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EFFECT OF TARIFF ESCALATION ON GHANAIAN COCOA EXPORTS: AN EMPIRICAL PERSPECTIVE

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Abstract

This study analyses the effects of tariff escalation on Ghanaian cocoa exports in four importing markets: USA, EU, Japan and Malaysia. The study estimates nominal and effective protection coefficients in these markets based on ad-valorem equivalent of applied and bound specific tariffs. Results revealed that, effective protection exists in the Japanese and Malaysian cocoa industries at different stages of processing on both bound and applied tariffs. In contrast, the USA and the EU do not effectively protect their cocoa industries, thus, no tariff escalation on applied tariffs against cocoa imports from Ghana. This study concludes that from a static effect, higher tariffs do have a negative consequence on Ghanaian cocoa exports in these importing countries. From a dynamic perspective however, the relationship between tariff structures in these importing countries and Ghanaian cocoa exports is somewhat ambiguous and each situation has to be viewed on their own merit. A complete elimination of tariffs as a form of trade barrier on Ghanaian cocoa exports does not necessarily imply that Ghana could easily increase its exports of value added cocoa.

Keywords: *Tariff escalation, Effective rate of protection, Ghanaian cocoa exports.*
JEL Codes: F13; F14; Q17; Q18

1. Introduction

The impact of agricultural protection in developed countries has attracted increased awareness in recent times. While considerable trade policy reforms have caused massive reduction in protection of manufacturing industry globally, the agricultural industry in most developed and developing countries still face high levels of protection. Agricultural protection remains one of the most debatable topics in international trade discussions with substantial protection in industrialised countries a major cause for concern, leading to collapse in talks during the Cancun Ministerial meeting in 2003 (Aksoy & Beghin, 2004). A key aim of the Doha round of trade negotiations also known as the 'development round' by the World Trade Organisation (WTO) was to increase market access for developing countries in industrialised countries' markets. Crucial is the reduction of higher levels of tariffs for agricultural products

as well as subsidization of developing country exports through export subsidizing policies and other support measures (McCorriston & Sheldon, 2004).

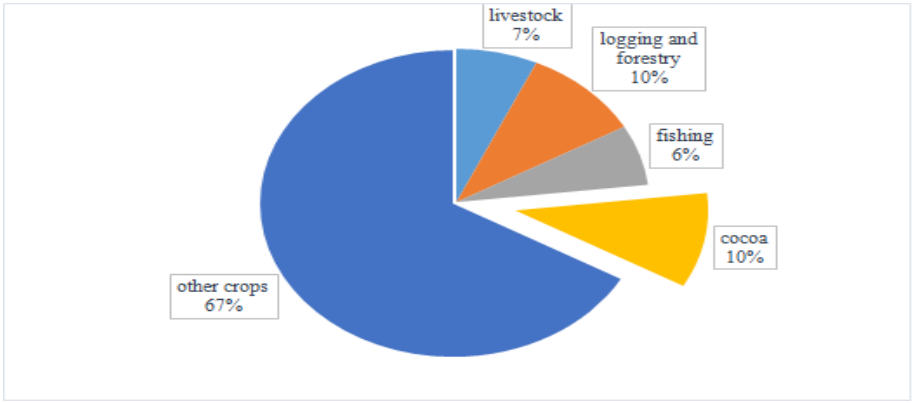
Developing countries' requirements with regards to market access is predominantly focused on minimizing inequity in international agricultural trade, particularly in tariff dispersion, tariff peaks and tariff escalation. Tariff Escalation (TE) in agriculture, i.e. higher import duties (tariffs) on processed agricultural products than on their primary counterparts, is a very challenging issue in international trade negotiations with massive disagreements between industrialised and developing countries (Francois, Stringer & Sarris, 2005).

From a theoretical perspective, arguments against tariff escalation are well and truly established. However, empirical analysis on the magnitude and consequence of tariff escalation on developing countries is still not conclusive, hence, providing concrete reason for more research in this area. Arguments against TE suggest that, it involves deliberately low rates of duty on imported raw materials in developed countries while providing a higher protection for their domestic industries for competing products imported. This phenomenon by developed countries could potentially lead to undesirable outcomes on developing countries' exports and thus influence their economic activities more in the direction of raw material production than processing (WTO, 1996; World Bank, 2007).

In as much as developed countries such as the United States of America (USA), European Union (EU), Japan, Canada among others state their willingness to eliminate tariff escalation in response to increasing demands from developing countries, no concrete solution has yet been universally agreed upon. This is due to difficulty in evaluating escalating tariffs, which poses as a key restriction to trade enhancement in developing countries (Antimiani, DiMaio & Rampa, 2009).

Numerous problems arise due to over-reliance of developing countries on continual export of traditionally raw agricultural products in international trade. These problems can be overcome if developing countries channel their attention and efforts to exports of agricultural products with higher degrees of processing. Some concerns associated with the exports of primary agricultural commodities include among others: decline in the overall terms of trade for developing countries' exports and at the same time increased uncertainty, volatility and deterioration in long term prices of these primary exports in world trade (Prebisch, 1959; UNCTAD, 2003); reduced profit margins and poor employment opportunities associated with continual export of primary products (Yeats, 1984; Winters et al., 2004); increased over-dependence and disproportionate use of natural resources due to over-specialising in primary products, and thus, destroying the environment (Hecht, 1997; Awan, 2013).

This study focuses on cocoa which is of great economic importance to Ghana as it is for other countries within sub-Saharan Africa. Ghana is the second largest producer and exporter of cocoa. Although production levels of Ghana's cocoa has decreased, the country is well endowed with premium bulk cocoa which is strategically positioned to capture significant market shares for the growing demand in specialty cocoa products on the world market (Gockowski et al., 2011).The revenue from cocoa exports generates massive foreign exchange and contributes significantly to the Gross Domestic Product (GDP) of Ghana and that of other sub-Saharan African countries. Cocoa is the foremost agricultural export earner and contributed to about 10% of overall agricultural GDP in 2013 in Ghana (Ghana Statistical Service, 2014). Figure 1 shows the contribution of Ghana's cocoa exports to agricultural GDP in 2013.

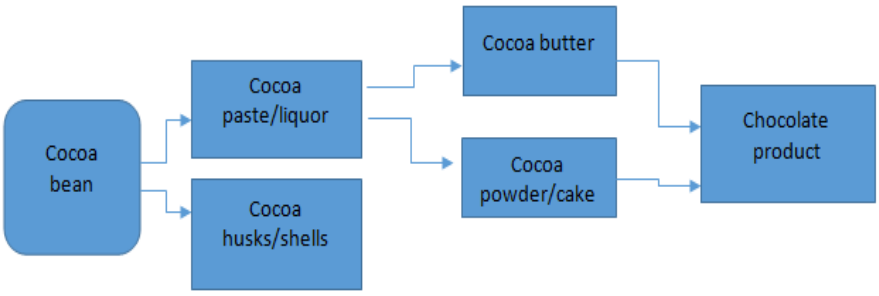


Source: Author's elaboration based on data from Ghana Statistical Service (2014)

Figure 1. Contribution to Agricultural GDP from Ghana's Cocoa Exports in 2013

Also, in 2013 for example, earnings from cocoa constituted approximately 16.48 percent (US$ 2,267.3 million) of total agriculture export receipts (ISSER, 2014). It is believed that the cocoa sector in Ghana employs over eight hundred thousand (800,000) smallholder farm families and about 1.5 million hectares of land is used in the cultivation (Anim-Kwapong and Frimpong, 2004; Danso-Abbeam et al., 2014). For these farmers, the sector contributes about 70-100% of their annual household income (Appiah, 2004).

