Why is it important to measure the Market Development Gap? An application to the agricultural sector of Uganda

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Abstract

An abundant literature exists on measuring the effects pricing and trade policy on agricultural commodity prices since the seminal work by Krueger, Schiff and Valdes (1991) and then the massive worldwide project led by Kym Anderson (2009) on distortions to agricultural incentives. Much less empirical analysis is available on the effects of market and policy failures on production incentives or disincentives. This is most likely due to the difficulty of disentangling the effects of explicit policy instruments from other factors influencing price levels. In addition, this topic is much less relevant for high income countries where most of the OECD type of policy measurement work has occurred. Important challenges related to data scarcity in developing countries as well as methodological options have also prevented researchers from further investigating this topic. In this paper, these other factors are described as the Market Development Gap. The Market Development Gap is a concept that refers to the excessive marketing costs and inefficient price transmission resulting from poorly functioning market, inadequate market structure and uncompetitive behavior of agents in the value chains. The paper attempts to identify the major sources of market development gap in African commodity markets and proposes a methodological framework to measure it as a residual of price gap and the estimated policy-induced price gap. This methodology is applied to several commodities in Uganda. We find a number of cases where the estimation of the market development gap helps to better understand the factors driving the important disincentives affecting producers.

Keywords

Policy measurement, policy support, market failures, market development gap, Uganda

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Introduction

Commodity prices in output markets of African economies often diverge from their equivalent reference prices in world markets for a variety of factors. Market distortions arising directly from government policies such as taxes, subsidies and other restrictions are among the factors that have received attention in the economic literature (Akiyama, 2003; Baffes and Gardner, 2003; Barret, 2008; Anderson and Kurzweil, 2008; Anderson, 2009; Balié and Maetz, 2011). Several measures have been used to quantify the impact of such distortions on domestic prices, e.g., the nominal rate of protection and the market price differential of OECD. Price divergence, however, can also arise from poor functioning of the market or usage of obsolete technologies, inadequate market structure and uncompetitive behavior leading to excessive marketing costs and inefficient price transmission between world and domestic markets of the commodity. This category can be interpreted as a market development gap.

The distinction between policy impact and market development gap is becoming increasingly important for several reasons. Firstly, governments in developing countries are increasingly moving towards liberalizing agricultural markets avoiding administered pricing, state monopoly and procurements. With diminishing government intervention, other economic agents are taking over these roles. Determining the effectiveness and efficiency of these structural changes requires that a special attention be paid to critical factors related to the policy environment which are partly captured by the market development gap concept as we define it here (Quiroz and Valdés, 1993; Friss-Hansen, 2000; Poulton, 2006). At the same time, as fewer price policy instruments such as tariff, subsidies, or exchange rate are used, it becomes easier to isolate and attribute the explicit effect of policies on prices as distinct from the implicit effects. Secondly, this distinction matters because the policy response varies according to the source of market signal distortions. For instance, price disincentives arising from excessive taxation can be addressed through reduction of those taxes. In contrast, reducing the market development gap requires shifting the focus to the deficiencies in the provision of public goods (roads, irrigation, basic education, market information systems, research and extension to acquire and use modern technologies) and to the need to improve institutions and governance (contract law and enforcement, systems of grades and standards) (Kelly et al, 2003). Improvements in these areas would not only lower marketing costs and consequently increase producer prices but would also reduce the cost of inputs to farmers. Thirdly, the exact impact of the various policy instruments in place is difficult to understand

without distinguishing the impact of explicit policies from the impact of the market development gap. Otherwise, the intended objective of a government adopting a policy measure may be reduced, muted or reversed by the effect of the market development gap. Finally, as more emerging economies are included in the list of countries monitored by the OECD using the Producer Support Estimate (PSE) methodology, it is increasingly common to find negative PSEs that cannot be explained by any specific policy in the form of an export tax, for example. It therefore has become useful to capture the non-policy and non-market effects on price disincentives that could result from underdeveloped markets.

At the same time, while the issues of market failures and non-market stimulants affecting market prices are widely discussed in the literature, little attention has been paid to the measurement of the extent and impact of the market development gap on domestic commodity prices. Indeed, measuring the impact of the market development gap is challenging. The major perceived difficulty is to decompose the price differential between two points of the same value chain into one element directly attributable to the explicit policies and another element resulting from other factors here called the market development gap. The first attempt to systematically measure this market development gap emerges in FAO's Monitoring and Analyzing Food and Agricultural Policies (MAFAP) Project (Balié and Maetz, 2011; FAO, 2014). The MAFAP project proposes estimates of the market development as well as a set of other indicators for a number of commodity and country pairs for the period 2005-13 with regular updates. While the market development gap concept is identical, the methodology described here slightly differs from that of the MAFAP project as currently implemented (FAO, 2015). In this note, we explore the potential of measuring the market development gap as a residual of the total gross price gap and the estimated impact of explicit policies.

