3. Estimation of observed access costs from farm-gate to export market of Robusta coffee in Uganda (2005-2011)

Column1	2005	2006	2007	2008	2009	2010	2011
buying and storage costs	29,657	39,070	16,490	28,648	38,690	36,260	40,134
factory costs	88,189	64,400	86,730	85,191	128,050	107,825	119,344
general overheads	3,337	1,170	1,560	3,224	8,280	4,081	4,517
pre-processing costs	103,283	95,960	126,890	99,771	97,370	126,280	139,770
export processing ccosts	97,244	70,030	99,470	93,938	137,770	118,897	131,598
export marketing costs	20,093	24,850	11,640	19,410	27,460	24,567	27,192
pre-exporting costs	2,319	-	-	2,240	7,930	2,835	3,138
CDO charge (1% tax)	25,468	26,739	27,576	33,893	30,254	31,575	47,239
Observed access cost to point of competition	593,549	576,846	659,006	721,045	783,927	800,268	1,046,218
adjusted access cost to point of compeititon	542,080	518,787	593,753	640,853	714,103	721,954	926,427
observed access cost to the border	25,468	26,739	27,576	33,893	30,254	31,575	47,239

a\ Adjusted access cost to the border is zero.

Source: Author's computation from data from Bank of Uganda (2008) and bank of Uganda (2010).

EXTERNALITIES

Estimates of production externalities are unavailable and thus externalities were not accounted for.

BUDGET AND OTHER TRANSFERS

Estimates of budget and other transfers to producers are unavailable and were not considered in this analysis. As such, nominal rate of assistance is not estimated. These will be included in the analysis as data becomes available.

QUALITY AND QUANTITY ADJUSTMENTS

The analysis of Robusta coffee is undertaken for FAQ beans since producer prices of FAQ beans is considered here. As FAQ beans undergo export processing to sort the different qualities of coffee, the weighted export prices of all qualities is used. Therefore, quality and quantity adjustment factors take the value of unity.

DATA OVERVIEW

Table 4 summarizes the data used in the analysis as described above and table 5 presents the data used in the calculation of the various indicators.

Table 4: Summary of the description of the data used in the estimation of policy indicators for coffee in Uganda

data	Description	
	Observed	*Adjusted*
Benchmark price	*Unit export prices for Uganda coffee obtained from various reports published by CDO (see Figure 5)*	*N.A.*
Domestic price at point of competition (auction)	*Annual average unit export price adjusted by the 1 percent export tax charged by CDO (see Table 2).*	*N.A.*
Domestic price at the farm gate	*Annual average price received by coffee producers obtained from CDO reports for various years (see Table 2)*	*N.A.*
Exchange rate	*Annual average of exchange rate as reported by IMF (2012)*	*NA*
Access cost to point of competition (auction)	*CDO charge of 1 percent of export price on coffee exports*	*Adjusted access cost is zero.*
Access costs to farm gate	*All observed marketing costs involved in transportation and marketing of coffee as reported by Bank of Uganda (2008) and Bank of Uganda (2010) plus an estimated profit margin of 12.6 percent (see table 3)*	*All observed marketing costs involved in transportation and marketing of coffee as reported by Bank of Uganda (2008) and Bank of Uganda (2010) plus an assumed profit margin of 10.0 percent (see table 3)*
Quantity conversion factor	*All data for FAQ coffee (unit conversion factor)*	*All data for FAQ coffee (unit conversion factor)*

Source: compiled from the data described above.

Table 5. Data used in the analysis of MAFAP policy indicators for coffee in Uganda