To better understand market circumstances and potential for increased income to all actors, particularly small-scale farmers, it is important to analyse production processes of cocoa along the entire value chain. The cocoa value chain is usually more complicated compared to other traditional crops because the final product (i.e. chocolate) includes other raw material inputs such as sugar and milk in its production. Processing of cocoa bean results in the production of cocoa liquor mass (cocoa paste) which is cooled and solidified into liquor blocks, and used as direct input for chocolate production or further processed into two intermediate products, cocoa powder and cocoa butter by hydraulic pressing (Kox, 2000). The combination of different proportions of cocoa powder and cocoa butter as well as other inputs produce chocolate. Cocoa powder is usually perceived as the by-product and produced at fixed proportions with butter, bearing in mind the fat content of beans (Gilbert, 2008). Figure 2 illustrates a simplified diagram of cocoa value chain where cocoa bean is converted into semi processed products as liquor, butter and powder and sold to chocolate manufacturers or other actors along the chain before ultimately reaching the final consumer.



Source: Authors' Elaboration

Figure 2. Illustrative Diagram of Cocoa Value Chain

The study addresses the following objectives which seeks to contribute to the already existing understanding and measurement of tariff escalation by analysing the effects of tariff escalation on Ghanaian cocoa exports in four importing country markets (European Union, United States of America, Japan and Malaysia): (1) to examine the tariff structure of cocoa product exports from Ghana in the importing country markets over time. (2) to estimate the level of protection in each of the importing country markets on Ghanaian cocoa exports. (3) to describe the relationship between tariff levels and exports flows of Ghanaian cocoa products in the importing countries. Whiles, some research has been done on different aspects of tariff escalation, much of the work in this study relies on distinct data and information specific to the product (cocoa) and research area under consideration. This is important in ensuring that results are plausible and unambiguous for strong policy actions. The four importing countries were selected arbitrarily based on their trade relations with Ghana. The EU is Ghana's largest trading partner in the cocoa sector followed by the United States of America. Japan and Malaysia were also considered due to their importance within the Asian sub-region, particularly for Malaysia as it is also a cocoa producing country.

2. Literature Review on Tariff Escalation

2.1 Background

Comprehensive provision on market access via reduction of tariffs and auxiliary agricultural trade barriers have been agreed upon in the relatively recent framework of modalities.[1] The fundamental principle indicates that processed products with complex tariff schedules than their unprocessed (primary or intermediate) counterparts will be categorised into the subsequent higher groupings for tariff cuts. Products in the next higher group will be subjected to a 6% reduction more than the normal reduction in higher groups. Conversely, if the difference between the primary and processed product is less than 5%, then tariff escalation principle does not apply and as such tariff on processed product is not cut below the level of intermediate product (Jean, Laborde & Martin, 2010; WTO, 2008). Conventionally, discussions on T.E. phenomenon dates back to Tokyo and Uruguay rounds of negotiations, however, some of the literature reviewed for the purpose of this study reflect recent policy documents on tariff escalation from empirical studies.

2.2 Empirical studies on Tariff Escalation

One of the early studies to conduct an empirical analysis of protectionist measure in developed countries for their processing industry was done by Tangermann (1989). Tangermann reported on trade barrier escalation in agricultural products with illustrative case studies on cocoa and soya for wide range of countries categorised as either developed or developing countries. He developed a trade model that incorporates prices, foreign exchange and balances on trade flows. His results indicated an overall significant increase in trade flows when escalating trade barriers are removed with different impacts of this removal on individual countries. Tangermann observed lower gains for developing countries due to a shift of processing towards industrialised countries caused by escalating tariffs in European Economic Community (EEC). He argued however that in spite of the obvious escalating tariffs for both products i.e. cocoa and soya, there is no effective protection in actual trade in the EEC and USA markets. In later years, Safadi and Yeats (1993) concentrated on escalating trade barriers for ten countries within the Asian sub region. They found that trade barriers in this region had restrictive impact on trade principally on processed products. They further observed that importers were more subjective against processed products in this region compared to other

regions as the European Union and that nominal tariff escalation was pronounced along the forty eight processing chains considered for all countries with the exception of Hong Kong where there were zero tariffs. Their result further indicated that NTB's discriminated against processed products especially in the agricultural, food and feed sectors.

Even after the implementation of Agreements on Agriculture, numerous studies in post Uruguay round still found persistent escalation of trade barriers i.e. bound and applied tariffs (Elamin & Khaira, 2003; Lindland, 1997). The OECD reports that tariff reduction on processed commodities has been less frequent after the UR compared to reduction on primary products (OECD, 1996).

Lindland (1997) further found positive escalating tariffs in the E.U, Japan, and U.S.A. markets for twenty six processed products. He analysed the impact of Uruguay round on tariff escalation in agricultural products. His results indicated existence of escalating tariffs for more than 50% of commodity pairs considered, 10% having no tariff wedges i.e. same tariffs on input and output with the remainder (about one third of the product pairs) having negative or de-escalating tariffs. In absolute terms, his result revealed that about 80% of reduction on bound tariffs occurred as a result of the Uruguay Round. Cernat, Laird and Turrini (2002) and FAO (2004) showed similar results of pronounced escalating tariffs on processed agricultural products as vegetable oils, beef, cereals, sugar, meat, cocoa, coffee and tobacco highlighting this as a major constraint for developing countries, consistent with previous studies at stated above. The UNCTAD (2003) looked into the effects of a 50% reduction in tariffs on processed agricultural products. Their estimated earnings revealed incremental benefits of more than US$ 12 billion for developed countries in Asia, Western Europe and North America. Similarly, Elamin and Khaira (2003) simulated the effects of changes in tariff escalation by examining the effects of three tariff reduction methods i.e. Linear, Swiss formula and Harbinson proposal formula using the Agricultural Trade Policy Simulation Model (ATPSM). Their results revealed that the Harbinson formula appeared to produce lowest tariff wedges resulting in overall increase in export potential of developing countries exports when critical elements of tariff escalation in multinational trade negotiations are considered and evaluated in conjunction with other trade barriers. Summary of their results are presented in Table 1.

