

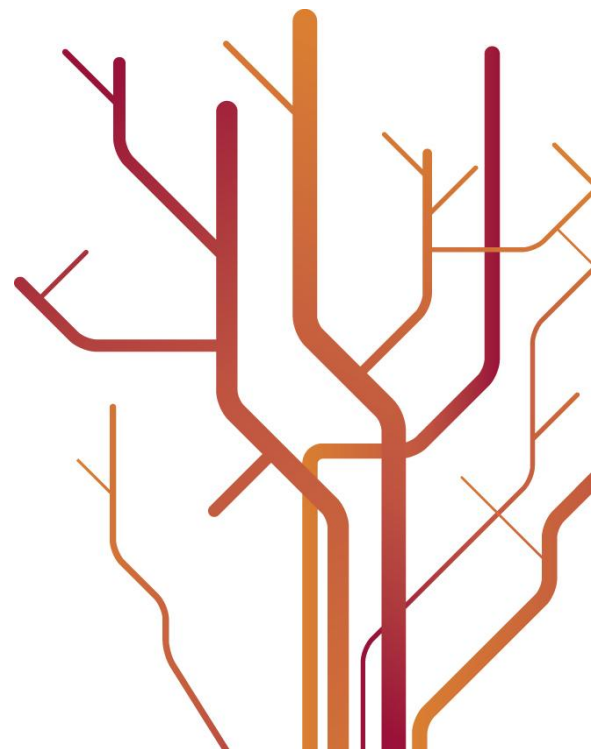
# An Analysis of the Performance of Ghanaian Canned Tuna Export to EU Market (1999-2009)



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To God be the glory.

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## **Abstract**

The tuna fishery is an important sector in Ghana. In 2009, total landing of tuna in Ghana represented about 24% of total catches in the East Atlantic. Canned tuna is Ghana's most important non-traditional export commodity in terms of foreign exchange earnings. The main focus of this thesis is to analyze the performance of Ghanaian canned tuna export to the EU - 27 market. Performance is measured in terms of Ghana's competitiveness relative to the performance of other exporting countries; namely, Cote d' Ivoire, Ecuador, Madagascar and Thailand. The competing countries are all leading exporters of canned tuna and were chosen to reflect regional balance and different trading and tariff systems in the EU market.

The performance indicators employed for the study are two measures of specialization; the Revealed Comparative Advantage (RCA) and the Revealed Symmetry Comparative Advantage (RSCA) and a measure of competitiveness, the Market Share (MS) Index using yearly data from 1999 -2009. To infer competitiveness from the changes in export value over time, a first- level Constant Market Share (CMS) analysis was used to decompose the changes in export value into a structural effect, competitive effect and second-order effect. To augment this technique, an empirical analysis on the determinants of the Ghana's canned tuna export was conducted using the Armington trade model by OLS regression on monthly data from January 1999 – December 2009, with quantity market share as the dependent variable. The results of the indices of specialization, shows that, Ghana has comparative advantage in the export of canned tuna to the EU -27 throughout the study period. In terms of competitiveness, Ghana's market share value has declined over the study period. Judging by the operational definition of competitiveness, Ghana has been less competitive. The CMS decomposition of changes in export values indicates that the changes in export value of Ghana can be attributed to structural effect (growth of the market) mainly. The results of the regression analysis indicate that, price ratio, the level of specialization and trade policy effect have statistically significant effect on the quantity market share of Ghana.

### Keywords:

Revealed comparative advantage, market share, specialization, competitiveness, constant market share, determinants, canned tuna, Ghana

# 1: Introduction

Fish is one of the most traded food commodities in the world. International trade in fish and fishery products has continued to grow over the last few years. Total world import of fish stood at a whopping US\$89.6 billion in 2006, a 10% increase from the previous year and 57% since 1996. The EU, USA and Japan markets alone accounted for about 72% of the total import value. The value of import by the EU, increased by a significant 12% in 2006 (FAO, 2009). Developing countries have continued to be important supply source in the global fish trade. In 2006, more than half of the total value of import by these developed markets came from developing countries.

This situation has arisen because local fishery productions in these developed countries are not enough to meet the growing demand, as a result, there is an increasing reliance on imports and aquaculture. In 2007, the value of imported fish and fishery products into the EU market stood at €16 billion. This accounts for more than 60% of the EU's fish consumption. The bulk of these imports has been high-value species. The major products imported in terms of value were Pacific salmon, frozen shrimps and canned tuna. Canned tuna imports constitute about 7% in value terms of the total fish and fishery products imported into the EU market following fresh or chilled pacific salmon and frozen shrimp which have 8% apiece. Ghana has consistently being ranked among the leading exporters of canned tuna to the EU.

The importance of the fishery sector to the economy of Ghana is not in question. The sector plays a key role in the economy of Ghana, contributing about 3% to GDP. Fish and fishery products are Ghana's leading non-traditional export commodity with tuna being the most dominant. The importance of the tuna fishery and its allied businesses like the canneries has not been lost on successive governments. Over the years, the government has embarked on projects and programs aimed at modernizing the tuna fishery sector and building a sustainable tuna supply chain, from the fisher to the markets. This is to enable the sector to take advantage of the thriving world market for tuna in the bid to increase employment, improve the livelihood of fishing communities and contribute to economic growth via export revenues. Export contributes in no small way to the economic growth of a country. It fosters better



capacity utilization, technology improvements, and economies of scale (Feder, 1982). It allows for building foreign exchange reserves which are necessary for local currency stabilization and economic growth.

In light of the growing demand for canned tuna, changing trade conditions, health and safety standards, and investment into the sector by government, what has been the performance of Ghanaian canned tuna export to the EU? In other words, how did the performance of Ghanaian canned tuna export to the EU measured up to the performance of competitor countries? The answer to this question is the thrust of this study. The primary objective of this thesis is to analyze Ghana's performance in terms of its competitiveness in canned tuna export to the EU market relative to competitor countries. This study will examine canned tuna product form because it is the main form of tuna products exported in terms of both value and volume. Ghana's performance will be compared to the performance of other exporting countries like Cote d'Ivoire, Ecuador, Madagascar and Thailand. The selection of these countries is to reflect regional balance and the different trading and tariff systems in the EU market. Cote d'Ivoire, a neighboring West African country, like Ghana, exports canned tuna to the EU under the ACP-EU preferential trade agreement. Madagascar as well exports under the same agreement. Ecuador, a Latin American country exports under the General System of Preferences (GSP)+ regime. Thailand an Asian exporter, until July 2003, when a reduced tariff quota for canned tuna was opened for Thailand and the Philippines did not have preferential access treatment.

The justification of such a study lies in the fact that, trade performance analysis is a key and integral part of strategic market research and planning. Strategic market research enables the benchmarking of national and sectoral trade performance and the identification of priority products and markets for trade development (Magagane et al, 2008). Because foreign markets tend to be more diverse and in some cases unpredictable compared to domestic markets, a clear understanding of export performance becomes imperative (Sousa, 2004). Such knowledge is of essential interest to governmental or policy makers, business and corporate managers and market analyst or researchers (Katsikeas et al. 2000). From the public policy maker's standpoint, a clear understanding of the construct will enable formulation of

appropriate policies, setting of priorities in terms of products, sectors and trading partners in order to provide adequate trade support to industry and carry out effective trade promotion and development. At the micro or firm level, managers will be interested in research on export performance because it is considered as an apparatus for increasing sales revenue, growth, survival and reinforcing competitive edge (Samiee and Walters, 1990). It is against this backdrop that this study is imperative.

Export performance has received considerable attention in the literature lately; however there is a lack of consensus on conceptualization and operationalization of the construct (Diamantopoulous, 1999; Cavusgil and Zou, 1994; Shoham, 1998). Several methods and indicators are available for studying and analyzing export performance. The choice of indicator will be influenced by data availability and scope of the analysis i.e. whether the analysis is at the firm (micro) or national (macro) level.

In this study, the analysis is based on trade data over the period 1999 to 2009. Performance is analyzed through the estimation of the following indicators; specialization and competitiveness. Specialization refers to focusing on goods in which a country has some advantage whereas, competitiveness is the ability of a product to achieve and maintain a certain market share.

The analysis of specialization as a performance indicator will be based on the Revealed Comparative Advantage (RCA) and the Revealed Symmetry Comparative Advantage (RSCA) indices. On the other hand, the reference methodology for measuring competitiveness is the Market Share (MS) index. In addition to the RCA, RSCA and MS indices, a first-level Constant Market Share (CMS) analysis is carried out to decompose the changes in export value into structural, competitive and second-order effects, in order to infer competitiveness. An empirical analysis on the determinants of the Ghana canned tuna export is also conducted using the Armington trade model by OLS regression method on monthly data from January 1999 – December 2009, with quantity market share as the dependent variable.

Secondary data was used for the study. EU import and export data were extracted from the Eurostat statistical database. The region or market under consideration for this study is the EU-27 Market. The product form was chosen because it is the main form of fishery product exported.

The study is organized as follows;

The second chapter deals with background information about the Ghanaian tuna fishery with highlights on the history, production, contribution to the economy, markets and management and the EU import market with emphasis on tariff and non-tariff measures employed by the market.

The third chapter will consider the theoretical framework and a review of the various methods of export performance measurement as well as a detailed description of the indicators used for the analysis.

The fourth chapter provides the empirical results and a discussion of the results.

The final chapter presents conclusion of the study.

## **2: Background**

### **2.1 The Ghanaian Tuna Fishery**

#### **2.1.1 Brief History**

The fishing industry in Ghana dates back several years even before Ghana attained independence in 1957 by the people living along the coast. The Gulf of Guinea which bounds Ghana on the south supported a thriving fishing industry. The fishery started with very crude and inefficient harvest technology. From the mainly traditional use of hand dugout canoes the fishery has evolved into a multi fleet industry with a blend of both traditional and modern harvest technology.

The tuna fishery started round about 1959, a couple of years after independence. The tuna industry was birthed as a result of collaboration between the government of Ghana and Star Kist International of the USA. Actual exploitation of the resource started with the Japanese bait boats. Since then, the fishery has developed with the growth of infrastructure such as cold stores, processing plants etc at the main landing port of Tema.

#### **2.1.2 Producers**

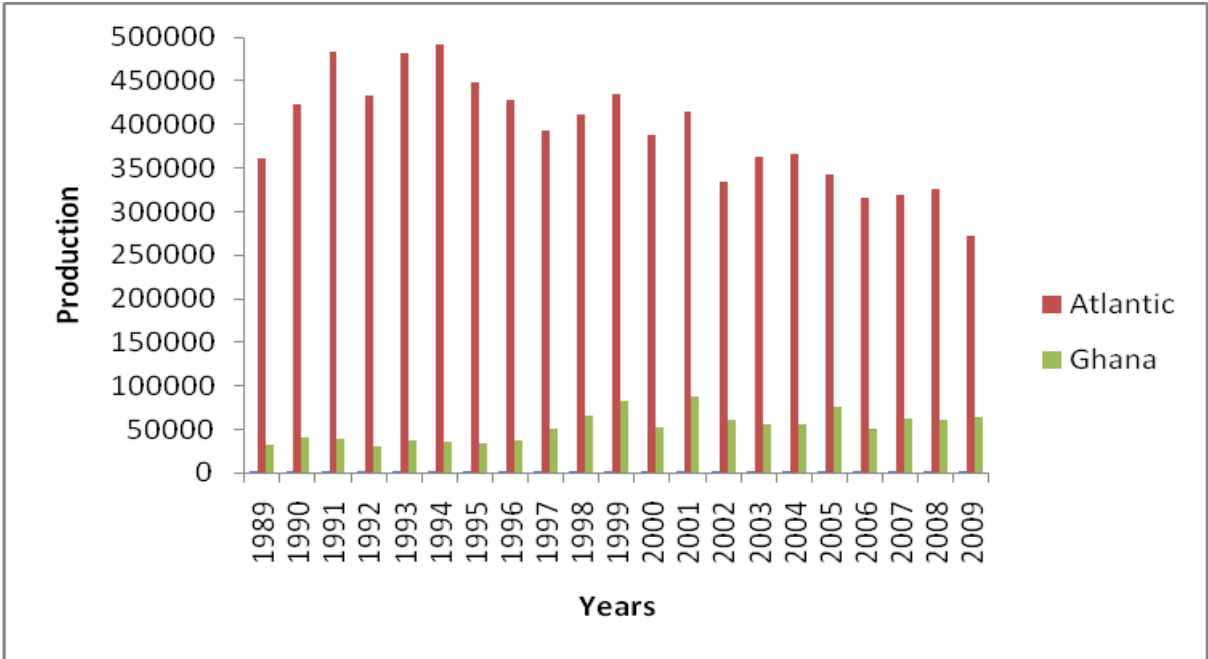
The Ghanaian tuna fishery is based on the exploitation of three main species, namely, Skipjack (*Katsuwonus pelamis*), Yellowfin (*Thunnus albacares*) and the Bigeye (*Thunnus obesus*). It is a bait boat and purse-seine fishery. Presently there are a number of bait boats and purse-seiners operating in the fishery. The purse-seiners are operated by commercial or industrial fishing companies whereas the bait boat fleets has some level of artisanal participation. There about 45 tuna commercial fishing vessels operating in the fishery. Of these, 10 are purse-seiners. The vessels are operated by about 19 fishing companies. The companies form the Ghana Tuna Association (GTA). The vessels are mostly beneficially

owned or controlled on joint venture basis with Ghanaians having at least 50% of the shares as required by law, the Fisheries Act 625 of 2002.