DATA		Unit	Symbol	trade status	2005	2006	2007	2008	2009	2010	2011
				Year	x	x	x	x	x	x	x
Benchmark Price											
1	Observed	US $/TON	$P_{b(int\$)}$		1,430	1,460	1,600	1,970	1,490	1,450	1,960
1b	Adjusted	US $/TON	P_{ba}								
Exchange Rate											
2	Observed	USh/US $	ER_o		1,781	1,831	1,723	1,720	2,030	2,178	2,410
2b	Adjusted	USh/US $	ER_a								
Access costs border - point of competition											
3	Observed	USh/TON	ACo_{wh}		25,468	26,739	27,576	33,893	30,254	31,575	47,239
3b	Adjusted	USh/TON	ACa_{wh}		-	-	-	-	-	-	-
4 **Domestic price at point of competition**		USh/TON	P_{dwh}		2,521,366	2,647,145	2,730,009	3,355,382	2,995,173	3,125,885	4,676,710
Access costs point of competition - farm gate											
5	Observed	USh/TON	ACo_{fg}		593,549	576,846	659,006	721,045	783,927	800,268	1,046,218
5b	Adjusted	USh/TON	ACa_{fg}		542,080	518,787	593,753	640,853	714,103	721,954	926,427
6 **Farm gate price**		USh/TON	P_{dfg}		1,635,452	1,937,586	2,166,946	2,751,893	2,239,984	2,591,348	4,141,667
7 Externalities associated with production		USh/TON	E								
8 Budget and other product related transfers		USh/TON	BOT								
Quantity conversion factor (border - point of competition)		Fraction	QT_{wh}							-	
Quality conversion factor (border - point of competition)		Fraction	QL_{wh}								
Quantity conversion factor (point of competition - farm gate)		Fraction	QT_{fg}								
Quality conversion factor (point of competition - farm gate)		Fraction	QL_{fg}								

CALCULATION OF INDICATORS

The indicators and the calculation methodology used are described in Box 1. A detailed description of the calculations and data requirements is available on the MAFAP website or by clicking here. Computed indicators include observed and adjusted price gaps, observed and adjusted nominal rates of protection and market development gaps at farm gate. Exchange rate gap and reference price gaps were not considered here since we assume that observed exchange rate represents the equilibrium exchange rate and no reference price adjustment is considered. Data and calculation of indicators are presented in Appendix 2. Table 6 and Figure 5 present the estimated price gaps at the two markets for 2005-2011 while Table 7 and Figure 6 present the estimated rates of protection for the same period. Table 9 presents the relevant components of the market development gap.

Box 1: MAFAP POLICY INDICATORS

MAFAP analysis uses four measures of market price incentives or disincentives. *First*, are the two observed nominal rates of protection, one at the wholesale level and one at the farm level. These compare observed prices to reference prices free from domestic policy interventions.

Reference prices are calculated from a benchmark price, such as an import or export price, expressed in local currency and brought to the wholesale and farm levels with adjustments for quality, shrinkage and loss and market access costs.

The **Nominal Rates of Protection - observed (NRPo)** is the price gap between the domestic market price and the reference price divided by the reference price at both the farm and wholesale levels:

$$NRPo_{fg} = (P_{fg} - RPo_{fg}) \Big/ RPo_{fg}; \quad NRPo_{wh} = (P_{wh} - RPo_{wh}) \Big/ RPo_{wh};$$

The $NRPo_{fg}$ captures all trade and domestic policies, as well as other factors affecting market incentives and disincentives for the farmer. The $NRPo_{wh}$ helps identify where incentives and disincentives may be distributed in the commodity market chain.

Second, are the **Nominal Rates of Protection - adjusted (NRPa)** in which the reference prices are adjusted to eliminate distortions found in developing country market supply chain. The equations to estimate the adjusted rates of protection follow the same general pattern:

$$NRPa_{fg} = (P_{fg} - RPa_{fg}) \Big/ RPa_{fg}; \quad NRPa_{wh} = (P_{wh} - RPa_{wh}) \Big/ RPa_{wh};$$

MAFAP analyzes market development gaps caused by market power, exchange rate misalignments, and excessive domestic market costs, which contribute to the NRP*o* and NRP*a* indicators. Comparison of the different rates of protection identifies where market development gaps can be found and reduced.

Table 6: MAFAP price gaps for coffee in Uganda 2005-2011 (U Sh per Mt)

	2005	2006	2007	2008	2009	2010	2011
Trade status for the year	x	x	x	x	x	x	x
Observed price gap at the point of competition	0	0	0	0	0	0	0
Adjusted price gap at the point of competition	-25 468.4	-26 738.8	-27 575.9	-33 892.8	-30 254.3	-31 574.6	-47 239.5
Observed price gap at farmgate	-292 364.6	-132 712.9	95 942.2	117 556.1	28 737.6	265 730.9	51 1175.3
Adjusted price gap at farmgate	-369 301.9	-217 511.4	3 113.5	3 471.2	-71 340.6	155 841.9	344 144.5

Note the observed indicator at the point of competition is zero by definition.
Source*:* Authors' calculations using data as described above.