Table 1. Impact of Harbinson Proposal on Tariff Wedges and Export Values

			% change In export value			
Product	Base tariff wedge %	Tariff wedge under Harbinson %	World	Developed countries	Developing countries	Least Developed countries
Coffee: green			1.0	0.9	1.0	1.1
Coffee: roasted	2.7	1.6	0.4	0.3	0.6	0.4
Cocoa beans			0.3	0.3	0.3	0.3
Cocoa powder	7.3	4.4	1.4	1.2	1.6	7.3
Cocoa butter	-4.7	-5.7	1.1	0.6	1.3	n.a
Chocolate	24.7	11.0	6.5	6.3	6.8	6.7
Oilseeds			1.8	1.2	2.4	28.1
Vegetable oils	-21.3	-8.4	4.6	2.2	5.0	6.1

Source: Elamin and Khaira (2003)

Wailes et al. (2004) reported a bias in rice importing countries protecting their domestic industries with escalating tariffs in favour of paddy rice exports over other varieties. A typical example is the case of USA where rice trade is distorted in support of paddy exporters. Guerra,

von Cramon-Taubadel and Brümmer (2006) analysed the importance of coffee tariff escalation on value addition at origin. Their study evaluated tariff escalation on bound and applied tariffs and estimated for effective protection rates in developed countries i.e. EU, USA and Japan and for emerging countries as China and Russian Federation on six exporting countries or regions namely Brazil, Vietnam, Indonesia, Colombia, Central America and Ivory Coast. Their results indicated that although considerable reduction in importing countries' duties have been achieved since the Uruguay round of trade agreement, all the markets considered still showed considerable tariff escalation scenarios on both bound and applied tariffs with higher values observed in effective protection estimates than on nominal tariff wedges. Bureau, Disdier and Ramos (2007) also highlighted pervasive T.E on bound tariffs for the USA, EU, Japan, and Canada; however, this did not relate to applied tariffs, especially where Generalised System of Preference schemes were applied for developing countries. It is worth mentioning that, commodities such as cotton, chocolate and fruit juice products in Japan, USA and EU could cause a lack of credibility for the GSP system and thus lead to potential bias in results due to auxiliary products such as milk and sugar used in their preparation. Berkum (2009) analysed tariff escalation of EU imports from developing countries for ten agricultural product groups. He finds that indeed tariff escalation occurs, but not for the entire product categories considered. Empirically, he indicated that the link between tariff escalation and EU agricultural imports is ambiguous with no direct correspondence between high or low tariffs and high or low imports. His study further revealed heavy protection in the EU for the sugar, dairy, fruit and juice industries. Antimiani, Di Maio and Rampah (2011) focused on the impact of tariff escalation between nine African countries and other developed countries such as the USA, China, India, Japan, and EU. They sought to identify who are the real friends of these African countries in terms of preferential trade agreements offered. Their results revealed that the EU is the friendliest region in terms of trade preference for these African countries while Japan and India extremely protected their agro-food sector and hence less friendly with trade preferences concentrated more on intra (within their region) than preferential treatments towards African countries. Narayanan & Khorana (2011) quite recently analysed whether or not tariff escalation affects exports shares of developing countries for the cases of raw coffee and roasted coffee; and for cotton and textile. They used economy wide model i.e. GTAP (Global Trade Analysis Project) and its accompanying database 2004 version. They found little or no escalating tariffs in the coffee sector compared to the cotton industry that had significant escalating tariffs. By bringing tariffs on processed products to raw materials, their result indicated that tariff escalation did not directly affect export shares due to other factors such as tariff differentials across countries and industries and also complex nature of international trade. On average, however, elimination of tariff escalation did increase export shares globally.

3. Theoretical Concept, Methodology and Data

3.1 Theoretical Concept of Effective Protection versus Nominal Protection

The desire to extend the analysis of inputs other than only on raw material under consideration to include possible price distortions of these auxiliary inputs is due to the fact that, economic incentives to undertake a processing activity does not only rely on the price ratio between the output and the main raw material input, but on the value added, obtained in the processing industry. The fundamental rational behind this crucial argument is that, the degree of expansion for a specific processing industry in a country is determined by the income earned from factors of production in that processing industry. The specific industry expands and pulls resources away from other activities if value added or income on the production factors increase through government intervention and vice versa. The total repercussions of all government interventions on essential input and output markets, and their effects for value

added in a specific industry should therefore be analysed in order to generate an estimate for the extent of protection in this industry (Tangermann, 1989).

For the purpose of this study, the assumption of constant returns to scale is implied such that output changes are at the same proportion as input and thus, average production cost does not depend on the scale of production. Technological use in the industry is assumed to be linear and in the long run average costs are constant, ceteris paribus. This assumption is justifiable and realistic in the cocoa industry given that on average, the proportion of cocoa paste or cocoa butter (output) obtained from processing of cocoa bean (input) is generally fixed. Furthermore, the implied assumption for the concept of effective protection rate in the industry is defined for production technologies with fixed input-output coefficients and measures the percentage change in value added for a production activity due to government intervention.

Assuming that a_i is the quantity of input 'i' required to produce one unit of output, r_i is the price of input, and p is the price of output without government intervention. Added value on each unit of output without government intervention, v, can be defined as

$$v = p - \sum_i a_i r_i \quad (1)$$

Assuming now that overall effect of government interventions on price of output is expressed by its ad-valorem tariff equivalent, t, and equally for inputs by t_i, value added for each unit of output with government intervention, v^1, can then be written as,

$$v^1 = p\,(1+t) - \sum a_i r_i\,(1+t_i) \quad (2)$$

The effective protection rate, e, is therefore expressed as the relative variation in value added as a result of government intervention

$$e = \frac{v^1 - v}{v} \quad (3)$$

From equations 1 and 2, effective protection rate can be reformulated as

$$e = \frac{pt - \sum_i a_i r_i t_i}{p - \sum_i a_i r_i} \quad (4)$$

In order to discuss effects of escalating tariffs on raw products and their processed counterparts along the processing chain, assume that input 1 is the raw commodity and the output is the same product in its processed form, as in the case of cocoa. Assume further that tariff equivalents on all other inputs are zero, then, effective protection rate of a specific processing activity can be written as

$$e = \frac{pt - a_1 r_1 t_1}{p - \sum_i a_i r_i} = \frac{p}{v} t - \frac{a_1 r_1}{v} t_1 \quad (5)$$

Furthermore, effective rate of protection for the case of no tariff escalation i.e. $t = t_1$ can be derived from equation (5) as

$$e = t\left(\frac{p - a_1 r_1}{v}\right) \quad (6)$$

This formula indicates a positive effective protection of the processing industry even in circumstances where tariff on processed product is the same as tariff on raw material, which is higher than nominal tariff on the raw material and its processed counterpart. It can be

established from equation 4 that if weighted average of tariffs on all inputs is less than tariff on processed product, then protection of the processing industry is at an effective rate higher than nominal tariff on processed commodity. If inputs are taxed at equal rates as output, then the processing industry is also protected at the same rate. Escalating tariff schedules along processing chain is therefore sufficient but not necessary to establish effective protection of a processing industry.[2] Equal tariffs at every stage of processing along the chain could as well imply substantial protection in a particular industry as long as it is not indemnified by higher tariffs on further inputs (Tangermann, 1989).