**2.1.3 Production**

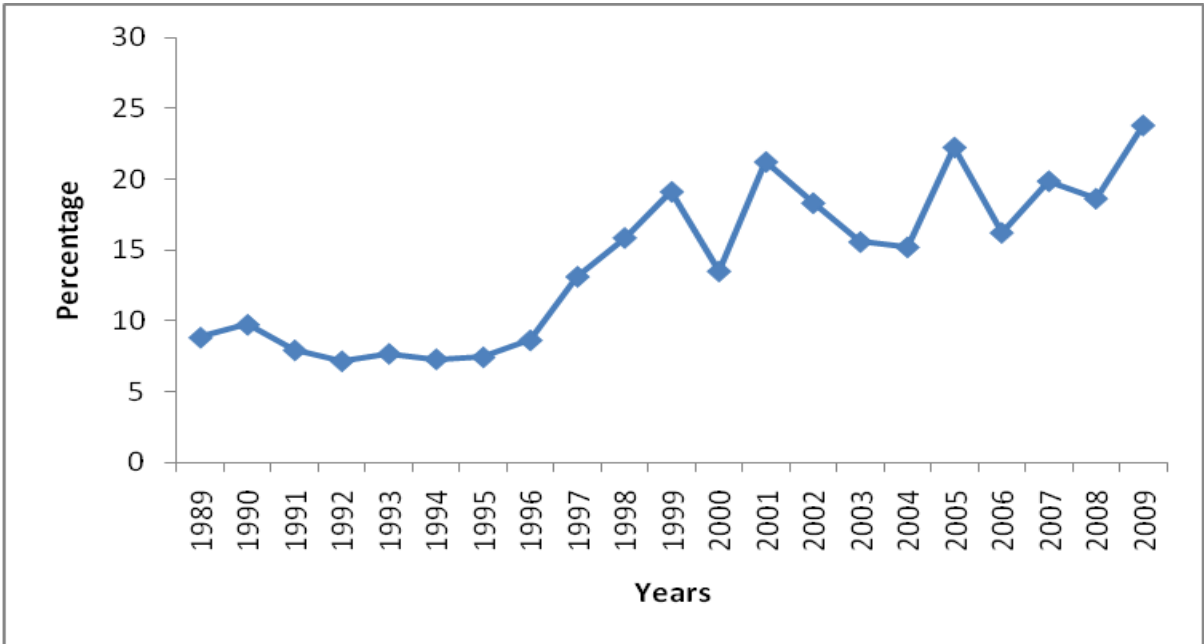
Ghana’s tuna production has increased by more than 100% since 1989. The average catch over the last 20 years stands at 53,199 MT. Over the last two decades the highest annual catch level is 88,076 MT and the minimum catch level of 31,164 MT recorded in 2001 and 1992 respectively. Since 1997, tuna production has consistently been above 50,000 MT compared to an average of about 35,000 MT prior to 1997. The upsurge in production can be attributed to adoption of more efficient harvest technology and increased investment into the sector by government. For example, the adoption of the Fish Aggregating Devices (FADs) technology in the 1990’s has significantly helped to improve production levels.

(Table 1) shows annual tuna production in the East Atlantic and Ghana as well as Ghana’s percentage share of total production in the East Atlantic waters.



**Figure 1: Total tuna production in MT: Ghana and East Atlantic (1989-2009)**

Using a log-linear growth model:  $\ln(Y_t) = \beta_1 + \beta_2 t$ , where  $Y_t$  is the production level,  $\beta_1$  is the constant term and  $\beta_2$  is the coefficient of time, an approximation of the growth rate. We calculate that, the average annual growth rate for Ghana is about 3.8% compared to a negative growth of about 2% for the entire East Atlantic tuna fishery over the period of the data. This means that Ghana's percentage share of total production in the East Atlantic tuna fishery on the average is growing.



**Figure 2: Ghana's percentage share of total tuna production in the East Atlantic 1989-2009**

The percentage share of Ghana's production of total production in the East Atlantic fishery has been increasing steadily since 1995 but experienced some fluctuations between 2000 and 2008. In 2009, Ghana's percentage share is 24%, nearly a quarter of the total catch of the entire East Atlantic tuna fishery. This makes Ghana an important player in the fishery.

### **2.1.4 Processing and Markets**

The main landing site for tuna is the Tema Harbour. Bulk of the total landings is sold to the tuna canneries and factories for processing into canned tuna products and lions for the export market, mainly, the EU, USA and the Economic Community of West African States (ECOWAS) markets. The Fisheries Act 625 law requires that at least 10% of tuna landings be sold on the domestic market. Usually, undersized catches are sold on the local market. Frozen low value tuna is imported to augment supply on the domestic market. In 2002, Ghana imported about 21,000 tons of Yellowfin tuna amounting to \$ 12 million (Lem, 2004). Currently, there are about five tuna processing factories, all operating in and around Tema. The three main tuna processing factories are, the Pioneer Food Cannery Ltd (PFC) a subsidiary of Heinz USA and the Ghana Agro Food Company Ltd (GAFCO), joint venture between the government of Ghana, Industrie-Bau Nord (IBN AG) and a local institutional partner and Myroc Food Processing Company Ltd.

### **2.1.5 Employment**

The sector employs thousands of persons both on onboard vessels as well as shore-based processing plants and auxiliary business activities. By law, as stipulated in the Fisheries Act 625, at least 75% of officers and crew employed by owners of industrial or semi-industrial fishing vessels must be Ghanaians. Several hundreds are also employed in land based activities such as handling and storage. The canneries and processing plants are also key sector employers. All together, the tuna fishing industry provides employment for several thousands of people.

### **2.1.6 Governance and Management**

The national fisheries policy framework of Ghana is provided by the law, the Fisheries Act 625 of 2002. The Act provides for the regulation and management of fisheries, regarding the development of the fishing industry and the sustainable exploitation of fishery and aquatic

resources. The Act establishes the Fisheries Commission, the regulatory fishery body. The object and function of the commission include:

1. Regulation and management of the utilization of fishery resource and policy co-ordination
2. Preparation and continual review of fisheries management and development plans
3. Conflict resolution
4. Monitoring, control and surveillance
5. Research and stock assessment
6. Ensuring sustainable exploitation of fishery resource

Management of the tuna fishery is done by Marine Fisheries Research Division (MFRD) of the Fisheries Commission. The MFRD, work within the ambit of the broader objectives and functions of the Fisheries Commission. Among other things, MFRD monitor the marine environment and how changes in the environment is impacting on the fishery, conducts stock assessment and scientific research and provide information required for the preparation of the fisheries management plans for marine fish stocks. They also collaborate with international organizations in the management of shared fish resources. Management of the tuna fishery is mainly by effort control, in the way of licensing. All fishing vessels are required to get a license of operation from the Fisheries Commission before they participate in the fishery. There are some restrictions on the type of gear or technology used in the harvest process. For example, a moratorium has been placed on the use of fish aggregating devices (FADs).

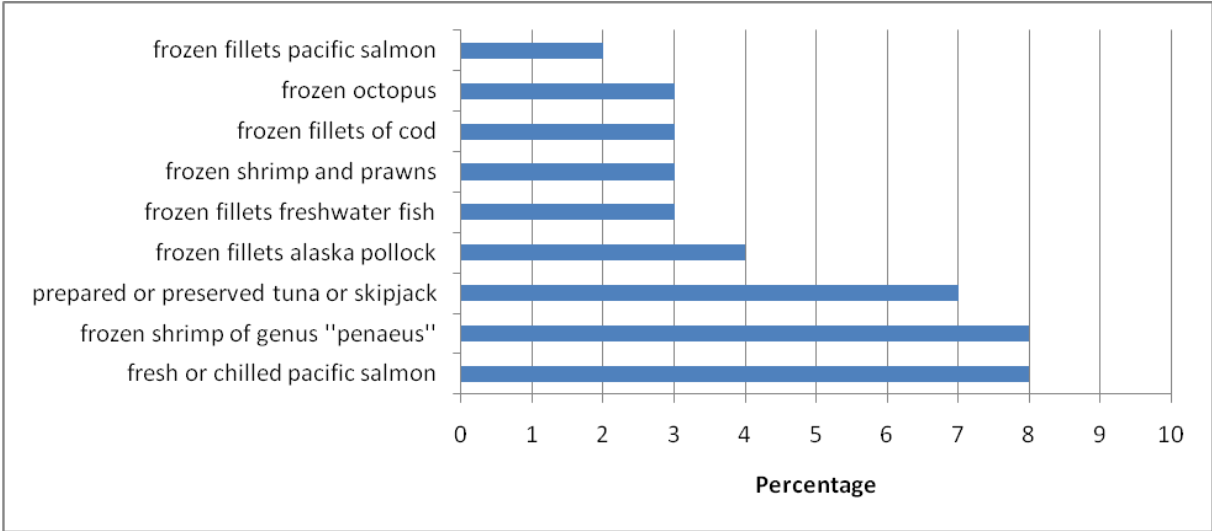
Due to the highly migratory nature of tuna stocks and vessels, management of the stock requires both domestic and international management. In terms of international cooperation, Ghana is a member of the International Commission for the Conservation of the Atlantic Tuna (ICCAT). ICCAT is responsible for the conservation and sustainable management of tuna and tuna-like species in the Atlantic Ocean and neighboring seas. The organization was established in 1966 in Rio de Janeiro, Brazil following the preparation, adoption and signing of the international convention for the conservation of Atlantic Tunas at a Conference of Plenipotentiaries. Currently, there are 48 contracting parties in the Commission. The core



function of the Commission is research with main focus on the effects of fishing on stock abundance and ensuring the sustainability of the stock.

## 2.2 EU Import Market Situation

The EU continues to rely on imported fish and fishery products to meet its growing demand. Considerable portion of total world's export of fish and seafood products ends up on the EU market. The European Union is the world's largest importer of fish and seafood products. Import regulations are harmonized in that; same rules apply in all EU countries. In 2007, the EU imported €16 billion worth of fish and fishery products to augment domestic supply. This accounts for more than 60% of its fish consumption ([www.ec.europa.eu/trade](http://www.ec.europa.eu/trade), visited 22/08/2010). From the 2008 figures, Pacific salmon represents the most important imported fish and fishery products in value terms. The Pacific salmon is followed by frozen shrimps and canned tuna. (Figures 3) gives an overview of the most important products, in terms of value imported into the EU market in 2008. Canned tuna accounted for 7% of all EU imports of fish and fishery products in value terms in 2008.



**Figure 3. Most significant fish and fish products imported into EU (value terms) 2008**

Source: [www.ec.europa.eu/trade](http://www.ec.europa.eu/trade)

## **2.3 Import Policies: Tariff Measures**

Canned tuna and tuna loins (a semi-processed product for use in canning) attracts a Most Favoured Nation (MFN) import duty rate of 24%. On the other hand, the community has suspended tariffs on imports of unprocessed tuna destined for the processing industry of the EU community. This is part of efforts to guarantee adequate supply of raw material for the sector. The canning industry located mainly in Spain, France and Italy provides a major source of employment and revenue especially in coastal communities. In 2004, the community passed regulation (Council Regulation (EC) No 379/2004) opening and providing for the running of autonomous tariff quota for certain fishery products for the period 2004-2006. Tuna loins for processing had an annual quota of 4,000 tonnes at quota duty of 6%. This quota was doubled in 2007 and increased to 9,000 tonnes and 10,000 tonnes in 2008 and 2009 respectively.

However, major exporting countries of these products have continued to benefit from unrestricted duty-free access to the EU market under the various tariff preferences schemes, chiefly, the Africa, Caribbean and Pacific (ACP) states tariff preferences or through the Generalized System of Preferences (GSP)+ regime. The duty free access to the EU market is in consideration of the substantial investments in tuna canning made by some EU countries in certain ACP and Latin American countries (<http://ec.europa.eu/trade>, visited on 23/08/2010).