The next section of this paper attempts to identify the major sources of market development gap in African commodity markets. The third section presents the conceptual framework for measuring the price gap and then describes the proposed approach for measuring the market development gap. In the fourth section, the data used for applying the methodology to several examples in Uganda are described and results are presented, interpreted and discussed in the fifth section. The final section concludes.

Sources of market development gap

There are many and complex sources of market development gap mainly originating from non-price stimulus. The policy reform process, initiated in the 1980s in Africa, has tended to focus on macroeconomic reforms designed to improve agricultural price incentives, with less attention to non-price stimulants that influence farm-level microeconomic decision-making (Friis-Hansen, 2000; Kherallah et al., 2002; Kelly et al, 2003). Africa's lack of attention to these non-price stimulants (e.g., institutions and technologies) appears to have diminished the ability of macroeconomic reforms to transmit price stimuli, particularly to the non-tradable sector comprised largely of food crops produced for domestic consumption (Barrett and Carter, 1994). However, the impact of such stimulus is not only limited to non-tradable but may also exist in cash export and import substituting commodities.

Of the major sources of market development gap are the high transaction costs and problems of asymmetric information in African commodity markets. These continue to bedevil smallholder farmers, especially those with poor access to markets for products, inputs and services (Shiferaw, Obara and Muricho, 2006). Lack of access to market infrastructure and geographical isolation either due to remoteness or poor roads and poor communication systems limit the development of markets. Hence, smallholder producers in these areas are poorly served by agricultural traders, making local markets thin, less competitive and prices highly dependent on seasons: falling sharply at the time of harvest and increasing gradually as local supply declines. The lack of competition among buyers, low local effective demand and covariate risks limit opportunities for farmers to bargain for better prices, which leaves them to accept low prices for their produce (de Janvry et al., 1991; Kindness and Gordon, 2001).

Along the market and value chain, processors and traders are constrained by low quality grain, inadequate supply and high cleaning costs whereas market intermediaries in the supply chain face high assembly costs, high market risk and cash flow problems (Shiferaw, Obara and Muricho, 2006). Due to the dominance of smallholder agriculture, marketed quantities are often small and collection requires an additional intermediary to undertake such function. These factors deprive farmers from the underlying incentives to produce and supply quality and differentiated products with desirable market traits in addition to their inability to penetrate high value niche markets (Jones et al. 2002). This indicates that small-scale, dispersed and unorganized producers are unlikely to exploit market opportunities as they cannot attain the necessary economies of scale and lack bargaining power in negotiating prices. This reduces their ability to compete with well-established large scale producers and

farmers in more favored areas to harness available and emerging market opportunities (Johnson and Berdegue, 2004). In the absence of institutions that help to coordinate marketing functions or to link producers to markets, the associated high transportation costs and transaction costs undermine the processes of exchange (Kranton, 1996; Gabre-Madhin, 2001) and result in limited or localized markets with little rural-urban linkages (Chowdhury et al., 2005).

Another source of market development gap is the non-competitive behavior in commodity markets caused by the demand-driven nature of some of the commodity value chains and the market power of buyers over sellers due to lack of market information. Similarly, the slow or time-lagged price transmission within domestic markets and between domestic and regional and world markets (Meyer and von Cramon-Taubadel, 2004, Dawe et al, 2015) contributes to the market development gap. For example, the price of maize in the wholesale market of Kampala is often higher than the export prices to neighboring countries (RATIN, 2012). In some cases, market development gap is caused by the failure of the market to respond to supply constraints caused by natural factors such as drought or pests. A necessarily important source of market development gap is the government intervention in related markets or other sectors, e.g., energy sector, which influence marketing costs (transportation and processing) or lack of intervention to correct market failures or provide public goods such as infrastructure and market information.

Overcoming the effects of such market imperfections in agricultural input and output markets would therefore require a deliberate attempt to strengthen institutions that promote coordination of market functions, reduce transaction costs and integrate markets to facilitate a continual transition to a higher level equilibrium (World Bank, 2002).

Analytical framework

The assessment of the efficiency of agricultural price policies is based on the law of one price, which is the economic theory that states that there is only one prevailing price for each product in a perfectly competitive market. According to OECD (2010), the key theoretical assumption underlying the estimation of support is that agricultural markets are competitive. The characteristics of competitive markets, such as perfect information, homogeneity of products traded and free entry and exit, imply price arbitrage where market agents exploit and gain from price differences across markets. Theoretically, price arbitrage works to dissipate

price wedges between domestic and world market so that there is a stable tendency of domestic prices to align with external prices when expressed in a common currency unit.