Table 7: MAFAP nominal rates of protection (NRP) for coffee in Uganda 2005-2011 (percent)

	2005	2006	2007	2008	2009	2010	2011
Trade status for the year	x	x	x	x	x	x	x
Observed NRP at the point of competition	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adjusted NRP at the point of competition	**-1.0%**	**-1.0%**	**-1.0%**	**-1.0%**	**-1.0%**	**-1.0%**	**-1.0%**
Observed NRP at farmgate	**-15.2%**	**-6.4%**	**4.6%**	**4.5%**	**1.3%**	**11.4%**	**14.1%**
Adjusted NRP at farmgate	**-18.4%**	**-10.1%**	**0.1%**	**0.1%**	**-3.1%**	**6.4%**	**9.1%**

Note the observed indicator at the point of competition is zero by definition
Source: Authors' calculations using data as described above.

Table 8: Market development gap for coffee in Uganda 2005-2011 (USD per Mt)

	2005	2006	2007	2008	2009	2010	2011
International markets gap	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exchange policy gap	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Access costs gap to point of competition	-25468.35	-26738.84	-27575.85	-33892.75	-30254.28	-31574.60	-47239.49
Access costs gap to farm gate	-51468.96	-58059.72	-65252.88	-80192.18	-69823.88	-78314.41	-119791.30
Externality gap	-	-	-	-	-	-	-
Market Development Gap	-3.8%	-3.9%	-4.3%	-4.2%	-4.3%	-4.5%	-4.4%

Source: Authors' calculations using data as described above.

4. INTERPRETATION OF THE INDICATORS

Under the liberalized economic policy, there is no explicit trade policy in Uganda in the form of tax or subsidy on exports including coffee. The only applicable tax on coffee is a charge of 1 percent of export price by Uganda Coffee Development Authority on coffee exports. Under such conditions, the results should logically indicate a zero nominal rate of protection at the point of competition.

Most of Ugandan coffee is exported directly by coffee processors and therefore there is no active domestic wholesale market. In such cases, the point of competition is the border. The processors/exporters receive the full export price equivalent of the world prices depending on the point of delivery. Therefore, the observed price gap is zero (no difference between the prices received by exporters and reference prices) while the adjusted price gaps is equivalent to the CDO export tax which vary from one year to the other depending on export price (Table 6). Consequently, the observed nominal rate of protection is zero at the point of competition while the adjusted nominal rate of protection reflects the 1 percent CDO tax on coffee export (Table 7). This is expected since there are no other direct policy interventions which may lead to deviation of producer prices from their corresponding reference prices.

The observed nominal rate of protection can be interpreted as the tax rate on coffee for the different market participants since quantitative restrictions are not imposed in this case. In other words, coffee exporters appear to receive prices very close to what they would have received in world market given all the currently observed market access costs. This situation is consistent with the liberalization policy. Since the export tax is used by CDO to finance its activities, it is concluded here that the export market of coffee is operating optimally from the perspective of policy impact.

However, the situation for coffee farmers is slightly different. Given the current profit margins which are generally low for processors and exporters, coffee growers began to receive some slight price incentives in recent years (2007-2011) in the form of positive price gap (Figure 6). However, when reference prices are adjusted for excessive profit margins, the adjusted price gaps in recent years are often small and variable over time (Table 7). Consequently, the adjusted nominal rate of protection is negative on average (-2.3 percent).

As there is minimal or no direct policy intervention in the coffee markets at the farmgate, most of this price deviation is due to excessive access cost between farm gate and the export markets as measured by the access costs gap to the farm gate (Table 8), the remainder is accounted for by the observed price gap as explained above as there are no policy, regulatory or institutional constraints within the market chain.