From equation 5, it can be observed that zero effective protection requires[3] that

$$t = \frac{a_1 r_1}{p} t_1 \tag{7}$$

Value added for each unit of the main raw product in the absence of government involvement can be expressed as

$$v = \sum_j b_j p_j - \sum_i a_i r_i \tag{8}$$

Assume the raw product of interest is input 1, coefficient a_1 is the quantity of input 'i' needed to produce one unit of input 1. Coefficient b_j is the quantity of processed commodity j which arises from processing of one unit of raw product, a_1 is unitary and p_j is the price of processed commodity j. Value added due to government intervention can therefore be written as

$$v^1 = \sum_j b_j p_j (1 + t_j) - \sum_i a_i r_i (1 + t_j) \tag{9}$$

With t_j being the tariff equivalent of all government involvement that affects the processing of product j, effective protection rate can be written as

$$e = \frac{\sum_j b_j p_j t_j - \sum_i a_i r_i t_i}{\sum_j b_j p_j - \sum_i a_i r_i} \tag{10}$$

Let t_p be the weighted mean of tariff rates applied to processed products,

$$t_p = \frac{\sum_j b_j p_j t_j}{\sum_j b_j p_j} \tag{11}$$

If all inputs are subject to tariff rates of zero percent, except for raw product i.e. input 1, then effective protection rate can be expressed as

$$e = \frac{\sum b_j p_j}{v} t_p - \frac{r_1}{v} t_1 \tag{12}$$

The consequences are identical to that of equation 5, apart from the fact that considerations must be made for weighted mean of tariff rates on several processed commodities instead of solitary tariff rate on the individual output. Moreover, there could be protection in the processing industry long before tariff rates are escalating. Note however that, weights considered for averaging tariffs on processed commodities are based on virtual output figures.

In empirical studies of estimating for escalating tariffs, trade shares of individual products may be used because trade data are easy to access compared to production data. It is challenging to properly identify this phenomenon of protection in industries by simple observation from tariff schedules. If indeed all cases of protection in processing industries are

to be analysed, one needs to have information on shares of raw products and value added in the price of processed commodities (Greenaway & Milner, 2003). Unfortunately, data on such parameters are not readily obtainable in most instances and even if they are, their dependability could be debateable. For this reason, it is comprehensible that most empirical estimates are restricted to information based on tariff schedules to identify cases of escalating tariffs.

With time, the number of writings on effective protection has decreased slightly since it was developed in the late 1960's. Key reasons include among others: its theoretical limitations i.e. reliable empirical quantification of effective protection may not be realised and thus confines most studies on tariff escalation to nominal rates, desertion of general equilibrium ramifications of tariff changes and assumption of fixed input coefficients (Tangermann, 1989; Greenaway & Milner, 2003).

There are reasons to doubt whether these supposed shortcomings can validate seeming neglect for this concept and focus solely on the simple measure of nominal protection. Knowing that estimates on effective protection could be partial is not an excuse to abandon this concept and turn attention to simple measures of nominal protection. A simple comparison on nominal protection of processed products and nominal protection of raw commodities does not in reality deliver much evidence if one wants to analyse the degree to which tariffs on inputs and outputs affect processing in an industry. From a dynamic perspective, effective protection provides more information and thus should be treated superior to nominal protection. Quantitative assessments of effective protection may be slightly partial, however, it is extremely implausible that the bias would be substantial enough to provide less conclusive information compared to that obtained from nominal protection (Greenaway & Milner, 2003).

This practical inference appears crucial in cases where comparatively basic processing activities are examined such that one key raw product is converted into one or more unequivocal outputs, for example crushing of oilseeds to yield oil and meal. In such instances, assumption of fixed input coefficients is generally realistic because the raw material in question cannot be replaced by new inputs. However, different types of variability have to be considered with regards to the content of the final output, since none of the final output is genuinely pure in practice. Considering the case of grinding cocoa beans to yield cocoa butter and cocoa powder, cocoa powder as generally traded may contain some butter. The extent of this composition can be variably taken care of in grinding process and is tailored towards market circumstances and to prearranged use of these partially processed products for production of final product such as chocolate, confectionary and the like. In such scenarios, output substitution instead of input substitution occurs.

This type of substitution, however, does not create major problems for estimations of effective protection since conceptually the actual outputs can be disintegrated into supposed unadulterated products such as pure cocoa butter or pure cocoa powder upon which effective protection estimates can be calculated (Tangermann, 1989).

3.2 Methodology

3.2.1 Measuring Nominal Tariff Escalation

Nominal tariff escalation is measured by tariff wedges, difference in nominal tariffs between the output product and the input product. Tariff wedge is expressed as:

$$TW = T - t \tag{13}$$

TW denotes Nominal tariff wedge; T denotes Tariff in ad valorem equivalent of the output product; t denotes Tariff in ad valorem equivalent of the input product.

Nominal tariff escalation occurs when TW > 0, nominal tariff de-escalation occurs when TW < 0 and tariff parity is defined as TW = 0. While nominal tariff wedge (TW) is straightforward and easy to calculate, it does not fully measure the extent of protection given to the final product. First, information about impact of tariff structure on value added of the final product is not provided and second, it compares nominal tariffs of the final output and only one input (Elamin & Khaira, 2003).

3.2.2 Measuring Effective Protection

Effective rate of protection measures the actual degree of protection for a product by assessing effects of tariffs on value added of the processed commodity, taking into account tariffs on multiple inputs. The formula for estimating ERP coefficients in this study is expressed as:

$$ERP = (P.T - \sum_i a_i r_i t_i)/(P - \sum_i a_i r_i) \quad (14)$$

r_i denotes input price; P denotes output price in absence of government intervention; a_i denotes output produced per unit of input; T denotes Tariff in ad valorem equivalent of the output product; t_i denotes Tariff in ad valorem equivalent of the input product.

If $T = t_i$, then $ERP = T = t_i$, If $T > t_i$, then $ERP > T > t_i$, If $T < t_i$, then $ERP < T < t_i$, If $T < \frac{\sum_i a_i r_i t_i}{P}$, then $ERP < 0$

A positive ERP indicate that value added in the industry is greater than it would be without government intervention. A negative ERP on the other hand could either mean that the industry is disadvantaged under governmental policies or that it is extremely protected such that its value added is negative (Guerra et al., 2006).

3.3 Data

For the purpose of this study, the Harmonised Commodity Description and Coding System (HS) is used for different classifications of cocoa and cocoa preparations. Product codes at HS 6 digit level for cocoa preparations are denoted as follows: Cocoa beans, whole or broken, raw or roasted (180100) ; Cocoa paste not defatted (180310) ; Cocoa paste wholly or partly defatted (180320) ; Cocoa butter (180400) ; Cocoa powder unsweetened (180500) ; Cocoa powder sweetened (180610).