Thus, the analysis can assess the efficiency of agricultural price policy by comparing the existing price structure with an alternative one that reflects efficient resource use (Tsakok, 1990). The guiding principle in determining the alternative price is the use of opportunity cost as a benchmark from which a reference price is derived by adjusting for marketing costs. For a tradable, the opportunity cost is the border price which represents what the country would have to pay or would receive if trading internationally (Tsakok, 1990). If the domestic markets are efficient and competitive, the difference between the domestic price of a commodity and the benchmark price measures the impact of any existing price policies. However, agricultural markets in developing countries are rarely perfectly competitive and therefore the measured price gap not only reflects the impact of pricing policies but also the impact of deviations from competitiveness and other market inefficiencies.

Let P_d be the observed domestic price at farm gate, P_w be the reference price at the farm gate obtained by adjusting the benchmark price for marketing costs between the border and the farmgate, the price gap at the farm gate, (PG_f), is expressed mathematically as follows:

$$PG_f = P_d - P_w \qquad (1)$$

Further the price gap can be expressed relative to the reference price as the nominal rate of protection:

$$NRP_f = \frac{PG_f}{P_w} = \frac{P_d - P_w}{P_w} \qquad (2)$$

If P_w, the reference price, is properly estimated, then PG_f is the sum of both the impact of any policy distortions and market development gap on market prices. There are two limiting cases. In one extreme, the entire price gap is due to explicit policy distortions and the market development gap is zero. Examples include fixed prices and binding ceiling prices. On the other extreme, the entire price gap is due to the market development gap where no explicit policy exists that could influence commodity price level and explain the price gap. This is common among countries that have fully liberalized their agricultural markets such as Uganda.

Theoretically, a positive price gap suggests price policy support to producers while negative values indicate that producers are taxed. However, in some cases, a price gap with the sign opposite to what would be expected based on the policies in place may be estimated (OECD,

2010). For example, the price gap may be negative for an export while no policies – export duties, export restrictions, or administrative barriers to inter-regional movement of goods – that would explain the negative price gap are applied. Similarly, the price gap may be negative for imported commodity although policies which should increase the domestic price are in place, such as a tariff. The reverse case may also emerge - that is a positive price gap for an export in the presence of an export tax or a positive price gap for an importable in absence of tariff. In such cases, the usual practice is to assume no policy effect and attribute a zero to the price gap (OECD, 2010). However, this is not fully satisfactory as it can intuitively be argued that at least a part of the observed price gap is due to other factors than explicit agricultural trade or price policy measures. In fact, these unexpected and counterintuitive signs are explained by the existence of a market development gap.

Further, the price gap in equation (1) and (2) above can be decomposed into policy-induced price gap (P_g) and market development gap (M_g) as follows:

$$PG_f = P_d - P_w = P_g + M_g \quad (3)$$

The direct policy gap and market development gap can also be expressed into relative terms by dividing by the reference price:

$$NRP_g = NRP_n + MDG \quad (4)$$

Where NRP_g and NRP_n are the gross and net nominal rates of protection, respectively, and MDG is the market development gap measured relative to the reference price.

In equation 4, the gross nominal rate of protection measures the impact of both policy and market on domestic commodity price while the net nominal rate of protection measures only the given policy-induced impact on domestic prices of the commodity. It is worth noting that MDG can be positive in some cases[2] indicating that the market development gap tends to increase the producer price above the world market. This depends on the origin and nature of this gap. In the case of imports, for example, the market development gap at the wholesale level tends to raise the cost of imports and consequently the producer price for the domestic import substitute. If this effect outweighs the negative gap at the farm gate, then the MDG will be positive.

[2] Whether negative or positive, the market development gap represents an inefficiency that tends to create gap between the domestic price and its opportunity cost/value. The sign only indicates its effect on domestic price.

Measuring the policy-induced price gap

When there is no known policy in place, the policy impact is assumed to be zero and all the price difference is due to the market development gap. Conversely, when known policies are in place, the policy impact must be estimated in order to be able to calculate the impact of the market development gap.

The most common policy instruments in developing countries include tariff, quantitative restrictions such as quota, export subsidies and taxes, administered procurement, price floor and price ceilings and local taxes. Overvalued exchange rate is less common nowadays with a few exceptions. A substantial body of literature has focused on measuring the impact of these policies, e.g., OECD (2010) and Deardorff and Stern (1997) and this knowledge is summarized hereafter.

a. The effect of import tariff

For a ***net importer,*** the policy impact can be derived directly from tariffs. This method is not a preferred option if other policies such as tariff quotas, licensing or state-trading enterprises are in place, because it does not capture the extent to which these policies change domestic market prices. However, it can be used even when other policies exist if it is believed that deriving the price gap by this method results in a more accurate estimate of *price gap* for the commodity. The policy-induced price gap (P_g) due to the tariff can be expressed as either:

$$P_g = P_w . t \qquad \text{or} \qquad P_g = T \ldots\ldots\ldots\ldots (5)$$

where t is the average specific tariff rate applying to the commodity and T is the average specific tariff applying to the commodity. According to OECD (2010), the most appropriate tariffs to use are the *statutory applied Most Favored Nation (MFN) tariffs* that would pertain to imports since these represent the protection level imposed on marginal imports.