Figure 6: MAFAP observed and adjusted price gaps of Robusta coffee in Uganda (2005-2011)
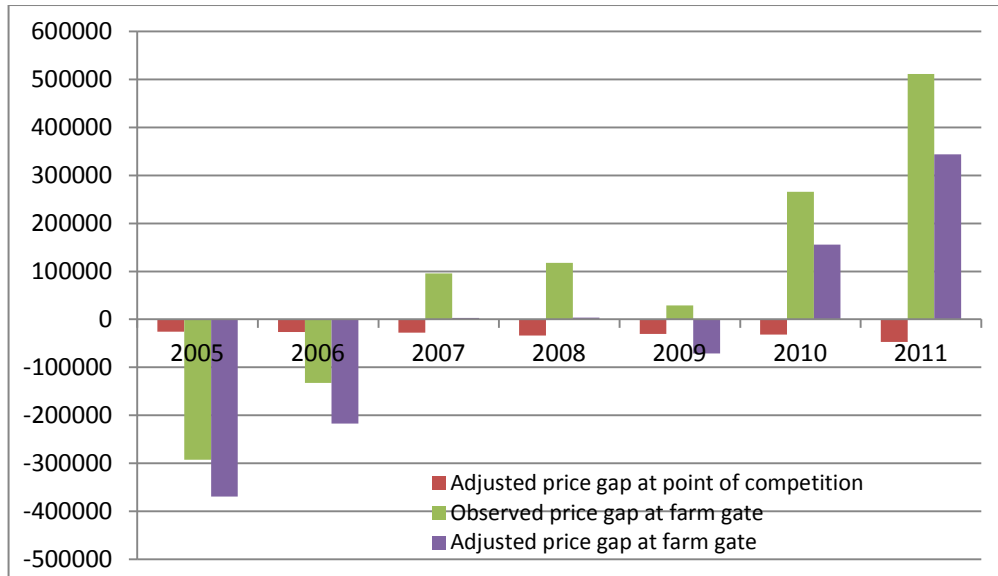
Figure 7: MAFAP observed and adjusted nominal rates of protection of Robusta coffee in Uganda (2005-2011)
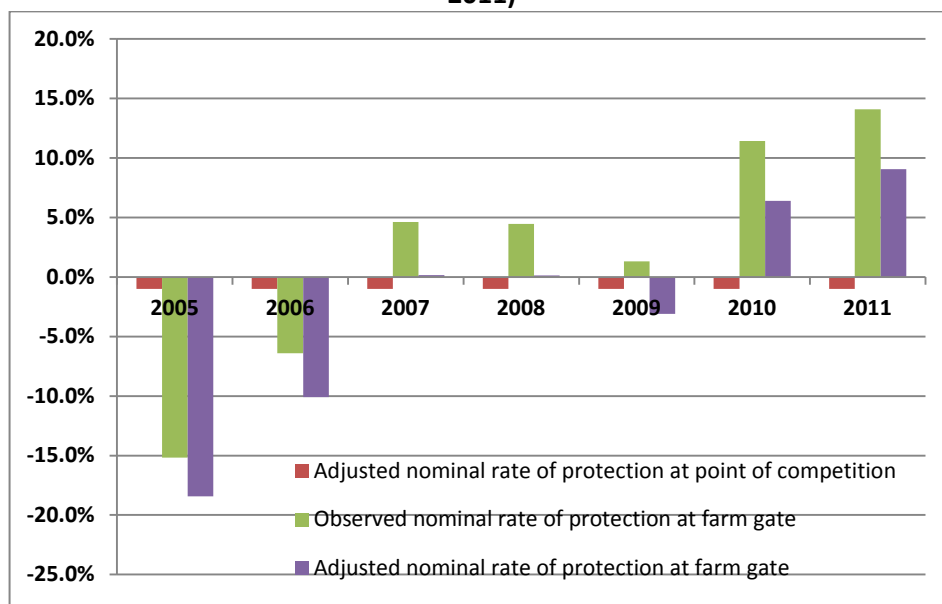
As price gaps may result from direct intervention, i.e., observed, or implicit in the functioning of the market, i.e., adjusted, access cost gap can be defined as the difference between the observed and the adjusted price gaps between the border and farm gate. Since this is the only estimated component of price gaps, it can be viewed as the market development gap. As both components of this gap (observed and adjusted) are negative, the access cost gap is also negative and smaller in absolute value than the adjusted price gap.