### **2.3.1 ACP-EU Partnership Agreement**

The ACP comprise of 79 member states. The Economic Partnership Agreement (EPA) between the ACP and EU- the ACP-EU Partnership Agreement dates back to the year 2000 with the signing of the Cotonou Agreement. From 1975, when the ACP group of countries was formed to 2000 when the Cotonou Agreement was signed, economic relations between the ACP and European Community were regulated by the Lomé Conventions (Lomé I - Lomé IV). Significant advances in the global economy as well as changes in the socio-economic landscape of ACP countries brought to the fore the need to have a second look at ACP-EU economic relations thus the birth of the ACP-EU Partnership Agreement. The principal aim of

the new EPA is to help ACP countries integrate into the global economy, share and benefit from the prospects of globalization. The partnership agreement is expected to promote and boost trade between the ACP countries and the EU. The increased trade is expected to deliver a number of benefits to both consumers and producers in Europe and ACP countries. A wider market translates into more sales for producers which in turn will generate employment and income thereby reducing poverty. The EU consumers stand to benefit from increased competition resulting from enhanced trade in the EU market by way of declining average price and wider range of goods to choose from. It is worthy to note that 6 out of the 10 top canned tuna exporting countries into the EU market are members of the ACP group. Ghana, Cote d'Ivoire, Madagascar, Mauritius, Papua New Guinea and Seychelles all six countries are among the top ten exporters of canned tuna to the EU are signatories to the ACP-EU Partnership Agreement and as such enjoy zero and unreciprocated tariff on fish and fishery products exported to the EU. The export performance of these countries hinges on, to a very large extent the preferential access enjoyed under the Agreement.

### **2.3.2 Generalized System of Preferences (GSP) regime**

The GSP is an EU trade arrangement through which 176 developing countries are provided with preferential access to the EU market. The incentive is in the form of unreciprocal reduced tariffs for goods exported into the EU market. The principal objective of this tariff measure is poverty reduction and providing the impetus for sustainable development and good governance. GSP has three variant preference regimes, namely

- The standard GSP, offers preferential access to 176 beneficiaries countries and territories
- The Everything But Arms (EBA) incentive, provides duty-free, quota-free access for all goods for the 49 Least Developed Countries (LDCs)
- The GSP+, provides further tariff reductions to support vulnerable developing countries. Beneficiary countries as a requirement must have ratified and implemented 27 given international conventions. The conventions cover issues on human and labour rights, sustainable development, and good governance.

Under the GSP+, countries are considered vulnerable on the basis of its size or the scope of diversification in its exports. Limited diversification in this context is defined as meaning that more than 75% of total GSP-covered export to the EU is represented by the 5 leading categories of its GSP- covered export of the beneficiary country. Additionally, GSP- covered imports from the beneficiary country must also equates to less than 1% of total EU imports under GSP.

Canned tuna and tuna loins exporting beneficiary countries under the GSP+ regime are located in Latin America (<http://ec.europa.eu/trade> visited on 28/08/2010). Ecuador and Guatemala both leading canned tuna exporting countries are beneficiaries under GSP+ incentive.

### **2.3.3 WTO Negotiations**

The preferential access treatment enjoyed by countries under the ACP-EU and the GSP regimes and the repeated concerns raised by the Philippines and Thailand both major canned tuna exporting countries, led to World Trade Organization (WTO) mediation between the EU on one hand and the Philippines and Thailand on the other hand. Subsequent to the mediation, a reduced tariff quota for canned tuna was opened in July 2003 for Thailand and the Philippines. The EU opened a quota of 25,000 tonnes at 12% duty, a 50% reduction of the MFN rate of 24%. The quota was revised up to 25,750 tonnes on 1 July 2004.

## **2.4 Import Policies: Non-Tariff Measures**

Non- tariff measures raises grave concern for many fish and fish product exporting countries because of its potential to impede market access. This is because of the complex and stringent nature of the requirements these exporting countries must satisfy in order to access the EU market. Limited capacity in terms of financial, human and technical competence of these countries further aggravates the problem (Doherty, 2010). The increasing requirements and

standards are driven by growing health and safety concerns by consumers. In a speech at the Conference on EU Exports and Sanitary and Phytosanitary Measures, Brussels 27 May 2005, Peter Mandelson, the EU Trade Commissioner pointed out that “the future challenges in trade policy will not be in the field of traditional tariffs, but in the so-called non-tariff barriers to trade, to which the question of standards is crucial”. Mould (2005) posits that, several millions of dollars of potential trade may be lost through the imposition of these measures.

Notwithstanding the preferential access treatment Ghana’s tuna export enjoys under the ACP-EU Agreement, the sector like that of many other ACP countries is under intense strain to meet the ever increasing health and safety standards imposed by these measures, and as such not benefiting fully from the potential gains it could enjoy under the Agreement. Two agreements on non-tariff measures are of paramount importance to the sector, namely, The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT Agreement).

The SPS Agreement established in the Uruguay Round defines sanitary and phytosanitary measures to include “all relevant laws, decrees, regulations, requirements and procedures including, *inter alia*, end product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during transport; provisions on relevant statistical methods, sampling procedures and methods of risk assessment; and packaging and labeling requirements directly related to food safety”.

Under the Agreement the WTO recognizes the sovereign right of member states to set their own food safety and health standards; however the SPS measures must be science-based. The nature and scale of the potential risk must be unambiguous and the SPS measure must be proportionate to the perceived risk. The measures should not “arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail, including between their own territory and that of other Members. Sanitary and phytosanitary measures

shall not be applied in a manner which would constitute a disguised restriction on international trade.’’

On the other hand, TBT Agreement seeks to ensure that, the preparation, adoption and application of technical regulations and standards by governments that define product characteristics, such as its packaging, labeling, design or use for the purpose of pursuing legitimate public policy objectives for example human health and safety, fauna and flora life, environment, consumer protection from deceptive practices, or national security concerns do not result in unjustifiable and unnecessary obstruction to international trade.

The increasing use of these non-tariff barriers coupled with other issues like the application of complex rules of origin and eco-labeling poses a serious challenge to the growth of Ghana’s tuna export and can eventually impair the competitiveness of Ghana’s tuna exports. To address the challenges posed, the government of Ghana with the support of donor partners like the EU has invested substantially in institutional capacity building to ensure fish export meets the health, safety and quality standards of the EU. The Ghana Standard Board (GSB), the elected Competent Authority (CA) to undertake standard developments and harmonization and fish inspection and quality certification for exports has been resourced and equipped to ensure Ghana fish meets the export market requirements. Additionally, the government with the support of donors has put in place measures to ensure compliance with Hazard Analysis Critical Control Point (HACCP).

## **3: Theoretical Framework**

### **3.1 The Revealed Comparative Advantage (RCA)**

The theory of comparative advantage was first introduced by David Ricardo to explain the underpinnings of international trade. According to Ricardo (1817), “comparative” rather than “absolute” advantages provide the impetus for international trade as advanced by John Stuart Mill and Adam Smith earlier on. Mill and Smith posited that, a country will export a good when it is the lowest cost producer of that good. The Ricardian Model however explains that, countries can still benefit from international trade through specialization in production of goods where it has comparative advantage even though the country has absolute advantage in all goods or can produce all goods more efficiently than other countries and that comparative advantage stems from differences in technology across countries.

The theory of international trade was taken a step further by the works of Heckscher and Ohlin (1991). The Heckscher-Ohlin (H-O) theory emphasizes and attributes comparative advantage to differences in factor endowment and cost differences in factor prices across countries (Leamer 1995; Ruffin 1988; Leishman et al, 1999). By implication, a country will export goods which are relatively intensive in the utilization of a factor which the country is relatively well endowed (Leishman et al, 1999).

Leung and Cai (2005) argues that comparative advantage can be obtained either through an increase in benefit gained by the production activity or a reduction in its opportunity cost. This implies that, comparative advantage is dependent on both demand-side factors (consumer preference) and supply-side factors (largely, factor endowment and technologies).

Comparative advantage has both equilibrium and a dynamic aspect. Thus, comparative advantage can be analyzed from these two perspectives. The equilibrium aspect defines equilibrium specialization patterns in the long run, whereas from the dynamic standpoint, the concept of comparative advantage shows the latent changes in specialization and trade patterns. These two aspects of comparative advantage provide valuable information on a country's most advantageous trade pattern in the long run, and also point out a country's short-term development priorities (Leung and Cai, 2005). A clear distinction between these two aspects is very important because each has a different policy implication. The decision to increase specialization or not will be influenced by whether comparative advantage is viewed from the equilibrium or dynamic spectacle (Cai et al, 2009; Leung and Cai, 2005). From the dynamic point of view if "an autarky country has comparative advantage in one good it implies that under free trade this country has tendency to increase specialization in that goods and export it" (Leung and Cai, 2005). On the other hand, if the country's actual specialization level is already optimal "then an attempt to further increase specialization could be counterproductive" (Cai et al, 2009).

Furthermore, comparative advantage can be employed both as a descriptive (or positive) and prescriptive (or normative) concepts. While the former provides "a basic explanation of the international pattern of specialization in production and trade", the latter offer "guidelines for government policies on resources allocation and trade" (UNIDO, 1986) as quoted by Leung and Cai (2005).

There are two complementary approaches in comparative advantage analysis provided by the economic literature (Cai et al., 2009; Leung and Cai, 2005). These are; the Domestic Resource Cost (DRC) or the Benefits- Costs (BC) approach and the Revealed Comparative Advantage (RCA) approach.

The DRC/BC approach uses social profitability to determine comparative advantage. A country's comparative advantage is measured by the DRC ratio. A lower ratio indicates more



efficient utilization of domestic resources and greater profitability, thus, a greater advantage (Cai et al., 2009; Leung and Cai, 2005). This approach is more data demanding and particularly not useful for international trade analysis.

De Benedictis and Tamberi (2001), notes that, countries will specialize in and be net exporters of goods in which they have comparative advantage under free trade conditions. The theoretical implication is that, under relatively general conditions, the observation of the difference between autarkic and free trade relative prices should identify goods or sector in which a country has a comparative advantage. A positive sign is indicative of comparative advantage in the production and export of that particular commodity, whereas, a negative sign will indicate comparative disadvantage (Deardorff, 1980).

However, relative autarky prices are unobservable variables (De Benedictis and Tamberi, 2001; Balance, Forstner and Murray 1987) and post- trade prices are also influenced by trade flows (Balance, Forstner and Murray 1987). Therefore, prices cannot be used directly to identify true comparative advantage. To circumvent this challenge, comparative advantage pattern is ascribed using information on post-trade variables for example, production, imports, exports and consumption (De Benedictis and Tamberi, 2001; Balance, Forstner and Murray 1987).

The RCA approach uses *ex post* trade patterns to determine or identify sectors which a country has a comparative advantage. Balance, Forstner and Murray (1987), notes that, economic conditions (EC) in various trading countries determine the international pattern of comparative advantage (CA). The patterns of comparative advantage, in turn, influence the pattern of international trade, production and consumption (TPC) among countries. Indices to 'reveal' comparative advantages (revealed comparative advantage) can be constructed from TPC variables.

Balance, Forstner and Murray (1987) adds that, although in a real world situation (many countries, products and factors), the clear-cut application of this model to determine the relationship between CA and TPC will not be possible, indices based on real world post- trade observations may “reveal” much about the underlying pattern of comparative advantage.

Several methods or techniques for calculating RCA has been suggested in the literature employing different combinations of the variables (production, imports, exports and consumption) to infer comparative advantage.

A widely used method is the Balassa RCA index also known as the Balassa Index. The Index measures the relative advantage or disadvantage of a country in a product or group of products as evidenced by the export structure or “revealed” by observed trade flows. It measures normalized export shares vis-à-vis to export of the same industry by other countries. It “reveals” the comparative advantage or disadvantage of a country rather than establishing the causal sources of the advantage or disadvantage.

The Balassa index (BI) introduced by Balassa (1965) is defined as this:

$$(1) \quad RCA_{ik} = \frac{X_{ik}}{X_i} / \frac{X_{wk}}{X_w}$$

Where

$RCA_{ik}$  = revealed comparative advantage index of country  $i$  in exporting product  $k$ ,

$X_{ik}$  = country  $i$ 's export value of product  $k$ ,

$X_i$  = total export value of country  $i$ ,

$X_{wk}$  = total world's export value of product  $k$ ,

$X_w$  = total world's export value.

In this study,  $k$  = canned tuna and  $i$  = Ghana and competitor countries.