Further, OECD (2010) describes two major steps that must be carried out in order to calculate an average tariff for a commodity. The first step is to ensure that the tariffs applying to imports of the commodity are expressed in the same form. Statutory tariff rates can be *ad valorem* or specific. Sometimes they are a mixture of both. To average several tariff lines, all tariffs have to be converted to either an *ad valorem* equivalent or a specific equivalent. The appropriate border prices to use for tariff conversion should be those corresponding to the specific tariff lines. But if the information is not available, *e.g.* if no trade occurs because the tariff is prohibitive, an alternative price has to be used, for example, another indicator of the world price of the same product, the border price of a close tariff line or the border price of

the commodity itself converted to the appropriate processing equivalent. The final step is to apply an appropriate weighting to the tariffs. If significant flows of trade occur for all tariff lines, tariffs can be weighted by import volumes, ensuring that volumes have been converted to the same product weight. If there are no imports for some tariff lines, for example because of prohibitive tariffs, another weighting system has to be used, usually a simple average.

b. **Non-tariff barriers (NTBs)**

Non-tariff barriers (NTBs) include import quotas, export limitations, licensing, voluntary export restraints and prohibitions. Deardorff and Stern, 1997 illustrate that the effect of any NTB can be gauged in terms of its impact on the domestic price in comparison to some reference price. Thus price comparisons have provided the basis for much of the general empirical work that has tried to quantify them and not just identify where they occur. Because the price impact is a general property of NTBs, such a price comparison can pick up the net effects of all NTBs as well as market development gap that are present in a market. Therefore, it is imperative to examine which prices to use in the comparison to estimate the impact of NTBs without including the market development gap.

Deardorff and Stern (1997) argue that the purest measure of an NTB in the price dimension is one that compares the price, that would prevail without the NTB with the price, P_2, that would prevail domestically with the NTB if the price paid to suppliers were to remain unchanged. However, because both these prices are usually impossible to observe, actual measures of NTBs have focused instead on a comparison of the domestic and foreign prices in the presence of the NTB, P_d and P_w, respectively. The measure of the NTB is given as a percentage difference between the prices comparable to tariff such that:

$$T = \frac{100(P_d - P_w)}{P_w} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

T is referred to commonly as tariff equivalent or implicit tariff. To apply this methodology, it is necessary to identify the appropriate prices in the available data. Deardorff and Stern (1997) argue that the appropriate prices to use in measuring an NTB are the domestic and invoice prices of the imported good. Accordingly, P_w is defined as the CIF invoice price of the imported good paid by the domestic importer to the foreign exporter inclusive of the transport cost but excluding tariff[3] while the domestic price is the price on the domestic market of the imported good itself. However, reported domestic prices typically do not

[3] This is equivalent to the reference price taking into account the comparison will be done for the price in the same market and the same quality of the product.

distinguish domestically produced from imported goods. In this case, it may be necessary to use the price of the good on domestic market independently of where it is produced. More details are presented in Deardorff and Stern (1997).

c. ***The effect of export subsidy***

In a ***net export*** situation, if the country has significant levels of exports of a commodity and uses export subsidies to bridge the gap between domestic and world prices, the level of export subsidy per tonne of exports represents the market price differential (MPD) due to the export subsidy (OECD, 2010; pg. 74). In this case, the *price gap* due to the export subsidy can be expressed as:

$$PG_f = \frac{XS}{QX} = S \dots\dots\dots\dots\dots (7)$$

where XS is value of export subsidies for the commodity or the products derived from it, QX is the level of exports of the commodity for the annual period and S is the export subsidy per unit of the commodity. This method is used by the OECD to calculate the *MPD* of several commodities (barley, eggs, pig meat, poultry, rice and wheat) for the United States, where the value of export subsidies is derived from expenditures by commodity on the Export Enhancement Programme (EEP) and also applied in the case of wine for the European Union (OECD, 2010, pg. 73). Similar approach can be used to estimate the price effect of lump sum export tax assuming that the burden of such tax is ultimately borne by producers.

d. **Exchange rate misalignment**

The use of exchange rate misalignment is becoming less important as a policy instrument since the structural adjustment. However, there is still an explicit exchange rate policy in some countries with an administrative exchange rate fixed by the central bank independent of the equilibrium exchange rate that would result from demand and supply interactions. Given a world market price (benchmark price in foreign currency), P_w, an observed exchange rate, E_o, and real (undistorted) exchange rate, E_r, the exchange rate impact on domestic price, E_g, is given by:

$$E_g = (E_o - E_r)P_w \dots\dots\dots\dots\dots\dots (8)$$

Taking a numerical example, if P_w = US$ 250 is equal to P_d = DC 1000 (at the undistorted exchange rate of US$ 1 = DC 4), then by fixing the exchange rate at US$ 1 = DC 3 the

government reduces the domestic price of the import to P_d = DC 750 and the impact of exchange rate overvaluation E_g = DC -250. Note that the E_g is negative if the domestic currency (DC) is overvalued and positive if it is undervalued.