The coffee industry is also characterized by relatively low level of market development gap averaging 4.2 percent (Table 8). Factors contributing to the market development gap at the farmgate include: high transportation costs of coffee from Western Uganda to Kampala, and the high processing costs and inefficiencies in the trading chain of coffee. The cost of truck transportation in Uganda averaged US$ 0.15 per ton-km for distances of 80 km or more in 2008 (World Bank, 2009). This cost more than doubled (US$ 0.33 per ton-km) for shorter distances. Obviously, transportation costs are highly related to the cost of fuel which accounts for 68 percent of the vehicle operating costs (World Bank, 2009). Therefore, taxes on fuel play a role in determining commodity transportation costs.

In some years, the cost of coffee processing is quite high. For example, exporters had losses in 2008/09 due to the increased cost of processing and low export prices (BoU, 2011). However, Baffes (2006) argued that there is not much to be done to reduce marketing and processing costs. This is because both transportation and processing costs are already at the price lowest possible and profit margins on a per unit basis are extremely low.

5. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

MAIN MESSAGE

Given that coffee is relatively high value crop, the price gaps, although negative in some years, do not seem to be excessive. The major issue at the farmgate seems to be the relative variability of the indicators over time which may imply inefficient price transmission between the farmgate and export markets. The deviation of the farmgate price from the reference price is due to a market development gap rather than policy or regulatory constraints. This is expected since the coffee industry in Uganda has undergone major reforms since the early 1990s. The reforms have been successful at least at the export market where the export market appears to operate optimally. Coffee market is completely liberalized. Producers' share of export prices increased significantly (Figure 4). Entrepreneurial activity increased enormously as the number of active exporters increased substantially while thousands of small traders entered the industry contributing to competition in the market. Most importantly, poverty reduction impact on households in the coffee-growing regions is well documented (Baffes, 2006).

PRELIMINARY RECOMMENDATIONS

The underlying causes of the market development gaps leading to deviation of market access costs from the observed difference between producers' price and the reference price may include high transportation costs between Western Uganda and Kampala resulting from poor infrastructure and high fuel costs, high processing costs and inefficiencies in the marketing chain of coffee that result in excessive profit margins at times and imperfect price transmission at others. Addressing these factors will reduce the level of taxation to coffee producers. In particular, improving transportation infrastructure will not only improve incomes of coffee growers but also to producers of other commodities as well.

LIMITATIONS

To make accurate adjustment to market access costs, more information is needed on the level of profitability margins of the different marketing agents involved in the coffee chain such as coffee traders. Currently, this information is unavailable. Based on the producers' share of export price, these margins are likely to be small and may not represent significant component of the nominal rates of protection and price gaps.

FURTHER INVESTIGATION AND RESEARCH

Based on the available value chain analysis studies, coffee market in Uganda does not include a wholesale market. However, the market includes other agents such as millers and rural traders. It will be interesting to compare the indicators at either point or for both. Coffee is produced in Central, Eastern, Western and South Eastern Uganda. Marketing cost structure is likely to vary between these regions due to differences in transportation. This analysis needs to be disaggregated by production regions. Moreover, although marketing chains and pricing of Robusta and Arabica are very similar, comparison of the indicators of both types of coffee is necessary for complete analysis.

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ANNEX I: METHODOLOGY USED

A guide to the methodology used by MAFAP can be downloaded from the MAFAP website or by clicking here.

ANNEX II: DATA AND CALCULATIONS USED IN THE ANALYSIS

DATA	Unit	Symbol	trade status	Year 2005	2006	2007	2008	2009	2010	2011
				x	x	x	x	x	x	x
Benchmark Price										
Observed	US $/TON	$P_{b(int\$)}$		1,430	1,460	1,600	1,970	1,490	1,450	1,960
Adjusted	US $/TON	P_{ba}								
Exchange Rate										
Observed	USh/US $	ER_o		1,781	1,831	1,723	1,720	2,030	2,178	2,410
Adjusted	USh/US $	ER_a								
Access costs border - point of competition										
Observed	USh/TON	ACo_{wh}		25,468	26,739	27,576	33,893	30,254	31,575	47,239
Adjusted	USh/TON	ACa_{wh}		-	-	-	-	-	-	-
Domestic price at point of competition	USh/TON	P_{dwh}		2,521,366	2,647,145	2,730,009	3,355,382	2,995,173	3,125,885	4,676,710
Access costs point of competition - farm gate										
Observed	USh/TON	ACo_{fg}		593,549	576,846	659,006	721,045	783,927	800,268	1,046,218
Adjusted	USh/TON	ACa_{fg}		542,080	518,787	593,753	640,853	714,103	721,954	926,427
Farm gate price	USh/TON	P_{dfg}		1,635,452	1,937,586	2,166,946	2,751,893	2,239,984	2,591,348	4,141,667
Externalities associated with production	USh/TON	E								
Budget and other product related transfers	USh/TON	BOT								
Quantity conversion factor (border - point of competition)	Fraction	QT_{wh}							-	
Quality conversion factor (border - point of competition)	Fraction	QL_{wh}								
Quantity conversion factor (point of competition - farm gate)	Fraction	QT_{fg}								
Quality conversion factor (point of competition - farm gate)	Fraction	QL_{fg}								