The RCA index compares the national export structure (the numerator) to the world's export structure (the denominator). The index takes any positive value, and if the value of RCA is greater than 1, it implies that the country in question has comparative advantage with regard to exporting the particular product. Likewise, if the value of RCA is less than 1, it may be said the country has comparative disadvantage in exporting the given product. Balance, Forstner and Murray (1987) provide three ways in which the RCA indices can be interpreted. Firstly, the index *quantifies* the commodity-specific degree of comparative advantage enjoyed by one country with reference to any other countries or set of countries. Secondly, the index provides commodity-specific *rankings* of countries based on the value of the index. Thirdly, the index provides a *demarkation* between countries that reveal comparative advantage in a particular commodity or sector and those countries that do not. Balance, Forstner and Murray (1987) refer to these three alternate interpretations as cardinal, ordinal and dichotomous measures respectively.

De Benedictis and Tamberi (2001) demonstrated that, interpreting the Balassa Index in a cardinal way allows for the preservation of the raw export data information content and offers possibility of both rankings and demarcation interpretation values but present some problems. Two of these problems are asymmetry (variability of the upper bound) and across-time ranking (variability of the mean value). Asymmetry means that, the values of RCA ranges from 1 to infinity for products in which a country has a revealed comparative advantage but only from zero to 1 for product in which a country has a comparative disadvantage (Iapadre, 2001). Others have criticized the Balassa Index that it produces biased results due to the exclusion of imports in the model. To address these and other shortcomings, alternative normalization of the index has been proposed.

Dalum, Laursen and Villumsen (1998) and Laursen (1998) proposes a different normalization called the *revealed symmetric comparative advantage* (RSCA) index:

$$(2) \quad RSCA = \frac{RCA_{ik} - 1}{RCA_{ik} + 1}$$

The RSCA is an approximation of the log transformation of the Balassa Index. This normalization makes the index symmetric with values ranging from -1 to 1. A country has comparative advantage in a particular sector, if  $0 < \text{RSCA} < +1$ , while it has comparative disadvantage if  $-1 < \text{RSCA} < 0$ .

Vollrath (1991) proposes three alternative specification of the revealed comparative analysis. These are the *relative trade advantage* (RTA), the logarithm of the *relative export advantage* (ln RXA) and *the revealed competitiveness* (RC).

The *relative trade advantage* (RTA) is calculated as the difference between *relative export advantage* (RXA) and *relative import advantage* (RMA). RXA is equivalent to the BI. The RTA can be expressed as follows:

$$(3) \quad RTA = RXA - RMA$$

Where

$$RXA = RCA = \frac{X_{ik}}{X_i} \bigg/ \frac{X_{wk}}{X_w}$$

and

$$RMA = \frac{M_{ik}}{M_i} \bigg/ \frac{M_{wk}}{M_w}$$

Therefore,

$$(4) \quad RTA = \frac{X_{ik}}{X_i} \bigg/ \frac{X_{wk}}{X_w} - \frac{M_{ik}}{M_i} \bigg/ \frac{M_{wk}}{M_w}$$

The second alternate RCA definition is the logarithm of the *relative export advantage* (RXA), specified as;

$$(5) \quad \ln (RXA).$$

The third measure, *the revealed competitiveness* (RC) is defined as the difference between the logarithm of the RXA and the logarithm of the RMA, given as:

$$(6) \quad RC = \ln (RXA) - \ln (RMA)$$

Given the varied and alternate measures of the RCA suggested in the literature, the consistency of these measures has been questioned. Balance, Forstner and Murray (1987) examined the empirical consistency among alternative RCA indices. Correlation coefficients for alternative pairs of RCA indices were compared for examining the consistency among cardinal RCA measures. The results of the calculations show that alternative specifications of RCA indices give values that are highly inconsistent. Consequently, the choice of RCA index as a cardinal measure might be highly sensitive to the particular index used. Rank correlation coefficients were calculated to determine whether pairs of RCA indices give a consistent ranking of countries by the degree of comparative advantage. The results indicate a high degree of consistency among the net export indices and a moderate level of consistency with the others. The consistency tests for RCA indices as dichotomous measures reveal a generally high level of consistency.

Considering the limitations of the index, it is important that policy makers make cautious interpretation of the RCA indices. The analysis of the statistical characteristics of the RCA index can provide very useful information on the state and dynamics of a country's advantage in international trade (De Benedicts and Tamberi, 2001). More so, it is important to note that, government policies and interventions like import restriction, export subsidies and other protectionist measures might distort the true reflection of comparative advantage or disadvantage revealed (Ferto and Hubbard, 2003).

Despite the limitations of the RCA index, it still can be useful in providing a systematic framework for comparing specialization patterns across countries. This information can offer invaluable insight into trade experiences of countries at advanced stages and which will help in trade development strategies formulation (Leung and Cai, 2005). Taking into consideration the limitations and the problems presented when using the RCA as a cardinal measure of comparative advantage, the study focuses on the ordinal trends of revealed comparative advantage.

### 3.2 Market Share Index

The competitiveness and competitive position of a product on the market is amply reflected in the product's market share. This index measures the ability of an exporting country to increase its market share in the target market with respect to countries exporting the same product to the same target market. The index is measured by the following formula:

$$(7) \quad MS_{ik} = \frac{X_{ik}}{M_i} * 100$$

Where

$MS_{ik}$  = is market share of product  $k$  by country  $i$  in the target market,

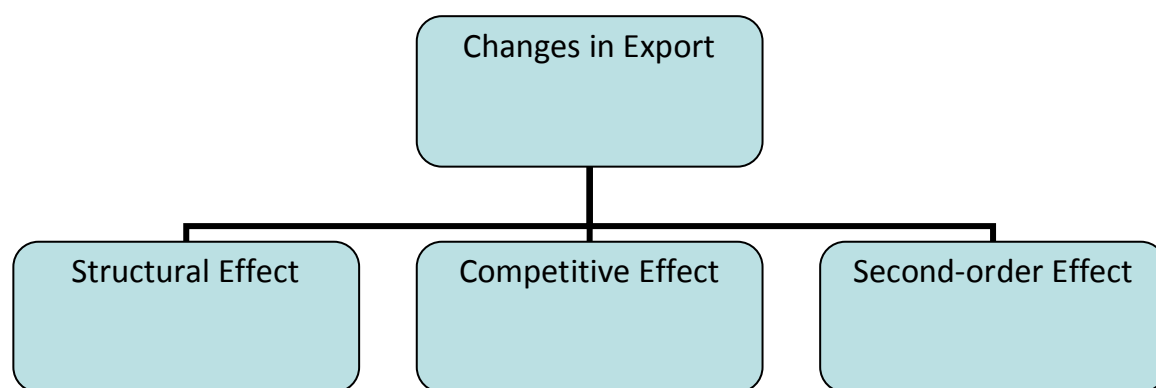
$X_{ik}$  = the total export of good  $k$  by country  $i$  to the target market

$M_k$  = the total import of product  $k$  by area or region constituting the target market

Even though, changes in the market share are not totally attributable to changes in competitiveness, the index nevertheless provides an accepted indication of the exporting country's or region's competitiveness in relation to the export market (Chen and Duan, 2001). The main advantage of this index is that is it easy to calculate and perceive. It provides simple but useful information for evaluating the international competitiveness of a country or a firm.

### 3.3 Constant Market Share (CMS) Model

To infer competitiveness from changes in exports, the CMS model is applied. The CMS analysis, also called the “shift-share” analysis, is used to decompose the changes in export value. The model was first applied to the study of international trade by Tyszynski (1951). The model is used to identify factors or components that could cause changes in a country’s export share overtime. The CMS analysis can be applied as a descriptive or diagnostic tool (Ahmadi-Esfahani, 2006). The basic model provides a two-level decomposition of changes in export. Chen and Duan (2001) explains, in the first level, the CMS model decomposes the changes in export into three factors: changes in export related to changes in the export market (structural effect), changes in exports due to changes in competitiveness of the exporting country (competitive effect) and change in export as a result of the combined effect of structural and competitiveness (second-order effect). This is illustrated in Figure 4.



**Figure 4: The decomposition of changes in export (CMS Model)**

Source: Chen and Duan (2001)

At the second level decomposition, the structural effect is further decomposed into the growth effect, the market effect, the commodity effect and the interaction effect; the competitive effect is decomposed into the general competitive effect and the specific competitive effect;

and the second-order effect is broken into the pure second-order effect and the dynamic structural effect. This study will be restricted to the first level of CMS analysis.

The first-level CMS analysis in this study uses a version provided by Chen and Duan (2001).

$$(8) \quad \Delta q = \underbrace{\sum_i \sum_j s_{ij}^0 \Delta Q_{ij}}_{\text{Structural Effect}} + \underbrace{\sum_i \sum_j Q_{ij}^0 \Delta s_{ij}}_{\text{Competitive Effect}} + \underbrace{\sum_i \sum_j \Delta s_{ij} \Delta Q_{ij}}_{\text{Second-order Effect}}$$

Where,

$q$  = exporting country's export (value)

$S_{ij}$  = exporting country's market share of product  $i$  market  $j$

$Q_{ij}$  = total import of product  $i$  by market  $j$

$\Delta$  = change in the two periods,

The superscript 0 represent the base year.

Merkies and van der Meer (1988) related the CMS method to a two-stage homothetic demand model. They derived that the competitiveness term is a supply term and the structural or market term as a demand term.

Houston (1967), Richardson (1971a) and Richardson (1971b) have questioned the theoretical foundation and policy relevance of the CMS technique but De Lomabaerde (1995) argues that, the practical usefulness of the CMS technique far outweigh the points raised by critics of the method. The main advantage of the CMS method is that, it presents a very simplified method for examining export growth.



### 3.4 Determinants

An empirical analysis of the factors that affect the market share of Ghana is conducted using the Armington trade model. The trade model developed by Armington (1969) distinguishes commodities by country of origin and import demand is determined in a two-step procedure. Such that, for example, Ghanaian canned tuna is distinguished from canned tuna imported from Thailand and the two products would represent two imperfectly substitutable products on EU market.

The basic assumptions underlying the Armington model are; separability between different import sources and homotheticity of import demands. The implications of weak separability relate to the potential substitution effect among commodity groups (Alston *et al.* 1990). Thus, the elasticity of substitution between two competing products on a market, are the same and constant. The assumption of homotheticity implies that the market share of a country is independent of group expenditure. As a result, all expenditure elasticities are identical and unitary and a country's import market shares vary only in response to relative price changes.

The model is specified either in the quantity market share or expenditure market share form. In this study, the quantity market share form is adopted. The model is specified as:

$$(9) \quad q_i/Q = b_i^\sigma (p_i/P)^{-\sigma} \quad i = 1, 2, \dots, m$$

Where:

$Q = \sum_{i=1}^m q_i$  is total import for commodity in question

$q_i$  = the quantity imported from country  $i$

$P$  = import price index =  $\sum_{i=1}^m (q_i / Q) p_i$ , is the trade weighted price of the commodity

$\sigma$  = the target market elasticity of substitution for the commodity in question

$b_i$  = country specific parameter

$q_i/Q = M_i$ , the quantity market share of the commodity from country  $i$  the destination market

Equation (9) can be specified in log-linear functional form as:

$$(10) \quad \ln M_i = \alpha - \sigma \ln (p_i/P), \text{ the variable } \alpha \text{ is the constant term.}$$

The Armington model has received a barrage of criticism in recent years (Davies and Kruse, 1993; Alston *et al.* 1990; Winter, 1984). Alston *et al.* (1990) and Winter (1984) tested the separability and homotheticity assumptions of the Armington model. The empirical results rejected the assumptions in both cases. Winter (1984) advocates for the adoption of more sophisticated models such as the AIDS model (Deaton and Muellbauer, 1980), which allows for greater generality and flexibility in factoring in the expenditure and substitution effects on demand even if separable import allocation models are to be used. However, Alston *et al.* (1990) argues that, the use of such parametrically more generous specification (such as the AIDS model) amounts to taken on an increased risk of getting the wrong signs in exchange for the main advantages the Armington model offers. They further argue that, the misspecification of the AIDS is also possible.

Notwithstanding, the criticism of the Armington model, it presents a useful tool for trade modeling. The main advantage of the model is its relatively ease of use and few parameters to be estimated, while at the same time maintaining compatibility with demand theory (Alston *et al.* 1990). The linear form of the model allows for modifications to the basic form to account for other factors such exchange rate, trend, dummy variables etc. The extensive application of model to international agricultural markets and adoption in Computable General equilibrium (CGE) models stems from the plausible and statistically significant parameter estimates the model often gives (Alston *et al.* 1990).

## 4: Data

The main data source for this thesis is the Eurostat database. For the index calculations and the analysis of specialization and competitiveness, yearly data on import values and quantity of canned tuna as well total imports (all products) into the EU-27 for the period of 1999-2009 were extracted. However, for the regression analysis to determine the factors influencing Ghana's market share, monthly rather than yearly observations covering the same period (1999 - 2009) were used. This is to avoid the problems associated with a small degree of freedom. The dataset for the regression analysis has 132 observations.