e. **Price stabilization policies (price floors and ceilings)**

Direct government interventions, through the sale and purchase of food, have been the main mechanism for stabilizing food prices in developing countries (Rashid, 2007). A prime example is the purchases and sale of maize by the National Cereal Board of Kenya on behalf of the government. The most common form of policy interventions in many African economies is a floor price (often set by adding certain margins to the cost of production) through public food procurement, stocking, and distribution. The distribution is often associated with price subsidy for consumers to ensure a regular supply of food for social safety net programs for the poor. However, this form of government intervention does not eliminate private trading in the agricultural sector and often a market price also exists for the commodity. In many cases, government is considered as a buyer of the last resort as the market price may be above the floor price. While a substantial literature attempts to analyze the impact of price stabilization policies (e.g., Rashid, 2007), attempts to measure their effect on domestic prices are hard to find.

The impact of the price stabilization policy can be measured, in principle, relative to an equilibrium price in absence of the intervention. However, this equilibrium price in the domestic market is unobservable. Therefore, the reference price derived from the world market price can serve as a proxy for this equilibrium price in absence of price intervention and efficient markets as the law of one price would suggest. Thus, the policy-induced price gap in the case of price stabilization policies involving price floors can be expressed as:

$$P_g = P_f - P_w \dots\dots\dots\dots\dots\dots\dots\dots (9)$$

where P_f is the government fixed prices. Similarly, the policy-induced price gap in the case of price stabilization policies involving price ceiling is expressed as:

$$P_g = P_w - P_f \dots\dots\dots\dots\dots\dots\dots\dots (10)$$

Note that policy-induced price is positive if the stabilization policy is a price floor above the equilibrium price (and zero otherwise) and it is negative for a price ceiling policy below the equilibrium price (and zero otherwise).

In addition to the above trade policies, local taxes (cess) on marketed agricultural commodities are quite common to generate revenues for local administrations. In many situations, these may be the only policy distortions to the price of the commodity particularly in the case of exports. These can be computed directly and added to other policy effects.

To sum up, where market development gap exists, the price comparison method yields the total price gap due to both policies and market development gap. To disentangle the two effects, direct estimation of the policy effects is necessary.

Applications

The above methodology is illustrated with application to rice, wheat, cotton, tea and coffee in Uganda. Rice and wheat represent the case of tariff on imports while cotton illustrates the case of indicative price that manifested itself as mostly ceiling price. Tea and coffee are traded under liberal export promotion policy with minimum taxation.

The case of tariff on rice imports

The most important policy measure affecting rice markets in Uganda is the East African Community (EAC) common external tariff (CET). This CET on rice is set at 75 per cent ad-valorem duty or USD 200 per tonne, whichever is higher on rice imported from outside the region (PMA, 2009). Under perfectly competitive and efficient market structure, this tariff is supposed to create an equivalent price wedge between the reference price of rice at the farm gate and producer price. However, the actual price wedge, as measured by the total price gap, is much smaller than the protection intended by the tariff and quite variable over time (Table 1).

Since the tariff policy-induced price gap is certainly positive, there appear to be other factors operating in the opposite direction and, thus, reducing the total price gap substantially. The impact of these factors is measured by the market development gap defined as the difference between the total price gap and the expected policy-induced price gap. Throughout the period of analysis, the market development gap is negative ranging from about 30 per cent to 91 per cent of the reference price in absolute value. As a result, the producer protection intended by the tariff policy is significantly eroded with producers only capturing part of it.

Table 1. Estimation of the market development gap for rice in Uganda

Column1	2005	2006	2007	2008	2009	2010	2011
CIF (border) price (US $/ton)	285.8	332.3	293.2	438.7	430.5	460.1	534.9
Tariff (US $/ton)	214.4	249.2	219.9	329.0	322.9	345.0	401.2
Other local taxes (Ush/ton)	21,122.7	21,715.7	20,434.8	20,399.2	23,957.2	25,831.1	28,582.6
Policy-induced gap (Ush/ton)	227,029.3	274,904.1	225,806.7	347,430.2	400,006.5	462,640.2	599,876.4
Total price gap (Ush/ton)	29,068.3	117,565.9	131,888.9	247,072.9	241,012.0	96,436.6	259,786.2
Reference price at the farmgate (Ush/ton)	241,209.3	303,315.9	241,581.9	403,850.1	463,593.1	541,649.0	716,619.9
Market development gap (Ush/ton)	-197,960.9	-157,338.2	-93,917.9	-100,357.4	-158,994.5	-366,203.6	-340,090.2
Gross NRP (%)	12.1%	38.8%	54.6%	61.2%	52.0%	17.8%	36.3%
MDG (%)	-82.1%	-51.9%	-38.9%	-24.9%	-34.3%	-67.6%	-47.5%
Policy-induced NRP (%)	94.1%	90.6%	93.5%	86.0%	86.3%	85.4%	83.7%