Tariff data from ‘‘Market Access Map’’ (MACMAP), developed and managed by International Trade Centre (ITC), UNCTAD/WTO is used in this study. ITC MACMAP uses data provided by national customs, statistical institutions and regional secretariats such as UN COMTRADE, TRAINS database, Integrated Data Base (IDB) from the WTO among others.

Yearly time series data on ad- valorem equivalents of specific applied tariffs from 2005 to 2014 is obtained from ITC MACMAP on cocoa and cocoa preparations at the HS 6 digit level for each of the importing countries considered. WTO ad-valorem equivalents of specific bound tariffs on Ghanaian cocoa imports in the four importing country markets are also obtained from ITC MACMAP. For calculation of effective protection estimates, an ad-valorem equivalent of specific tariffs for the reference year 2014 is used.

ITC Trade map is further used to gather information on trade statistics and trade indicators between Ghana and the respective importing countries for parameters such as import quantities or volumes, import values, growth rates or market shares and overall trade flows. Country specific unit values is used a as proxy for world market prices for cocoa and cocoa preparations in importing countries due to unavailability of accurate and uniform world market price data for processed cocoa commodities. Lindland (1997) and other related studies on tariff escalation

in agricultural products also used unit import values as a proxy for world market prices in situations where accurate price information on processed commodities were unavailable. The mean value of country specific import data is calculated over 5 years (2010 – 2014) to derive the unit values for traded quantities of cocoa and cocoa preparations as shown in Table 2 for the respective importing countries.[4]

Table 2. Unit Values of Cocoa Products at HS 6 Digit Level (Mean Value Over 5 Years) in USD/Tonne

	180100	180310	180320	180400	180500	180610
USA	2890	4015	2991	4960	3753	n.a.
EU	3654	4657	3013	4894	3834	n.a.
Japan	3168	3900	n.a.	4968	3755	n.a.
Malaysia	2995	3817	n.a.	4940	5045	n.a.

Source: Authors' elaboration with data from ITC Trade map, EUROSTAT.

It is observed from Table 2 that unit values for product codes 180100 and 180310 are highest in the EU compared to other destination regions. High unit values particularly for cocoa bean in the EU could be attributed to increased demand for this product in the EU, with EU being the largest processing region for this product i.e. controlling about 45% of the market. Also additional requirement such as quality, size, fat content of the product, minimal debris in the bean and other certification procedures strictly apply to imported cocoa products in the EU and these factors indirectly affect high unit import values for traded quantities in the EU.

Similarly, unit value for unsweetened cocoa powder (180500) in Malaysia was also the highest compared to other destination countries and this could be attributed to a lack of or low traded quantities for this product between Malaysia and Ghana in some of the years considered.[5] This value should therefore be treated with caution and thus serves as a limitation in the data used for this study. It is important to mention also that, lack of traded quantities between Ghana and the respective importing countries (mostly Malaysia and Japan) for product codes 180320 and 180610 imply that it is impossible to calculate for effective protection coefficients on these product categories, and thus, serves as additional limitation to the data used in this study.

Technical (input-output) coefficients are required in order to calculate effective protection rates. Data on input-output coefficients in this study relies heavily on a combination of different sources. Industry information (ICCO, Cadbury) as well as extensive literature on industrial chocolate manufacturing is used (see, Beckett [2011] on this important subject). For the purpose of this study, the following relationships are assumed

- Processing of one metric ton of cocoa bean results in 0.8 metric tons of cocoa paste.
- Processing of one metric ton of cocoa paste results in 0.55 metric tons of cocoa butter and 0.45 metric tons of cocoa powder.

4. Results and Discussion

4.1 Final Bound Tariffs

Table 3 shows ad valorem equivalents of specific bound tariffs in the aforementioned importing countries under WTO agreement for Ghanaian cocoa exports. From this table, tariff

escalation is noticeable in cocoa exports from Ghana if bound rates are used, given that tariff wedges between unprocessed cocoa i.e. cocoa bean and the most processed level i.e. sweetened cocoa powder considered in this study are significantly greater than zero. Nominal tariff wedges between cocoa bean (180100) and sweetened cocoa powder (180610) are 8.32% in the USA, 16.75% in the EU, 22.4% in Japan and 5% in Malaysia. Interesting is to note that Malaysia has bound tariff of 10% on cocoa bean from Ghana and tariff wedge between cocoa bean (180100) and cocoa paste (180310; 180320) is 16.1% and 29.2% respectively indicating substantial escalation based on bound tariffs at this stage. It can further be observed from the table that, output tariff on cocoa butter (180400) is less than input tariff on cocoa paste whether or not defatted (180310; 180320) for all the countries considered indicating potential strong tariff ceilings for the first stage of processing cocoa bean, thus negative tariff wedges at this stage.

Table 3. Ghanaian Cocoa Bound Tariffs in Importing Countries

Product code	U S A	E U	Japan	Malaysia
180100	0	0	0	10
180310	0	9.6	5	26.1
180320	0.08	9.6	10	39.2
180400	0	7.7	0	15
180500	0.15	8	12.9	15
180610	8.32	16.75	22.4	15

Source: Authors' elaboration with data from ITC MACMAP, TRAINS, TARIC.

4.2 Applied Tariffs

From an applied tariff perspective, Table 4 highlights country specific ad-valorem equivalent applied tariffs on Ghanaian cocoa product exports over time, from 2005 until 2014. Results from this table indicate considerable reduction in applied tariffs as compared to bound tariffs in the respective importing countries.

Table 4 shows massive reduction in tariff escalation on applied tariffs in terms of tariff wedges compared to escalation on bound tariffs. From the table, tariff wedges between unprocessed cocoa (180100) and processed cocoa until this level (180500) is essentially zero for both USA and EU indicating minimal or no tariff escalation. Both countries nonetheless have applied considerable tariffs on sweetened cocoa powder (180610) over the years. However, in 2014 for example, the EU applied zero tariffs on this product (180610) while the USA applied ad valorem equivalent tariff of 4.59% on the same product.

Important digression from this phenomenon is applied tariffs in the EU for the year 2005. It can be observed that the EU sharply departed from 'supposedly' high tariffs applied in 2005 on processed forms of the product to relatively no tariffs applied in the subsequent years. This reduction is attributed to the Economic Partnership Agreement (EPA) between the EU and African, Caribbean and Pacific (ACP) countries including Ghana, which forms an integral part of the Cotonou agreement. This agreement essentially provides a framework for the progressive elimination of trade barriers (i.e. tariffs) and enhance co-operation in all aspects relevant to trade between the EU and the ACP countries (Szepesi, 2004; Patel, 2007). The EPA essentially took effect from 2008, however before this period there was an interim or pre EPA agreement between the EU and the ACP countries which basically allowed for reduced or no tariff charges for the years 2006 and 2007.