### 4.1 Product

The product under consideration is canned tuna. The data for the analysis were taken at the 8 digits Combined Nomenclature (CN). The products forming canned tuna are covered by CN codes given in the table below:

**Table 2: CN codes for canned tuna products.**

CN Code	Description
16041410	prepared or preserved tuna and skipjack, whole or pieces (excluding minced)
16041411	tuna and bonito sarda spp, prepared or preserved whole or pieces in vegetable oil (excluding minced fish)
16041418	prepared or preserved tunas and skipjack excluding, fillets known as "loins" and such products in vegetable in oil
16042070	prepared or preserved tuna skipjack or other fish of genus euthynnus (excluding whole or pieces)

We considered for the analysis only data on the product coded; 16041418 as it is the most dominant form both for Ghana and the competitor countries.

## 4.2 Price

Dataset on prices were constructed by dividing the value of import by the quantity imported derived from the eurostat database, in a euro per 100 kg unit of measurement. We include in the regression model, relative price index as an explanatory variable.

## 4.3 Exchange rate

Theoretically we know that, the currency depreciation of the domestic currency (appreciation of the foreign currency against the local currency) makes domestic products cheaper relative to its competitors in the international market. This will increase foreign demand resulting in increased export market share, *ceteris paribus*. By implication, a depreciation of the Ghana cedi relative to its competitors is expected to increase the competitiveness of Ghanaian canned tuna export in the EU market. In line with this theory, bilateral exchange rate variable was included in the model as an explanatory variable for changes in Ghana's market share.

Historical data on the exchange rate between the Euro currency (EUR) and the Ghanaian Cedis (GHS) were obtained from [www.oanda.com](http://www.oanda.com), an internet - based forex trading and currency information service. Monthly average Euro/ Cedi (EUR/GHS) inter-bank exchange rates were obtained. Figures for the Ghana cedi (GHC) prior July, 2007 were divided by 10,000 in order to have amounts equivalent to the new Ghana cedi (GHS).<sup>1</sup>

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<sup>1</sup> The Bank of Ghana re-denominated cedi currency in July 2007. The new currency numeraire was set at 10,000 old Ghana cedi (10,000 GHC) to 1 new Ghana cedi (1 GHS)

#### 4.4 Policy Effect (WTO mediation)

Trade analyst have suggested that opening of reduced tariff quota for Philippines and Thailand in July 2003 following the WTO mediation between the EU and the two countries could impact negatively upon the competitive advantage of ACP exporting countries by eroding the gains of the preferential access treatment enjoyed under ACP- EU partnership agreement. These sentiments are aptly captured in the resolution passed by ACP-EU Joint Parliamentary Assembly in April 2003. Part of which reads “*having regard to the mediation within the WTO regarding a reduction in customs duties for canned tuna exported by Thailand and the Philippines and the mediators' proposal which has been forwarded to the European Commission calls on the EU to*” among other things “*refrain adopting the mediators proposal*”

This assertion is empirically tested by including a dummy variable as an explanatory factor for changes in Ghana’s market share to capture the effect of this policy. The dummy variable takes the value of zero (0) for the period prior to July 2003 and 1 thereafter. A method proposed by Halvorsen and Palmquist (1980) was used to interpret the effect of the dummy variable. The percentage effect on the dependent by the factor represented by the dummy variable is given as  $100 * g = 100 * \{ \exp(c) - 1 \}$  where the relative effect on the dependent variable is  $g = \exp(c) - 1$  and  $c$  is the coefficient of the dummy variable obtained from the regression results.

## 4.5 Descriptive Statistics

(Table 3), the value of canned tuna export from Ghana has increased by 33% from 44,067,246 euro in 1999 to 58,574,331 EUR in 2009. On the other hand, Thailand and Ecuador have increased their export value by a substantial 52% and 167% respectively, whereas, Madagascar's export value increased by 8% over the same time span. Conversely, the value of export from Cote d'Ivoire decreased by a significant 37%.

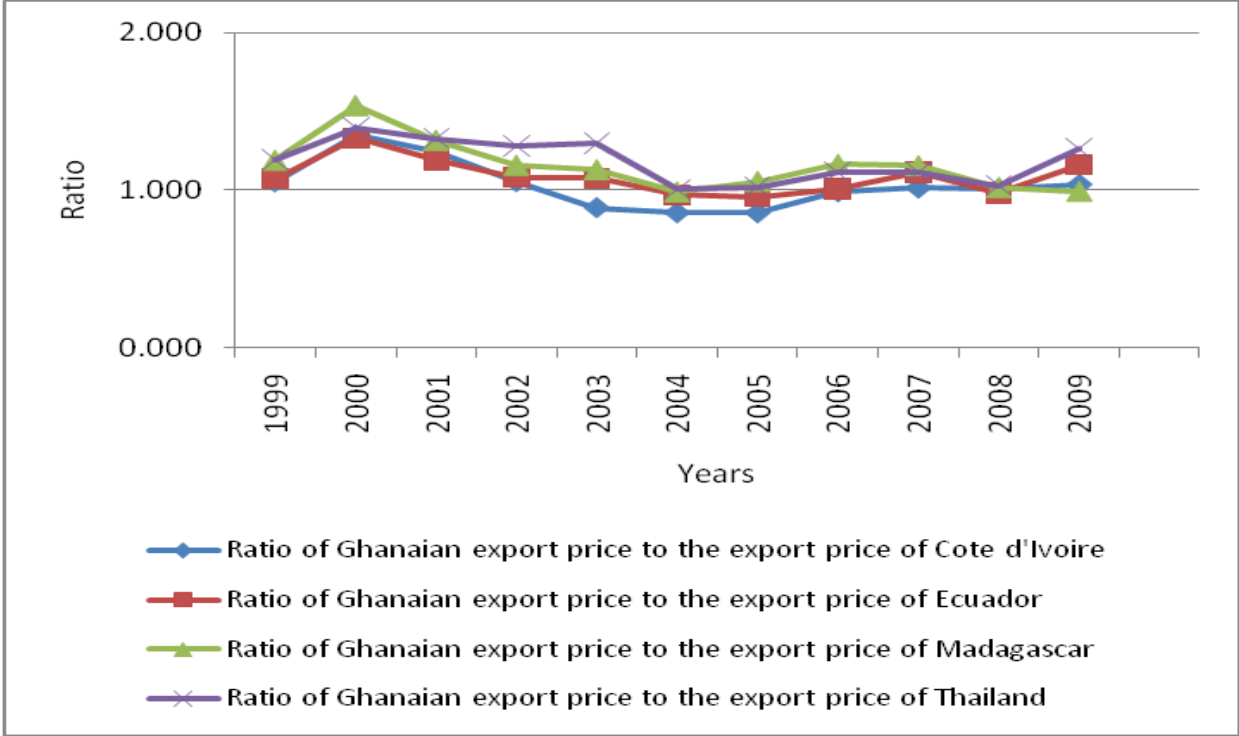
(Table 4), in terms of volume (quantity), Ghana's share of the market increased by a marginal 7% from 172,015 tonnes in 1999 to 183,388 tonnes in 2009 whereas, the volume of export from Thailand and Ecuador increased by 29% and 131% over the same period respectively. On the other hand, Cote d'Ivoire and Madagascar's volume share decreased by 51% and 28% apiece. (Table 4) below, provides a descriptive statistical summary of annual import of canned to the EU-27 market.

**Table 5: Descriptive Statistics of annual import of canned to the EU-27: (1989 -2009)**

		<b>Ghana</b>	<b>Cote d'Ivoire</b>	<b>Ecuador</b>	<b>Madagascar</b>	<b>Thailand</b>
Value of Import in €	Average	50,065,557	66,770,802	63,223,320	23,607,707	69,192,784
	Standard deviation	6,511,053	15,988,266	33,904,427	7,151,264	18,266,636
	Minimum	41,065,125	45,536,626	27,546,741	13,562,039	39,507,860
	Maximum	58,943,380	98,438,880	148,311,071	33,094,021	93,397,073
Import qty in (1000 kg)	Average	193,366	266,230	256,353	107,164	311,377
	Standard deviation	23,481	72,454	108,743	41,287	66,503
	Minimum	155,041	155,175	119,637	58,705	192,568
	Maximum	226,423	370,687	486,332	167,633	435,732
Price in €/1000kg	Average	261	255	241	229	221
	Standard deviation	39	29	30	43	31
	Minimum	195	212	201	186	178
	Maximum	319	309	305	322	291

The disparity between changes in value and quantity of import can be explained by changes in price. The percentage increase in the value of Ghana's export is not commensurable with the

increase in the volume of export. The percentage increment in the export value of Ghana was more than the increase in export quantity. This implies an increase in price over the period. Ghana’s export commands higher prices relative to the other countries. (Figure 5), show the ratio of Ghanaian export price to the export price of competitor countries over the period.



**Figure 5: Ratio of Ghanaian export price of canned tuna to the export prices of competitor countries, 1999-2009.**

The ratio has consistently being equal or above unity apart from 2003 -2005 when the ratio of Ghana to Cote d’Ivoire’s fell below unity.

## 5: Results and Discussion

### 5.1 Specialization

The results of the RCA analysis (Table 6 and Figure 6) shows that based on the dichotomous interpretation of the RCA index, Ghana as well as the other competitor countries have a RCA greater than 1; therefore have a comparative advantage in the export of canned tuna in all the period under study. Ghana made impressive stride in the growth of its RCA index from 1999 to 2001 coinciding with a similar trend in its market share over the same period before declining in 2002. Incidentally, Ghana's lost 3.8% of its market share at the same time that the RCA dropped. Ecuador experienced a similar trend in its RCA index growth. Cote d'Ivoire, Madagascar and Thailand on the other hand, experienced unstable trend of their RCA indices over the same period.

In terms of the ordinal interpretation of the RCA, Ghana ranked first, with an average RCA index of 92.15 over the period 1999-2001. Cote d'Ivoire, Madagascar, Ecuador and Thailand ranked, second, third, fourth and fifth with RCA of 72.59, 61.27, 60.81 and 8.59 respectively over the same period.

Over the period 2002- 2005, Ghana's RCA index made a steady increase from 74.4 in 2002 to 109.45 in 2005. Ecuador enjoyed a consistent increase in its RCA index, moving from 63.85 in 2002 to 108.61 in 2005. Cote d'Ivoire and Thailand experienced unstable trend, nevertheless, Thailand's RCA index increased from 8.99 in 2002 to 13.47 in 2005 but that of Cote d'Ivoire declined. Madagascar made an impressive gain in its RCA index, taking an "Olympic jump" from 94.12 in 2002 to 163.56 in 2005.

In terms of ranking, Ghana dropped to the second position with an average RCA index of 90.68 following first placed Madagascar with 124.97. Ecuador, Cote d'Ivoire and Thailand ranked third, fourth and fifth with 84.87, 59 and 8.91 respectively. Between the two periods



(1999- 2001 and 2002-2005), the RCA index of Ghana and Cote d'Ivoire declined while the index of Madagascar, Ecuador and Thailand increased.

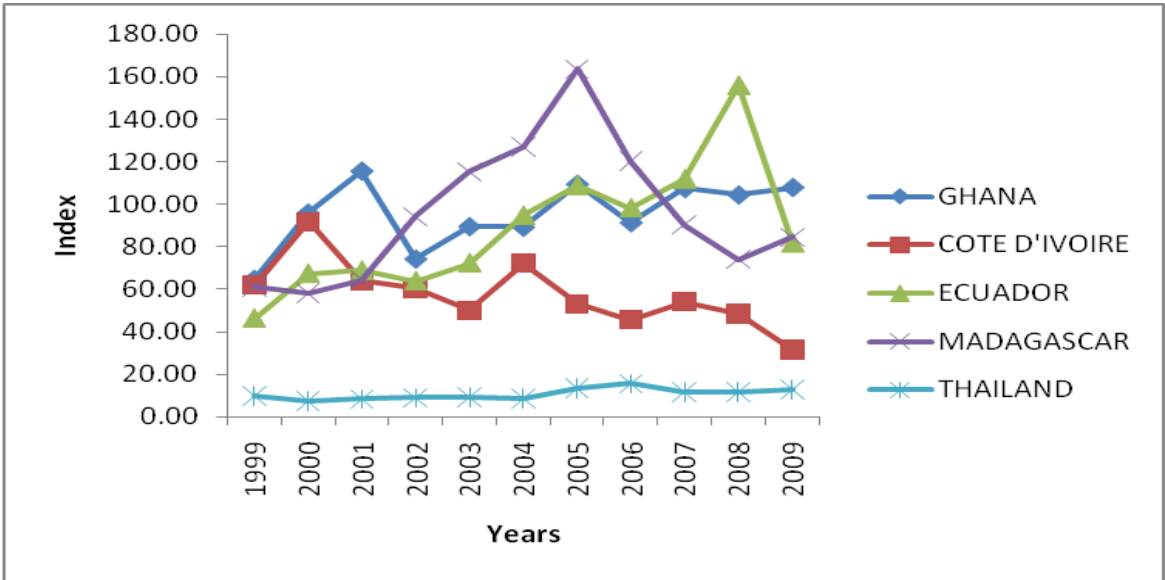
In the last four years of the study period (2006-2009), Ghana continued to experience a general upward trend in its RCA index, increasing from 91.43 in 2006 to 107.94 in 2009. The story was different for Cote d'Ivoire, Ecuador, Madagascar and Thailand. These countries suffered a decline in their RCA index. The RCA index decreased from 45.76, 98.20, 120.46 and 15.66 in 2006 to 31.61, 81.64, 84.43 and 12.78 in 2009 for Cote d'Ivoire, Ecuador, Madagascar and Thailand respectively. The sudden nose dive of Madagascar's RCA index is very noticeable and remarkable.