a. The policy-induced price gap is computed as 75% of the CIF price of rice and converted to per unit of paddy rice minus local taxes.
b. The total price gap is computed as the difference between the farmgate price and reference price of paddy rice.
c. The market development gap is obtained as the difference between the total price gap and the policy-induced gap.
d. MDG and gross NRP are measured relative to the reference price at the farmgate.

The considerable market development gap in Uganda suggests that the domestic rice markets are weakly connected to the international markets and further the wholesale prices are not fully transmitted to the farm gate prices. Domestic prices in any given year tend to be related to international prices in the previous year. This may be due to the time lag between the marketing season of domestic rice and the arrival of imports in the country and lack of information on current world market price trends. This may result in significant uncertainty for both producers and wholesale/importers of rice. In addition, domestic rice markets are characterized by considerable market development gap resulting from a marketing cost gap of excessive profit margins and local taxes ranging from USh 21,123 to 27,523 per ton of paddy.

The case of tariff on wheat imports

Although wheat is a minor crop in terms of acreage and production in Uganda, its import bill is significant exceeding US $150 million in 2011 (FAOSTAT, 2012). Wheat imports are subject to a tariff of 35 per cent as per East African Community (EAC) common external tariff (CET). Although the objective of the tariff is to encourage regional trade, wheat major imports of Uganda during the period of analysis are largely imported from outside the region. Thus, the tariff serves to provide protection to wheat farmers from relatively cheaper imports.

As shown in Table 2, the expected impact of the tariff is a policy-induced price gap of 35% of the CIF price of wheat. However, during the period of 2005– 2010, the gross nominal rate of protection is negative in the most recent four years, namely 2008– 2011. During these years, the domestic farmgate prices stagnated although the border prices of wheat were significantly high. This suggest that the tariff policy failed to achieve its full objective with farmgate price often below the reference price due to the presence of other factors affecting an effective price transmission from the border to the farm. .

The market development gap in the wheat market is estimated at 5-49 per cent of the reference price (Table 2). The policy incentives for wheat appear to be captured mostly by traders and importers at wholesale level as compared to wheat producers. This can be interpreted as oligopoly power capable of setting the producer price of the commodity irrespective of its world price and cost of imports.

Table 2. Estimation of the market development gap for wheat in Uganda

	2005	2006	2007	2008	2009	2010	2011
CIF (border) price (US $/ton)	339.31	285.95	343.44	450.04	370.98	329.67	480.71
Tariff (US $/ton)	118.76	100.08	120.21	157.51	129.84	115.38	168.25
Policy-induced gap[a] (USh/ton)	211,510.73	183,253.74	207,113.24	270,922.61	262,281.25	251,304.64	405,482.10
Total price gap[b] (USh/ton)	76,622	147,781	45,293	(218,945)	(114,205)	(3,100)	(268,035)
Reference price at the farmgate ((USh/ton)	823,377	752,218	804,706	993,944	1,014,205	1,003,100	1,468,035
Market development gap[c] (USh/ton)	-134,888.6	35,472.3	-161,819.9	-489,867.2	-376,486.3	-254,404.9	-673,517.0
Gross NRP[d]	9.31%	19.65%	5.63%	-22.03%	-11.26%	-0.31%	-18.26%
MDG (%)	-16.38%	-4.72%	-20.11%	-49.29%	-37.12%	-25.36%	-45.88%
Policy-induced NRP (%)	25.69%	24.36%	25.74%	27.26%	25.86%	25.05%	27.62%

a. The policy-induced price gap is computed as 35% of the CIF price of wheat.
b. The total price gap is computed as the difference between the farmgate price and reference price of wheat.
c. The market development gap is obtained as the difference between the total price gap and the policy-induced gap.
d. MDG and NRPs are measured relative to the reference price at the farmgate.

The case of price stabilization policies for cotton exports

Uganda has a highly liberalized domestic marketing policy for exports with minimum government interventions. In addition, the government is pursuing an export promotion strategy based on the exchange rate liberalization, zero rated duty and VAT exemption on exports, and no additional charges or levies. In addition, Uganda's exports qualify for preferential tariff rates in COMESA and EAC.