Table 4. Ghanaian Cocoa Applied Tariffs in Importing Countries over Time (2005-2014)

Year	Product Code	USA	EU	Japan	Malaysia	Year	Product Code	USA	EU	Japan	Malaysia
2005	180100	0	0	0	0	2010	180100	0	0	0	0
	180310	0	25	3.5	25		180310	0	0	3.5	10
	180320	0	25	7	19		180320	0	0	7	10
	180400	0	18	0	10		180400	0	0	0	10
	180500	0	25	10.5	10		180500	0	0 ; 5	10.5	10
	180610	13.64	34	21.15	19		180610	13.64	0 ; 26.21	21.15	10
2006	180100	0	0	0	0	2011	180100	0	0	0	0
	180310	0	0	3.5	25		180310	0	0	3.5	10
	180320	0	0	7	19		180320	0	0	7	10
	180400	0	0	0	10		180400	0	0	0	10
	180500	0	0 ; 5	10.5	10		180500	0	0 ; 5	10.5	10
	180610	13.64	22.42 ; 26.33	21.15	19		180610	12.35	0 ; 25.04	21.15	10
2007	180100	0	0	0	0	2012	180100	0	0	0	0
	180310	0	0	3.5	25		180310	0	0	3.5	10
	180320	0	0	7	19		180320	0	0	7	10
	180400	0	0	0	10		180400	0	0	0	10
	180500	0	0 ; 5	10.5	10		180500	0	0 ; 5	10.5	10
	180610	13.64	24.4 ; 27	21.15	19		180610	n.a.	0 ; 23.62	21.15	10
2008	180100	0	0	0	0	2013	180100	0	0	0	0
	180310	0	0	3.5	10		180310	0	0	3.5	10
	180320	0	0	7	10		180320	0	0	7	10
	180400	0	0	0	10		180400	0	0	0	10
	180500	0	0 ; 5	10.5	10		180500	0	0 ; 5	10.5	10
	180610	13.64	0 ; 27	21.15	10		180610	5.81	0 ; 22.59	21.15	10
2009	180100	0	0	0	0	2014	180100	0	0	0	0
	180310	0	0	3.5	10		180310	0	0	3.5	10
	180320	0.18	0	7	10		180320	0	0	7	10
	180400	0	0	0	10		180400	0	0	0	10
	180500	0.28	0 ; 5	10.5	10		180500	0	0	10.5	10
	180610	13.01	0 ; 27	21.15	10		180610	4.59	0	21.15	10

Source: Authors' elaboration with data from ITC MACMAP, TRAINS, TARIC.

Japan and Malaysia on the other hand, showed escalating tariffs as applied on Ghanaian cocoa exports in terms of tariff wedges (nominal tariff escalation). For Japan, tariff wedge between unprocessed cocoa (180100) and processed cocoa (180610) from 2005 to 2014 was

21.15% and this was the highest applied tariffs by a country on the product code 180610 in comparison to all other destination regions considered in this study. Possible explanation for this could be that countries in Asian sub region focus more on trade preferences within the sub region as opposed to trade preferences and agreements outside the Asian sub region (Antimiani, DiMaio, & Rampa, 2009).

It is also worth mentioning that tariff wedge between product codes 180100 and 180500 in Japan remained constant throughout the years at 10.5% indicating no changes in applied tariffs over this period. More interesting is the fact that Japan applied zero ad-valorem equivalents of specific tariffs on the product 180400 over the years, from 2005 to 2014.

Malaysia applied same ad valorem equivalents of specific tariffs on Ghanaian cocoa exports from 2005 to 2007 with tariff wedge between 180100 and 180610 being 19% over this period. From 2008 however, tariff wedge for both extremes of unprocessed cocoa i.e. cocoa bean (180100) and highest level of processed cocoa considered i.e. sweetened cocoa powder (180610) was 10% instead of 19% observed for the previous years, indicating a reduction in tariffs. This reduction was due to macro-economic policies by the Malaysian government to relax trade barriers and increase market access for its trading partners. All processed forms of cocoa products from Ghana considered in this study were subject to uniform ad-valorem equivalent tariffs of 10% from the years 2008 until the reference year 2014, on nominal terms in Malaysia. It is worth mentioning that, tariff schedules in all importing countries considered for the years preceding 2005 (from 2001-2004) were basically similar to tariff rates as applied in 2005, observed in Table 4.

4.3 Effective Protection Rate Estimates

The core part of this paper deals with estimating protection coefficients on both bound and applied tariffs for Ghanaian cocoa product exports in the importing countries considered. Protection estimates are based on the procedure stipulated in the methodology. Levels of processing for Ghanaian cocoa exports considered in this study are categorised into different stages as follows:

Primary stage: Nominal protection = Effective protection i.e. no processing
Stage 1: Direct processing of cocoa bean to cocoa paste i.e. from 180100 to 180310
Stage 2: Direct processing of cocoa paste to cocoa butter i.e. from 180310 to 180400
Stage 3: Direct processing of cocoa paste to cocoa powder i.e. from 180310 to 180500
Stage 4: Indirect processing of cocoa bean to cocoa butter i.e. from 180100 to 180400
Stage 5: Indirect processing of cocoa bean to cocoa powder i.e. from 180100 to 180500

Note that stage 4 and stage 5 result from a combination of intermediate processing stages of stage 1; 2 for stage 4 and stage 1; 3 for stage 5 respectively. The extraction coefficients used in calculating the ERP'S for these stages (stage 4 and stage 5) are therefore a combination of the input-output coefficients in the processes involved in the intermediate stages before obtaining the desired final product. It is important to further note that import values and their percentages are in the order 180100; 180310; 180400; 180500 respectively as indicated in Table 5.

Results of protection estimates from Table 5 and in Figure 3 indicate that, on applied tariffs, effective protection does not exist in the EU and USA markets with increasing degree of processing for Ghanaian cocoa imports, thus, no tariff escalation. In contrast, Malaysia and Japan effectively protect their cocoa industry at different stages of processing based on applied tariffs. Protection on value added at stage 1, stage 3 and stage 5 in Japan is 10%, 16.6% and 15.1% respectively on applied tariffs. There exist however, a negative protection on added value at stage 2 in Japan. This negative ERP for Japanese cocoa butter industry could mean that, under the current Japanese governments' policy, this specific industry is disadvantaged or perhaps the Japanese cocoa butter industry simply does not need protection effectively. This