Interpreting the RCA index as ordinal measure, the results of the analysis shows that, for the period 2006-2009, Ghana maintained its second place position with an RCA index of 102.82. Madagascar lost its previously held (2002-2005) first placed position to Ecuador (RCA index of 111.84), placing third with an RCA index of 92.33. Cote d'Ivoire and Thailand maintained their fourth and fifth positions with 44.99 and 12.87 respectively.

Overall analyzing the trend in RCA index in terms of averages between the three sub-periods, Ghana has maintained a high RCA index throughout the study, indicating a high level of comparative advantage in the export of canned tuna. Ghana's RCA index has increased between the periods 2002-2005 and 2006-2009. Nevertheless, it is significant to note that, it is only Ecuador and Thailand that have successfully and consistently increased their RCA index over the three sub-periods. The story is different for the ACP exporting countries, Ghana, Cote d'Ivoire and Madagascar. Ghana's RCA decreased between the first and second period and bounced back between the second and third periods. Cote d'Ivoire and Madagascar have experienced a steady decrease between all periods.

**Table 6: Revealed comparative advantage (RCA) from 1999 - 2009**

Year	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	64.88	61.95	46.25	61.27	9.98
2000	95.96	91.65	67.37	58.15	7.39
2001	115.63	64.17	68.82	64.40	8.39
2002	74.40	60.70	63.85	94.12	8.99
2003	89.59	50.04	72.33	115.28	9.17
2004	89.27	72.23	94.69	126.92	8.56
2005	109.45	53.08	108.61	163.56	13.47
2006	91.43	45.76	98.20	120.46	15.66
2007	107.47	54.16	111.74	90.37	11.51
2008	104.43	48.43	155.79	74.05	11.52
2009	107.94	31.61	81.64	84.43	12.78

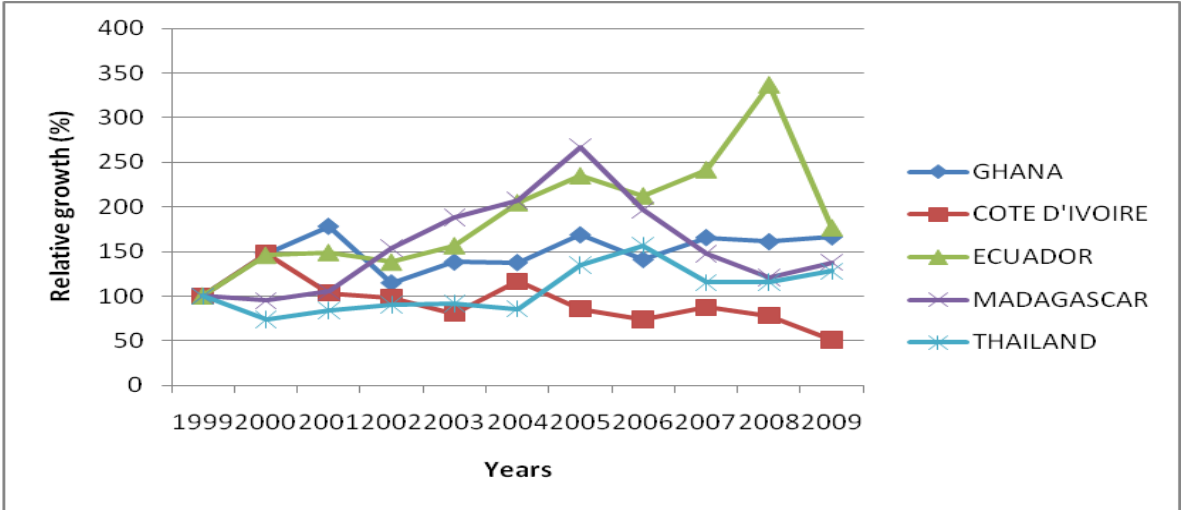


**Figure 6: Revealed comparative advantage (RCA) from 1999 - 2009**

In relative terms, setting 1999 = 100, Ghana’s RCA index has increased by 66% in 2009, compared to 77%, 38%, 28% increase and a negative growth of 49% for Ecuador, Madagascar, Thailand and Cote d’Ivoire respectively. This is shown in Table 7 and Figure 7

**Table 7: Relative growth in Revealed Comparative Advantage (RCA) 1999=100**

Year	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	100	100	100	100	100
2000	148	148	146	95	74
2001	178	104	149	105	84
2002	115	98	138	154	90
2003	138	81	156	188	92
2004	138	117	205	207	86
2005	169	86	235	267	135
2006	141	74	212	197	157
2007	166	87	242	147	115
2008	161	78	337	121	115
2009	166	51	177	138	128



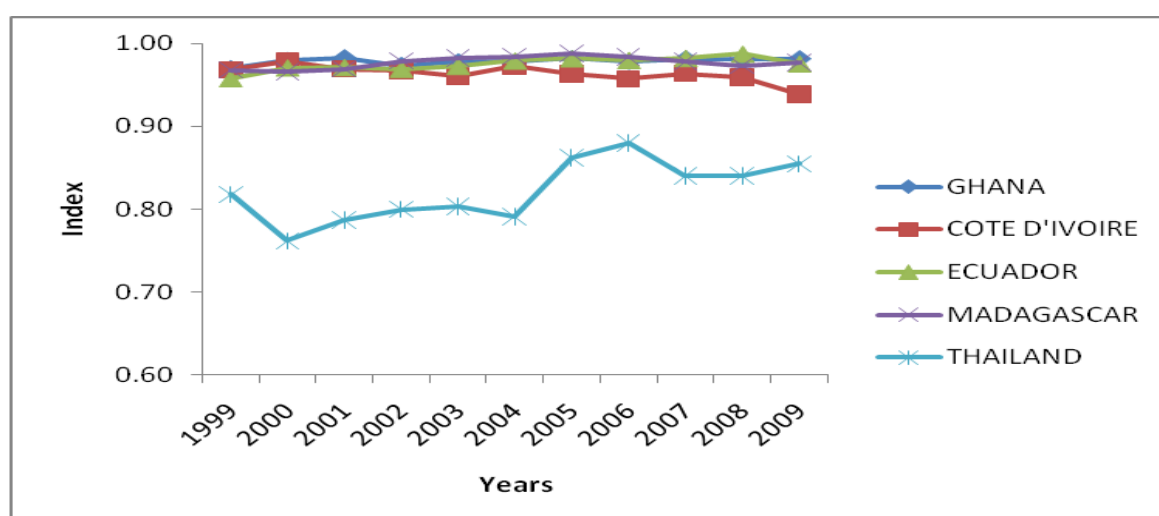
**Figure 7: Relative growth in Revealed Comparative Advantage (RCA) 1999=100**

Ghana’s growth rate comes second after Ecuador. The performance of Ghana reflects a high of specialization over the study period.

For purposes of comparison, we computed the RSCA index to assess the comparative advantage or disadvantage of the canned tuna exporting countries. The results of RSCA analysis provided in (Table 8 and Figure 8) show that all the countries have an RSCA index greater than zero and as such have comparative advantage in exporting canned tuna into the EU market. It is revealing to note that, unlike the RCA index, there is no wide disparity between the indexes of the various countries. The RSCA index show that, all the countries have almost the same index value (close to unity) apart from thailand that has an RSCA clearly below the other countries throughout the study period.

**Table 8: Revealed symmetric comparative advantage (RSCA) from 1999 - 2009**

Year	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	0.97	0.97	0.96	0.97	0.82
2000	0.98	0.98	0.97	0.97	0.76
2001	0.98	0.97	0.97	0.97	0.79
2002	0.97	0.97	0.97	0.98	0.80
2003	0.98	0.96	0.97	0.98	0.80
2004	0.98	0.97	0.98	0.98	0.79
2005	0.98	0.96	0.98	0.99	0.86
2006	0.98	0.96	0.98	0.98	0.88
2007	0.98	0.96	0.98	0.98	0.84
2008	0.98	0.96	0.99	0.97	0.84
2009	0.98	0.94	0.98	0.98	0.85



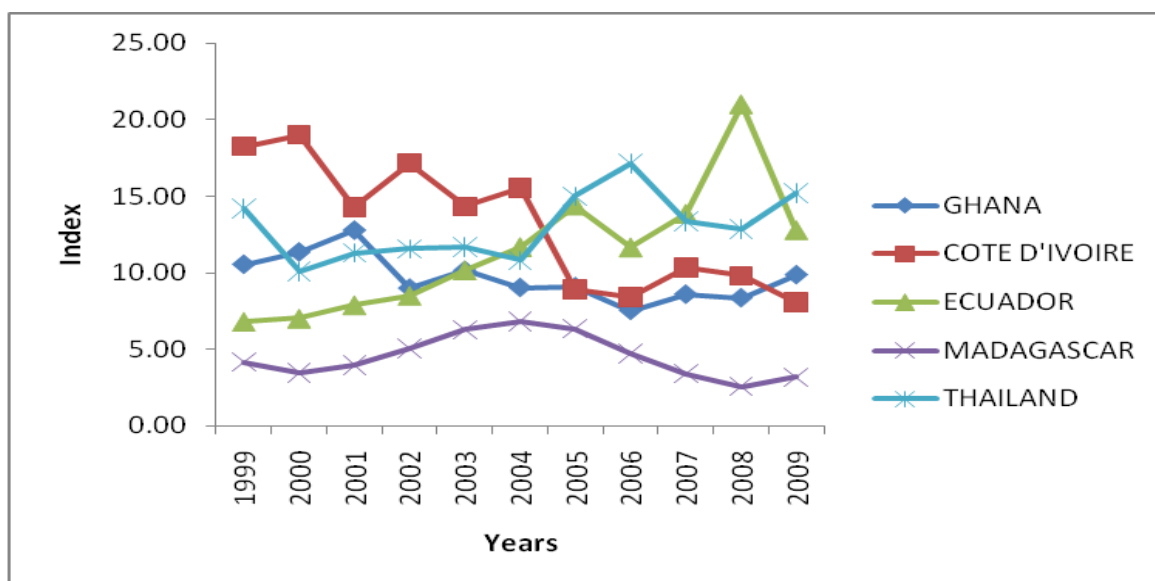
**Figure 8: Revealed symmetric comparative advantage (RSCA) from 1999 - 2009**

## 5.2 Competitiveness

The competitiveness of Ghana's export and that of competing countries measured by its market share (value) is presented in (Table 9 and Figure 9). Ghana's market share has generally been on the increase from 2006 to 2009. Prior to this period, Ghana's market share has generally been on the decline after reaching an all time high in the year 2001. Ghana's market share dropped sharply after this year. Reasons for this are not clear but probably this can be explained by the 43% drop in total production of tuna from the year 2001 to 2002. Ecuador has enjoyed such an impressive increase in its market share right from 1999 apart from the setback it suffered in 2005 to 2006 and the sharp fall in 2009. Cote d'Ivoire's market share has been very undulating after dominating the market from 1999 to 2004. Perhaps the successful negotiation of reduced tariff opened for Thailand in 2003 has affected the competitive position of Cote d'Ivoire. A similar trend can be ascribed to Madagascar. It is remarkably to note that, Thailand's market share has gone up by 4.4% comparing 2004 to 2009 figures. On the other hand, Ghana and Ecuador gained a marginal increase of 0.84% and 1.1% respectively, with Cote d'Ivoire and Madagascar losing a significant 7.5% and 3.6% respectively over the same timespan.