CALCULATED PRICES	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011
Benchmark price in local currency									
Observed	USh/TON	$P_{b(loc\$)}$	2,546,835	2,673,884	2,757,585	3,389,275	3,025,428	3,157,460	4,723,949
Adjusted	USh/TON	$P_{b(loc\$)a}$	2,546,835	2,673,884	2,757,585	3,389,275	3,025,428	3,157,460	4,723,949
Reference Price at point of competition									
Observed	USh/TON	RPo_{wh}	2,521,366	2,647,145	2,730,009	3,355,382	2,995,173	3,125,885	4,676,710
Adjusted	USh/TON	RPa_{wh}	2,546,835	2,673,884	2,757,585	3,389,275	3,025,428	3,157,460	4,723,949
Reference Price at Farm Gate									
Observed	USh/TON	RPo_{fg}	1,927,817	2,070,299	2,071,004	2,634,337	2,211,246	2,325,617	3,630,491
Adjusted	USh/TON	RPa_{fg}	2,004,754	2,155,098	2,163,833	2,748,422	2,311,324	2,435,506	3,797,522

INDICATORS	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011
Price gap at point of competition									
Observed	USh/TON	PGo_{wh}	-	-	-	-	-	-	-
Adjusted	USh/TON	PGa_{wh}	(25,468.3)	(26,738.8)	(27,575.9)	(33,892.8)	(30,254.3)	(31,574.6)	(47,239.5)
Price gap at farm gate									
Observed	USh/TON	PGo_{fg}	(292,364.6)	(132,712.8)	95,942.2	117,556.1	28,737.6	265,730.9	511,175.3
Adjusted	USh/TON	PGa_{fg}	(369,301.9)	(217,511.4)	3,113.5	3,471.2	(71,340.6)	155,841.9	344,144.5
Nominal rate of protection at point of competition									
Observed	%	$NRPo_{wh}$	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Adjusted	%	$NRPa_{wh}$	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%
Nominal rate of protection at farm gate									
Observed	%	$NRPo_{fg}$	-15.2%	-6.4%	4.6%	4.5%	1.3%	11.4%	14.1%
Adjusted	%	$NRPa_{fg}$	-18.4%	-10.1%	0.1%	0.1%	-3.1%	6.4%	9.1%
Nominal rate of assistance									
Observed	%	$NRAo$	-15.2%	-6.4%	4.6%	4.5%	1.3%	11.4%	14.1%
Adjusted	%	$NRAa$	-18.4%	-10.1%	0.1%	0.1%	-3.1%	6.4%	9.1%

Decomposition of PWAfg	Unit	Symbol	2005	2006	2007	2008	2009	2010	2011
International markets gap	USh/TON	IRG	-	-	-	-	-	-	-
Exchange policy gap	USh/TON	ERPG	-	-	-	-	-	-	-
Access costs gap to point of competition	USh/TON	ACG_{wh}	(25,468)	(26,739)	(27,576)	(33,893)	(30,254)	(31,575)	(47,239)
Access costs gap to farm gate	USh/TON	ACG_{fg}	(51,469)	(58,060)	(65,253)	(80,192)	(69,824)	(78,314)	(119,791)
Externality gap	USh/TON	EG	-	-	-	-	-	-	-
Market Development Gap	USh/TON	MDG	(76,937)	(84,799)	(92,829)	(114,085)	(100,078)	(109,889)	(167,031)
Market Development Gap	%	MDG	-3.8%	-3.9%	-4.3%	-4.2%	-4.3%	-4.5%	-4.4%