While the export promotion measures eliminate all major factors causing deviation of cotton prices at the point of competition (the border in this case) from its reference prices, an indicative producers' price of seed cotton based on Cot Look A index is announced by CDO at the beginning of the marketing season. This indicative price is the most important policy directly influencing producers' prices as it manifest itself in the market as some form of a "price ceiling" with few exceptions such as in 2011. As for the other exports of Uganda, cotton is not subject to export taxes except the 2 percent of export price levied by CDO to support its services to farmers. In 2009, the government advanced a producer price subsidy to

compensate farmers for the low producer price below the indicative price offered by ginneries.

Table 3. Estimation of the market development gap for seed cotton in Uganda

	2005	2006	2007	2008	2009	2010	2011
FOB (border) price (US $/ton)	**348**	**428**	**446**	**598**	**456**	**601**	**1,439**
Indicative (ceiling/floor) price (USh/ton)	**350,000**	**450,000**	**470,000**	**750,000**	**540,000**	**900,000**	**1,600,000**
Reference price at the farmgate (USh/ton)	**412,001**	**558,605**	**548,814**	**776,966**	**631,584**	**931,672**	**3,003,613**
Indicative price impacta (USh/ton)	**-62,001**	**-108,605**	**-78,814**	**-26,966**	**-91,584**	**-31,672**	**-1,403,613**
Producer price subsidy	**-**	**-**	**-**	**-**	**110,000**	**-**	**-**
Levyb (2%)	**-10,257**	**-14,505**	**-13,898**	**-20,439**	**-15,497**	**-24,929**	**-68,529**
Policy-induced gapc (USh/ton)	**(72,258)**	**(123,110)**	**(92,712)**	**(47,405)**	**2,920**	**(56,601)**	**(703,613)**
Total price gap (USh/ton)	**(62,001)**	**(108,605)**	**(98,814)**	**(26,966)**	**18,416**	**(31,672)**	**3,003,61**
Market development gap (USh/ton)	**10,257**	**14,505**	**(6,102)**	**20,439**	**15,497**	**24,929**	**68,52**
gross NRP	**-15.05%**	**-19.44%**	**-18.00%**	**-3.47%**	**2.92%**	**-3.40%**	**-23.43%**
MDG (%)	**2.49%**	**2.60%**	**-1.11%**	**2.63%**	**2.45%**	**2.68%**	**2.28%**
Net NRP	**-17.54%**	**-22.04%**	**-16.89%**	**-6.10%**	**0.46%**	**-6.08%**	**-25.71%**

a. Computed as the difference between the reference price and the indicative price except in 2011 where it is computed as the difference between the reference price and the actual farmgate price.
b. The levy is calculated as 2 per cent of the FOB price of lint and converted to a seed cotton equivalent.
c. Computed as the sum of the indicative price impact, the levy and the producer price subsidy.

Although the indicative price is meant to induce transparent pricing mechanism to farmers and ginneries, it *de facto* operated like a price ceiling in most of the seasons. As such, the impact of the indicative price is negative. The situation is worsened further by the 2 per cent tax levied by CDO. Consequently, the policy-induced price gap is negative except in 2009 when the producer price subsidy brought the farm gate price close to the reference price of seed cotton (Table 3).

Despite its consistent negative impact on producers' price, the indicative price reduced the market development gap to mostly small positive effect. In this case, the producers' price is fixed at the indicative price eliminating the ability of the market to manipulate the producer price. Unlike the case of the tariff where the impact of the tariff is reduced by the market development gap, here the policy effect limited the impact of the market development gap in the price.

The case of liberal export promotion policy for tea and coffee

Tea in Uganda is produced and exported under a completely liberal policy regime representing the case when there are no known policies affecting the commodity price. Government role is mainly restricted to quality regulations and production. This is a typical case where we expect the law of one price to hold as the policy-induced gap is eliminated. However, tea is characterized by a buyer-driven value chain where the smallholder producers have only a few options to sell their product. This gives the buyers a considerable market power to set the price at the profit-maximizing level.

Since there is no known policy affecting the prices in the tea markets in Uganda, the entire price gap can be attributed to factors other than policy, namely market development gap. The market development gap is quite significant except in 2005 and 2007 with extremely low world prices (Table 4). The estimated gap amounts up to 47 percent of the reference price of tea at the farm gate, which is a substantial gap for a product marketed under a highly liberalized policy.

These results suggest that factories are able to transfer price disincentives to producers. However, tea factories face considerable market risk resulting from the normal price fluctuations at the auction. Besides, tea factories can determine farm gate prices in any season purely based on price expectations at the time of sale of the processed tea. In addition, the tea processing industry is facing increasing costs of processing and transportation due mainly to the rising cost of energy in Uganda. Since for a given auction price, the increasing costs means lower profit margins for factories, factories have chosen to remain competitive by lowering or resisting increases in farm gate prices.