**Table 9: Market Share (Value) of canned tuna exporting countries to the EU-27: 1999 – 2009**

Year	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	10.53	18.25	6.82	4.17	14.20
2000	11.34	19.01	7.03	3.46	10.08
2001	12.75	14.27	7.90	3.98	11.29
2002	8.98	17.16	8.52	5.08	11.56
2003	10.13	14.32	10.17	6.28	11.66
2004	9.02	15.51	11.70	6.79	10.82
2005	9.07	8.90	14.40	6.35	14.99
2006	7.53	8.43	11.68	4.74	17.13
2007	8.58	10.33	13.87	3.42	13.37
2008	8.35	9.81	21.00	2.57	12.85
2009	9.85	8.05	12.80	3.18	15.21



**Figure 9: Market Share (Value) of canned tuna exporting countries to the EU-27: 1999 – 2009**

Analyzing the changes in market share value from another perspective, the average market shares of the periods 1999 – 2001, 2002 – 2005 and 2006 – 2009 are compared. The results are presented in (Table 10). The average market share of Ghana has seen a steady decline throughout the three periods. The same can be said for Cote d’Ivoire. Madagascar increased its average market share value from 1999 – 2001 to 2002-2005 but it experience a decline from 2002- 2005 to 2006-2009. On the other hand, the average market share value of Ecuador and Thailand has increased steadily.

**Table 10: Average Market Share (Value), 1999 -2001, 2002 - 2005 and 2006-2009**

Column1	Ghana	Cote d' Ivoire	Ecuador	Madagascar	Thailand
1999- 2001	11.54	17.18	7.25	3.87	11.86
2002- 2005	9.30	13.98	11.20	6.12	12.26
2006- 2009	8.58	9.16	14.84	3.48	14.64

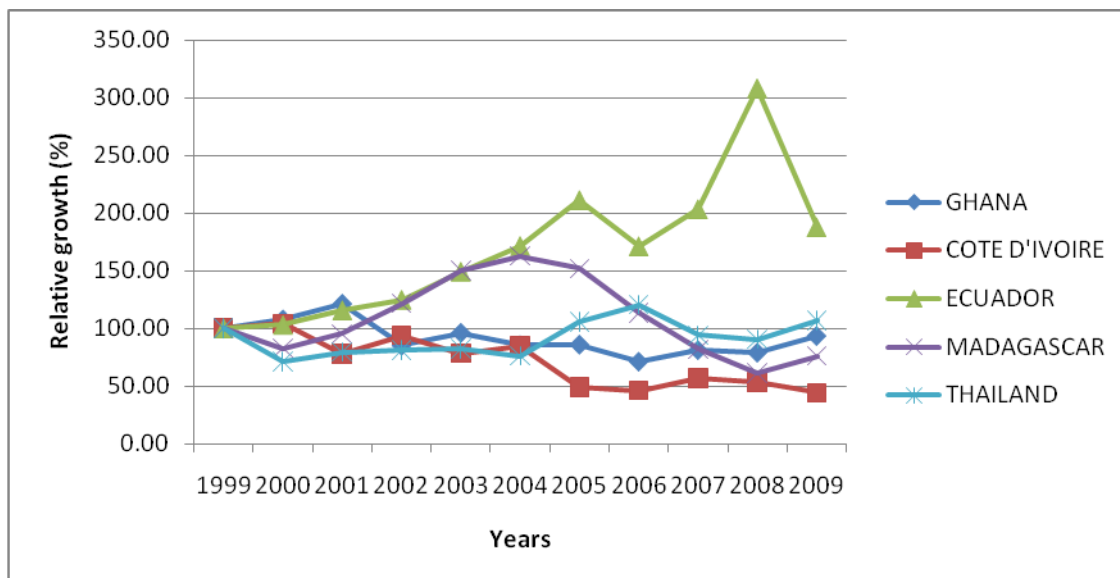
Ghana and Cote d’Ivoire have lost a significant 3% and 8% of their market share value from 1999-2001 to 2006-2009 respectively. Madagascar barely managed to keep its market share, suffering a decrease of 0.4%. On the other hand, Thailand and Ecuador increased their market share between the two periods, gaining 2.8% and 7.6 % respectively.

It is significant to note that, all ‘losers’ are ACP countries. It appears the ACP countries are losing their share of the market to Ecuador and Thailand. On a balance, the ACP countries altogether lost 11.4% of their market share between 1999-2001 to 2006-2009, whereas Ecuador and Thailand together gained 10.37% representing about 91% of the lost by Ghana, Cote d’Ivoire and Thailand. Of this figure, the gain in market share value by Ecuador and Thailand represents 67% and 24% respectively.

In relative terms, setting 1999 = 100, Ghana’s market share value has decreased by 6.42 % in 2009. Cote d’Ivoire and Madagascar’s share of the market, decreased by a significant 55.88% and 23.78% respectively. On the other hand, Ecuador and Thailand market shares value increased by a significant 87.67% and 7.15% respectively over the same period. The relative growth in value market share is presented in Table 11 and Figure 10

**Table 11: Relative growth in Market Share (Value) 1999=100**

Year	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	100.00	100.00	100.00	100.00	100.00
2000	107.68	104.15	103.06	82.93	71.02
2001	121.11	78.15	115.76	95.36	79.52
2002	85.27	94.01	124.89	121.66	81.43
2003	96.25	78.46	149.11	150.40	82.14
2004	85.65	84.99	171.47	162.78	76.17
2005	86.17	48.77	211.13	152.05	105.59
2006	71.52	46.19	171.15	113.46	120.61
2007	81.47	56.58	203.26	81.94	94.14
2008	79.29	53.73	307.86	61.58	90.53
2009	93.58	44.12	187.67	76.22	107.15



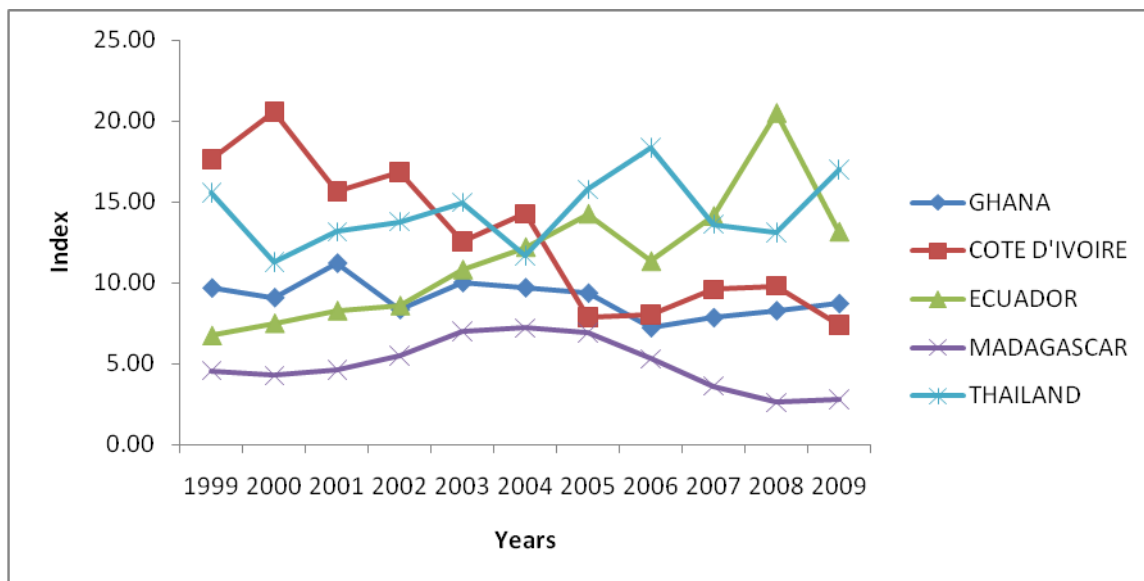
**Figure 10: Relative growth in Market Share (Value) 1999=100**

In terms of quantity market share (Table 12 and Figure 11), the trends are similar to the value market share. Ghana's quantity share of the market has decreased from 9.67% in 1999 to 8.71% 2009, a loss of 0.96% of its share. Similarly, Cote d'Ivoire and Madagascar have also lost 10.27% and 1.42% of their quantity market share respectively. Conversely, Ecuador and Thailand have gained 6.41% and 1.42% apiece.

**Table 12: Market Share (quantity) of canned tuna exporting countries to the EU-27: 1999 – 2009**

YEAR	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	9.67	17.64	6.73	4.56	15.57
2000	9.08	20.56	7.49	4.26	11.28
2001	11.19	15.62	8.27	4.60	13.16
2002	8.36	16.82	8.58	5.47	13.77
2003	10.01	12.56	10.80	7.00	14.96
2004	9.69	14.27	12.19	7.21	11.68
2005	9.35	7.86	14.25	6.90	15.78
2006	7.24	8.02	11.32	5.29	18.36
2007	7.86	9.58	14.11	3.62	13.62
2008	8.28	9.80	20.47	2.59	13.12
2009	8.71	7.37	13.14	2.79	16.99





**Figure 11: Market Share (quantity) of canned tuna exporting countries to the EU-27: 1999 – 2009**

In relative terms, setting 1999 = 100, the 2009 market share figure, represents a 9.93%, 58.20%, 38.85% decrease for Ghana, Cote d'Ivoire and Madagascar respectively. On the other hand, 2009 compared to the base year, the quantity market share of Ecuador and Thailand increased by 95.26% and 9.12% respectively.

This gives credence to the generally held suspicion that, Ghana and indeed all ACP countries are able to thrive in the market because of the preferential tariff treatment they enjoy and that without additional support, the granting of reduced tariff or the extension of preferential treatment to countries that fall outside the purview of the existing preferential trade agreements will impact negatively on the competitiveness of ACP exporting countries.

Judging by the operational definition of competitiveness as the ability of a product or sector to achieve and maintain a certain market share, Ghana, Cote d'Ivoire and Madagascar were not competitive. Ecuador and Thailand maintained and increased their market share values and can therefore be said, these two countries were competitive.

### 5.3 Constant Market Share (CMS) analysis

Using equation (8), a first level constant market share decomposition is conducted to explore the sources of changes in export. The whole study period is divided into three sub-periods, 1999-2001, 2002-2005 and 2006-2009. The average export values were computed for each sub -periods and compared. 1999 -2001 was compared with 2002- 2005, such that 1999- 2001 was considered the base year and 2002- 2005 the current year. Similarly, the 2002- 2005 was compared with 2006- 2009 and the two sub- periods considered as base and current year respectively. A summary of the computations and the decomposition procedure is presented in Table 13.

**Table 13: CMS decomposition procedure**

Countries	Period	q (€)	Q (€)	s	$\Delta s$	$\Delta Q$ (€)
<b>Ghana</b>	1999-2001	48,835,302	421,828,195	0.116		
	2002-2005	48,534,252	522,140,097	0.093	-0.023	100,311,902
	2006-2009	52,519,552	611,608,264	0.101	0.008	89,468,168
<b>Cote D'ivoire</b>	1999-2001	71,941,699	421,828,195	0.171		
	2002-2005	73,377,256	522,140,097	0.141	-0.030	100,311,902
	2006-2009	56,286,174	611,608,264	0.092	-0.049	89,468,168
<b>Ecuador</b>	1999-2001	30,680,727	421,828,195	0.073		
	2002-2005	58,013,090	522,140,097	0.111	0.038	100,311,902
	2006-2009	92,840,496	611,608,264	0.152	0.041	89,468,168
<b>Madagascar</b>	1999-2001	16,383,432	421,828,195	0.039		
	2002-2005	31,776,034	522,140,097	0.061	0.022	100,311,902
	2006-2009	20,857,585	611,608,264	0.034	-0.027	89,468,168
<b>Thailand</b>	1999-2001	50,110,301	421,828,195	0.119		
	2002-2005	63,978,427	522,140,097	0.123	0.004	100,311,902
	2006-2009	88,719,003	611,608,264	0.145	0.023	89,468,168

The results of the CMS decomposition of the change in export values to the EU-27 from 1999 to 2009 for Ghana and the competitor countries are provided in Table 14. Between the first two sub-periods, 1999- 2001 and 2002- 2005, all countries except Ghana increased their export values with Ecuador being the largest gainer. Ghana lost about 300, 000 euro of its export value, which equated to 2% decrease in its market share. Cote d'Ivoire, Ecuador, Madagascar, and Thailand increased their export value by 1.4 million, 27.3 million, 15.3 million and 13.8 million euro respectively. In contrast, the EU- market value increased by over 100 million euro over the same period. The first level CMS decomposition show that, the contribution of structural effect to the increase in export value was 1191%, 26%, 86% and 25.3% for Cote d' Ivoire, Ecuador, Thailand and Madagascar respectively. The contribution of structural effect to the changes in Ghana's export value was positive, however the gains from the growth of the market was offset by the negative effects of the other components.

In terms of competitiveness, the contribution of the competitive effect to the increase in export was positive for Ecuador, Thailand and Madagascar, while for Cote d'Ivoire it contributed negatively. Madagascar was the strongest competitor with 60.3% of the increase in export value attributed to competitive effect, followed by Ecuador and Thailand with 59.2% and 11% respectively. On the other hand, the competitive effect contributed massively (3197%) to the decrease in Ghana's export value. In actual terms, Ghana's export value was reduced by over 9.6 million euro due to the negative competitive effect.