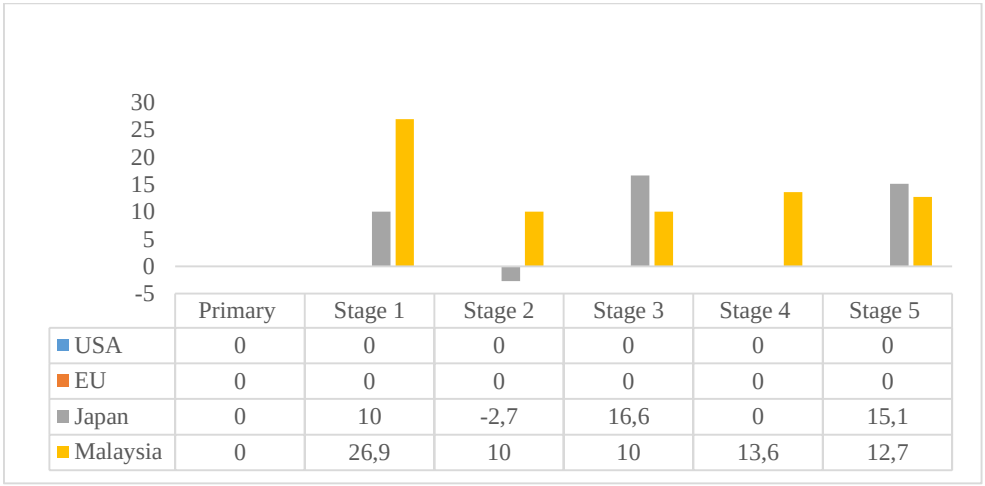
result is very interesting, indicating the fact that, looking only at tariff escalation is a necessary condition but may not be sufficient in evaluating difficulties imposed by importing countries on their exporting counterparts.[6] Lindland (1997) and Antimiani, DiMaio, & Rampa (2009) also found negative tariff wedges at various stages of processing for cocoa products (cocoa butter) in their respective studies.

Table 5. Effective Protection Estimates and Imports from Ghanaian Cocoa Products, 2014

	Effective Protection (in %)		Imports from Ghana	
	Bound tariffs	Applied tariffs	(In 1000 USD)	percent
United States of America				
Primary stage	0	0	162,670	82.9
Stage 1	0	0	12,917	6.7
Stage 2	0	0	5,720	2.9
Stage 3	0.29	0	15,084	7.5
Stage 4	0	0		
Stage 5	0.21	0		
European Union				
Primary stage	0	0	1,061,946	70.7
Stage 1	25.7	0	181,963	12.1
Stage 2	5.8	0	219,768	14.6
Stage 3	6	0	37,433	2.5
Stage 4	11.6	0		
Stage 5	12.2	0		
Japan				
Primary stage	0	0	72,001	80.1
Stage 1	14.3	10	16,563	18.4
Stage 2	-3.8	-2.7	29	0.03
Stage 3	19.8	16.6	1,257	1.4
Stage 4	0	0		
Stage 5	18.5	15.1		
Malaysia				
Primary stage	10	0	308,885	99.2
Stage 1	53.25	26.9	1,666	0.54
Stage 2	6.8	10	745	0.002
Stage 3	9.3	10	0	0
Stage 4	16.8	13.6		
Stage 5	16.3	12.7		

Source: Authors' computation.

Compared to Japan, Malaysia heavily protects its first stage processing, with effective protection value of 26.9% on applied tariffs. This could be a strategic policy action considering that Malaysia itself is a cocoa producing country. Still on applied tariffs, effective protection on value added at stage 2 and stage 3 are both at 10% while stage 4 and stage 5 have protection values of 13.6% and 12.7% respectively indicating palpable tariff escalation in the Malaysian cocoa market. Figure 3 provides a simplified graphical illustration of effective protection on applied tariffs as discussed.



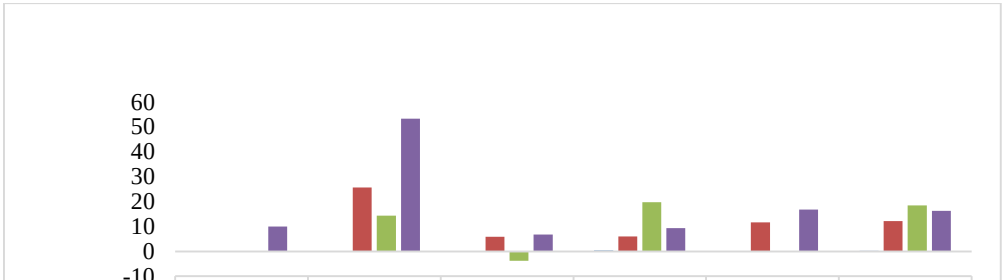
	Primary	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
USA	0	0	0	0	0	0
EU	0	0	0	0	0	0
Japan	0	10	-2,7	16,6	0	15,1
Malaysia	0	26,9	10	10	13,6	12,7

Source: Authors' computation

Figure 3. Effective Protection Estimates on Applied Tariffs (in %)

From a bound tariff perspective, the situation is somewhat different. On average, effective protection on bound tariffs are higher compared to applied tariffs with only few exceptions.[7] The USA is the friendliest nation in terms of bound tariffs with relatively zero protection in their cocoa industry for imports from Ghana at all stages of processing considered. In sharp contrast to observations on applied tariffs, the EU could protect their cocoa industry based on bound tariffs. This essentially means that, it is within the rights of the EU to utilise such tariff schedules as and when they deem fit based on WTO negotiations and agreements. This, however, does not reflect the actual level of tariff escalation in the EU since applied tariffs are essentially zero.

The case of Malaysia and Japan on bound tariffs is not significantly different from what has already been discussed on applied tariffs. On average, tariff escalation is profound in these two countries on bound tariffs, higher than observations on applied tariffs. Again effective protection based on bound tariff in Malaysia for the first processing stage stands at a whopping 53.25% greater than all other coefficients estimated in this study. Protection on bound tariffs is illustrated in Figure 4.



	Primary	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
USA	0	0	0	0,29	0	0,21
EU	0	25,7	5,8	6	11,6	12,2
Japan	0	14,3	-3,8	19,8	0	18,5
Malaysia	10	53,25	6,8	9,3	16,8	16,3

Source: Authors' computation

Figure 4. Effective Protection Estimates on Bound Tariffs (in %)

In a number of cases, protection at first stage processing is higher than second stage processing and effective protection actually declines as we move to higher stages of processing. This observation is explained by the fact that higher levels of processing may require increased technological sophistication and know-how which could be a limiting factor for the Ghanaian processing industries. It might therefore not be necessary to strictly protect the specific industry if the developed country in question possesses technological advantage for the higher processing stages.

4.4 Relationship between Tariff Levels and Ghanaian Cocoa Product Exports

The preceding analytical part of this study described an overview of importing country tariff structure for Ghana's cocoa exports over a number of years and estimated for protection coefficients in these importing countries.