The government policy objective is to promote and increase exports by improving the enabling environment for the private sector to produce and trade freely. Clearly achieving this objective in the case of tea is constrained by the presence of the market development gap. Without addressing these constraints through adequate investments, the potential price

incentives from liberalization to smallholder tea producers to invest in production of high quality tea sector will be eroded. Where markets are not functioning (due to economic coordination and other problems inherent in very poor rural economies) then market-based development processes cannot be relied on to drive development (Dorward et al, 2004).

Table 4. Estimation of the market development gap for tea in Uganda

Column1	2005	2006	2007	2008	2009	2010	2011
CIF (border) price (US $/ton)	1160	1650	1220	1790	1840	1770	1760
Export subsidy/tax/cess (USh/ton)	0	0	0	0	0	0	0
Policy-induced gap[a] (USh/ton)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total price gap (USh/ton)	-6816	-186023	-423	-161237	-185593	-133810	-169618
Reference price at the farmgate (USh/ton)	206016	395223	220023	401237	442953	403010	491518
Market development gap (USh/ton)	-6816	-186023	-423	-161237	-185593	-133810	-169618
MDG (%)	-3.31%	-47.07%	-0.19%	-40.18%	-41.90%	-33.20%	-34.51%
Gross NRP	-3.31%	-47.07%	-0.19%	-40.18%	-41.90%	-33.20%	-34.51%
Net NRP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

a. The policy-induced price gap is zero since there is no known policies affecting prices are imposed.

Like tea, the Robusta coffee market in Uganda was completely liberalized in 1992. Since then farmers have been free to decide how and to whom to sell their coffee (Hill, 2010). 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 the Uganda Coffee Development Authority on coffee exports. This represents the only policy-induced price gap and relatively low nominal rate of protection (Table 5). Despite this policy environment, significant and variable price gap exists in most of the years.

The coffee market is overseen by the Uganda Coffee Development Authority which collects, maintains and disseminates statistical data in respect of all aspects of the coffee industry and monitors world market price changes and adjusts the minimum price on a day-to-day basis to reflect the changes (UCDA, 2013). As such, coffee market differs from tea in terms of the

availability of market information to growers and more importantly, coffee is less perishable than the green tea leaves for which immediately processing is required.

As it tends to be more competitive, producer prices of coffee in Uganda follow export prices very closely. This suggests that exporters in Uganda receive small profit margin, 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 (Fafchamps and Hill, 2008).

As a result, the coffee market in Uganda is often characterized by low but variable and sometimes positive levels of market development gap (Table 5). 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.

Table 5. Estimation of the market development gap for coffee in Uganda

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
CIF (border) price (US $/ton)	1,430	1,460	1,600	1,970	1,490	1,450	1,960
Farmgate price (USh/ton)	1,635,45	1,937,586	2,166,946	2,751,893	2,239,984	2,591,348	4,141,667
Reference price at the farmgate (USh/ton)	2,004,75	2,155,098	2,163,833	2,748,422	2,311,324	2,435,506	3,797,522
Taxes and levies (USh/ton)	25,468	26,739	27,576	33,893	30,254	31,575	47,239
Policy-induced gap (USh/ton)	-25,468	-26,739	-27,576	-33,893	-30,254	-31,575	-47,239
Total price gap (USh/ton)	-369,302	-217,511	3,113	3,471	-71,341	155,842	344,144
Market development gap (USh/ton)	-343,834	-190,773	30,689	37,364	-41,086	187,416	391,384
Gross NRP (%)	-18.42%	-10.09%	0.14%	0.13%	-3.09%	6.40%	9.06%
MDG (%)	-17.15%	-8.85%	1.42%	1.36%	-1.78%	7.70%	10.31%
Net NRP (%)	-1.27%	-1.24%	-1.27%	-1.23%	-1.31%	-1.30%	-1.24%

Conclusions

While there is an interest in establishing systems for measurement of explicit food and agricultural policies, such as taxes, subsidies and various border measures, there is a simultaneous recognition that in African countries market incentives and disincentives are determined not just by policies, but by high transaction costs and the capture of rents along the commodity value chains. Accordingly, we have suggested a methodological approach for measuring these costs and rents –referred to as a "market development gap" – in a manner that is consistent (and comparable) with the measurement of formal policies. The methodology measures the market development gap as a residual after subtracting the expected impact of all policies affecting commodity price from the total price gap between the actual market price and a reference price derived from the border price and adjusted by the relevant marketing costs.

The above methodology is applied to representative common policy cases including tariff on imports, stabilization price and liberalized markets in Uganda. The findings suggest that the existence of a market development gap undermines the policy objective. The actual protection from tariff is significantly lower than expected for wheat and rice while producers of tea received price disincentives despite the liberal market policies. Also, price stabilization policies manifested itself as a price ceiling with negative incentives to cotton producers but eliminated market development gap. In contrast, coffee market shows mix results with variable market development gap oscillating between positive and negative impact on producer prices. In some years, the coffee market tends to be quite competitive with limited market development gap but the trend is inconsistent over time.

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