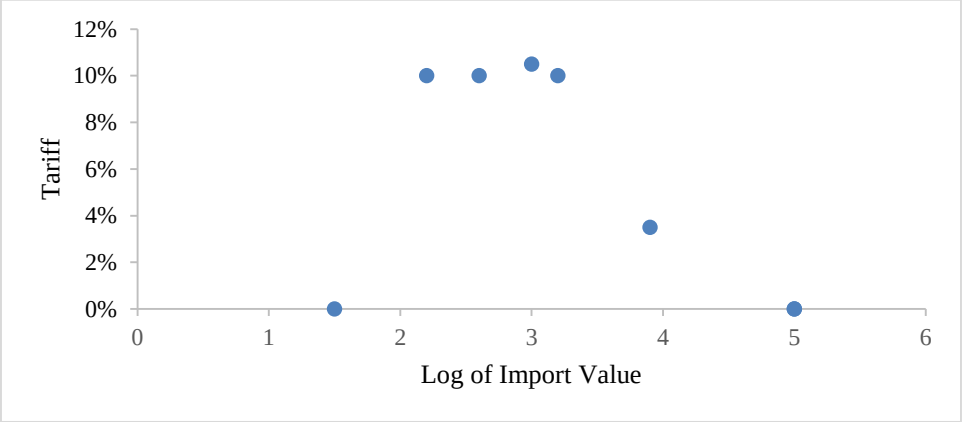
The problem with import tariffs and tariff escalation especially is that it restricts developing countries from accessing high valued foreign export market. The primary assumption behind this thinking is the generalised perception that higher tariffs correspond to low export flows and vice versa. Based on observations and analysis of the data used in this study, there does not seem to be a direct unambiguous relationship between Ghana's cocoa exports and tariff structures in the importing countries considered. This implies that, higher tariffs do not solely prevent Ghana's cocoa product exports from entering importing country markets in terms of value added. Examples exist in this study where processed cocoa products charged with little or no tariffs are still lowly traded (see for instance cocoa butter in Japan).

Further observations from the data suggest that, trade flow depends on the type of cocoa product being exported by Ghana, whether or not processed. It is clear from the this study that more than 80% of Ghana's cocoa exports to all the importing countries considered are in the primary form of cocoa bean (unprocessed), and subjected to zero applied tariffs.

It is puzzling to realise that processed forms of cocoa such as cocoa butter to Japan is also subjected to zero tariffs from the tariff data and yet Ghana's export value of this product to Japan is essentially zero in the year 2014. Again, the USA and EU uniformly apply zero tariffs on almost all forms of cocoa and cocoa products from Ghana considered, and yet exports of value added (processed) Ghanaian cocoa was still very much substantially lower than exports

in the primary product (cocoa bean). This outcome seems baffling and can only imply that tariffs are not the decisive factor in Ghana's cocoa exports with respect to the countries considered in this study. Parameters such as processing capacity and supply factors for processed cocoa in Ghana, consumer preference in importing countries, transport costs of cocoa bean vrs transport costs of semi-processed cocoa products, compliance to standards and other limiting issues are important to holistically understand Ghana's potential and prospects for increasing its cocoa exports, particularly for value added cocoa products.

Figure 5 presents a plot of 2014 tariff rates for Ghanaian cocoa product exports in Malaysia and Japan against a five year (2010-2014) average import values (in log) in these countries for cocoa product categories, whether or not processed. The figure shows somewhat scattered observations of import flows in both countries, with high imports coming in for low tariffs or zero tariffs on cocoa bean and also little or no imports for zero or low tariffs on processed cocoa. Furthermore, the evolution of Ghanaian cocoa exports to both Malaysia and Japan over the period 2010-2014 has seen little change qualitatively and quantitatively from the analysis of the data used in this study.



Source: Authors' elaboration

Figure 5. Plot of Relationship between Tariff and Import Values (in log)

It is important to mention that, a direct comparison between tariff rates in 2005 and their corresponding trade flows with tariff rates and trade flows in 2014 between the EU and Ghana for cocoa and its processed products in this study revealed substantial increase in traded value for lower or no tariff schedules in 2014 compared to higher tariffs in 2005 before the economic partnership agreement holding all other factors constant. This is only but a temporal coincidence indicating that, from a static perspective, higher tariffs may still restrain trade simply because it raises the price of a product in the importing country against domestic supply. It is however difficult to quantify to which extent they act as barrier, having in mind other factors that may also influence trade.

5. Conclusion and Recommendations

This study attempts to analyse tariff escalation on Ghanaian cocoa exports in four importing country markets. Results indicate that nominal tariff escalation (tariff wedge) occurs in all the importing countries, if bound tariffs are to be applied. On applied tariffs, nominal tariff escalation occurs in all the importing countries except the E.U for the reference year 2014.

Estimates of effective protection indicate that tariff escalation does exist in two of the four importing countries considered i.e. Malaysia and Japan with both countries heavily protecting their cocoa industries at different levels of processing on both bound and applied tariffs. Effective protection coefficients in the EU and USA are essentially zero on applied tariffs for cocoa imports from Ghana. On bound tariffs however, the EU could effectively protect their cocoa industry based on WTO agreements and negotiations.

Furthermore, the outcome of the relationship between tariff structures and exports of value added cocoa products from Ghana is somewhat ambiguous. From a static perspective, results reveal that higher tariffs could negatively affect traded values of Ghana's cocoa exports in the importing countries. From a dynamic perspective however, it appears there's a 'bigger problem' beyond tariff structures in these importing countries. These problems may include among others non-tariff barriers to trade, consumer preferences in importing countries, Ghana's technological capacity for cocoa processing, production cost issues, infrastructural development that play a crucial role in facilitating export potential of value added cocoa from Ghana.

Additional in-depth research is recommended to provide more information for policy makers and businesses alike to make investment decisions on value addition processes in the Ghanaian cocoa industry. Also, stakeholders in the Ghanaian cocoa industry should focus their attention on adding value at origin and build the capacity of Ghanaian processing companies to increase the potential for export of high valued or processed cocoa products from Ghana.

Although results from this study are concrete, the findings are only indicative and may not be used as basis for a generalised decision making process. Each situation has to be analysed independently based on its own merit before plausible policy measures can be undertaken.

6. Suggestions for Further Research

For further research, tariff escalation in importing countries on Ghanaian cocoa exports will therefore have to be evaluated not in isolation but rather, in connection with other non-tariff barriers for a more comprehensive assessment on market access constraints affecting exports of value added cocoa products from Ghana.

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[1]Tariff cuts shall be applied via tiered method that comprises four tariff groups and an outline for proportionate tariff reduction on bound agricultural tariffs in identical yearly cuts over 11 and 5 years in developing and developed countries respectively.

[2]It is a sufficient condition if weighted average of tariffs on other inputs is less than tariff on processed product.

[3] Having in mind the assumption that tariffs on other inputs are zero.

[4]n.a.; data not available due to a lack of trade thereof.

[5] It was not helpful to use Olympic average value since it practically did not change the mean unit value for unsweetened cocoa powder in Malaysia.

[6]It is important to note that, this study does not take into account non-tariff barriers to trade. In reality, processed exports from Ghana depend also on Ghana's capability to satisfy rules of origin and other technical barriers to trade.

[7]Exceptions being at stage 2 and stage 3 processing in Malaysia.