Over all, between the two sub-periods (1999-2001 and 2002-2005) Ghana made a poor showing in terms competitiveness compared to the other countries. Reasons for this are not obvious, but the effects of exchange rate movements cannot be ruled out.

**Table 14: Results of CMS decomposition of the change in export value**

Countries	Decomposition	1999-2001 compared to 2002-2005		2002-2005 compared to 2006-2009	
		Value (€)	%	Value (€)	
<b>Ghana</b>	change in total export	-301,050	100.0	9,764,814	100.0
	Structural effect	11,613,169	-3857.6	8,316,294	85.2
	Competitive effect	-9,625,297	3197.2	765,643	7.8
	Secondary effect	-2,288,922	760.3	682,877	7.0
<b>Cote D'Ivoire</b>	change in total export	1,435,557	100.0	- 17,091,082	100.0
	Structural effect	17,107,933	1191.7	12,573,117	-73.6
	Competitive effect	-12,661,449	-882.0	- 25,324,818	148.2
	Secondary effect	- 3,010,927	-209.7	- 4,339,381	25.4
<b>Ecuador</b>	change in total export	27,332,363	100.0	34,827,406	100.0
	Structural effect	7,295,961	26.7	9,940,483	28.5
	Competitive effect	16,187,071	59.2	21,246,378	61.0
	Secondary effect	3,849,330	14.1	3,640,545	10.5
<b>Madagascar</b>	change in total export	15,392,601	100.0	- 10,918,449	100.0
	Structural effect	3,896,025	25.3	5,444,791	-49.9
	Competitive effect	9,287,890	60.3	- 13,969,568	127.9
	Secondary effect	2,208,686	14.3	- 2,393,671	21.9
<b>Thailand</b>	change in total export	13,868,125	100.0	24,740,576	100.0
	Structural effect	11,916,367	85.9	10,962,637	44.3
	Competitive effect	1,576,793	11.4	11,762,454	47.5
	Secondary effect	374,966	2.7	2,015,484	8.1

Between the second sub-period (2002- 2005) and the third sub-period (2006- 2009), the results of the CMS decomposition indicates that, Ghana, Ecuador and Thailand increased their export values, while the export values of Cote d' Ivoire and Madagascar declined. It is remarkably that Ghana came from a negative position in the previous period to increase its export share. The increase in export value yielded a marginal 0.7% increase in its market share lagging behind Ecuador and Thailand with 4% and 2.3% respectively. On the other hand, Cote d' Ivoire and Madagascar failed to increase their export and consequently suffered a decrease of 4.9% and 2.7% apiece.

Structural effect contributed to the increased in export by 85.2% and 28.5% and 44.3% for Ghana, Ecuador and Thailand respectively. It is clear that, the increase in Ghana's export was due mainly to the growth of the market. The contribution of the competitive effect to the increase in export was 7.8%, 61% and 47.5% for Ghana, Ecuador and Thailand respectively.

Although, the competitiveness of Ghana has improved, the changes in export are still mainly due to structural effect and it can therefore be said that, it is less competitive compared to countries like Ecuador and Thailand. It is insightful to note that; generally, ACP exporting countries have been less competitive compared to Ecuador and Thailand. Thailand has improved significantly on its competitiveness, from 11% between the first and second sub-periods to 47.5% between the second and third sub-periods. It is striking to note that, even in periods before the opening of the reduced tariff quota for Thailand and Philippines, Thailand had been competitive on the market.

On the contrary, Madagascar, a previously strong competitor has lost out on its competitiveness, Cote d' Ivoire's story is no different and Ghana has barely managed to increase its export value and competitiveness.

## 5.4 Regression analysis

We conduct an empirical analysis on the determinants of the Ghana canned tuna export using the quantity market share as the dependent variable. The Armington model provided in equation (9) is transformed into a log-linear functional form and estimated using the OLS. The model was estimated using the following extended form:

$$(10) \quad \ln MS = \beta_0 + \beta_1 \ln (p_i/P) + \beta_2 \ln ER + \beta_3 \ln RCA + \beta_4 DUM + \varepsilon$$

Where, MS is the Ghana's market share (quantity),  $\beta_0$  is the constant term,  $\beta_1$  is the coefficient of price ratio,  $\beta_2$  is the coefficient of exchange rate (EUR/GHS),  $\beta_3$  is the coefficient of the RCA index of Ghana, and  $\beta_4$  is the coefficient of the dummy variable to capture the effect of the opening of reduced tariff quota in July 2003 for Thailand and Philippines (The dummy variable takes the value of zero (0) for the period prior to July 2003 and 1 thereafter) and  $\varepsilon$  is the error- term.

*A priori*, a negative relationship between quantity market share and the price ratio, a negative relationship between market share and exchange rate (strengthening of local currency verses Euro currency) and a positive relationship with level of specialization (measured by the RCA) is expected. Data Shortage of monthly total tuna landings led to the omission of total landings as an explanatory variable. A 5% significance level is used to determine whether a coefficient is statistically significant.

The results of the regression analysis presented in (Table 15), indicates a high coefficient of determination ( $R^2$ ). About 72% of the total variation in Ghana's market share can be attributed to the variations in the explanatory variable and 28% to random variations. The Durbin-Watson (DW) statistics indicates the absence of autocorrelation in the model.

**Table 15: Results of the regression analysis**

Variables	Coefficients	t Stat	P-values
Intercept	-5.622*	-27.19	0.000
lnPR	-0.849*	-7.275	0.000
lnER	-0.120**	-1.846	0.018
ln RCA	0.740*	16.73	0.000
DUM	-0.228*	-3.134	0.000
<b>R Square</b>	<b>0.72</b>		
<b>DW</b>	<b>2.093</b>		
<b>Observations</b>	<b>132</b>		

\* denotes statistical significance at 5% level, \*\* 10% level

Data period 1999:1 – 2009:12

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In consonance with the general theory of demand, the price ratio coefficient carries a negative sign confirming the *a priori* expectation and it is statistically significantly different from zero. The coefficient of the price ratio indicates that demand for Ghanaian canned tuna is inelastic. This means that, a percentage increase in price will lead to less than proportionate decrease in quantity market share of Ghana. The effect of exchange rate on Ghana's quantity market share is also negative.

The relationship between the level of specialization (measured by the RCA index) is positive as expected and it is statistically different from zero. This implies that, as Ghana increases its comparative advantage or level of specialization in the export of canned tuna, its quantity market share will increase. The coefficient of the dummy variable, representing the effect of the opening of reduced tariff quota for Thailand and Philippines in July 2003 was negative and statistically significantly different from Zero. Using the method proposed by Halvorsen and Palmquist (1980), the percentage effect of this trade policy on the quantity market share of Ghana is calculated as 20.38%. This means, the quantity market share of Ghana has been reduced by 20.38% over the study period, as a result of this trade policy.

## 6: Conclusion

The performance of Ghanaian canned tuna export has been examined in the EU-27 market during the period 1999-2009. The analysis was based upon the indices of specialization and competitiveness. Ghana's performance was compared to the performance of Cote d'Ivoire, Ecuador, Madagascar and Thailand. The Constant Market Share (CMS) model was used to decompose the changes in export value. The Armington trade model is applied to determine the specific variables that affect the quantity market share of Ghana.

Results of the analysis have shown that, based on the RCA and RSCA indices, Ghana has a high level of specialization or comparative advantage in the export of canned tuna to the EU market. Similarly, all the competitor countries also have comparative advantage in the export of canned tuna. Based on the RCA analysis, the period 1999-2001 witnessed the best performance of Ghana in terms of ranking. Ghana witnessed a consistent increase in its RCA index over this period and was ranked first with an average RCA index of 92.15. Comparing 1999-2001 to 2002-2005, Ghana's RCA index decreased to an average of 90.68 but bounced back in 2006-2009 with an average of 102.82. In the periods 2002-2005 and 2006-2009 Ghana was ranked second. Overall, Ghana has performed well, increasing its average RCA index of 92.15 in 1999-2001 to 102.82 in 2006-2009. In relative terms, Ghana's RCA index has increased by 66%, 2009 compared to 1999 (base year). A key observation made here is that, it is only the non-ACP exporting countries (Ecuador and Thailand) that have witnessed consistent increase in their RCA index over the three sub-periods.

On examining the competitiveness of Ghana's canned tuna export, the market share index has illustrated that, Ghana has been less competitive compared to Ecuador and Thailand. Ghana's value market share has experienced a steady decline. Ghana has lost a significant 3% of its market share between 1999-2001 to 2006-2009. Cote d'Ivoire and Madagascar have also lost 8% and 0.4% of their market shares over the same period respectively. On the other hand, Ecuador and Thailand have gained 7.6% and 2.8% respectively and have been consistent in increasing their market shares between all periods. As per the operational definition of



competitiveness, Ghana can be said to be uncompetitive in the export of canned tuna. Again, it is striking to note that all “losers” are ACP exporting countries.

To buttress the point on Ghana’s uncompetitiveness, the CMS analysis shows that changes in the export values of Ghana can be attributed mainly to structural effects (growth of the market) and not to increased competitiveness. Between 2002-2005 and 2006-2009, the increase in Ghana’s export value was 9.7 million euro. Of this increase, 85.2% can be attributed to structural effect (growth of the market) and only 7.8% to competitive effect. On the contrast, competitive effect contributed 61% and 47.5% to the increase in the export value of Ecuador and Thailand respectively over the same period. Clearly, Ghana’s competitiveness in the export of canned tuna does not measure up to the performance of Ecuador and Thailand. For Cote d’Ivoire and Madagascar the contribution of competitive effect over this period was negative. Once again, Ecuador and Thailand have proved to be the strongest contenders compared to the ACP countries.

The results of the linear regression analysis indicate a negative and statistically significant relationship between the price ratio of Ghana and its quantity market share. The demand for Ghanaian canned tuna is inelastic. A 1% increase in price will lead to 0.85% decrease in quantity market share. The results also indicate a positive and significant relationship between the level of specialization (measured by the RCA index) and quantity market share. A 1% increase in RCA index will increase the quantity market share of Ghana by 0.74%. The effect of trade policy (the opening of reduced quota tariff for Thailand and Philippines in July 2003) was negative and significant on the quantity market share of Ghana. The percentage effect of the trade policy on the quantity market share of Ghana was a negative 20.38%. Similarly, the effect of bilateral exchange rate on the quantity market share of Ghana was negative and statistically significant at 10% level. By implication, a 1% appreciation in the value of the Ghana cedi against the Euro will decrease the quantity market share of Ghana by 0.12%. In terms of the level of impact by the explanatory variables on the quantity market share of Ghana, price is most important followed by the level of specialization (RCA). Future research should include tuna landings to capture the effect of local production on export.

This study has shown that, although Ghana has exhibited a high level of performance in terms of specialization it has failed to measure up in terms of competitiveness relative to the performance of especially Ecuador and Thailand. Both domestic and international market and trade policy factors could be the culprit. Overall, the ACP countries have been less competitive. The call for additional governmental and international support for countries exporting canned tuna under ACP-EU Partnership Agreement especially in the period after the granting of reduced tariff quota for Thailand and Philippines is in the right direction. Ghana and the other ACP countries should collectively through the ACP secretariat bargain for additional support to stem the losses from the preference erosion.

Ghana has a lot to learn from Ecuador and Thailand as far as competitiveness in exporting canned tuna is concerned. It will be interesting for future research to look at country-specific factors that have affected the competitiveness of these countries. A comparative study in this regard will be useful.

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#### Websites

[www.iccat.org](http://www.iccat.org)

<http://ec.europa.eu/trade>

[www.oanda.com](http://www.oanda.com)

## Appendix 1

**Table 1: Total production of tuna in East Atlantic and Ghana (1989 -2009) in MT**

Year	East Atlantic	Ghana	Ghana's %
1989	361043	31944	9
1990	422908	41270	10
1991	482708	38396	8
1992	433844	31164	7
1993	481010	37085	8
1994	491228	35980	7
1995	447410	33392	7
1996	428858	37127	9
1997	392589	51602	13
1998	410704	65209	16
1999	435158	83248	19
2000	388506	52546	14
2001	414708	88077	21
2002	334286	61279	18
2003	362989	56612	16
2004	365733	55681	15
2005	341827	76081	22
2006	315898	51308	16
2007	318410	63302	20
2008	326582	60906	19
2009	272858	64973	24

Source: Data from ICCAT

## Appendix 2

**Table 3: Annual import value of canned to the EU-27: (1989 -2009) in Euro currency**

Year	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	44,067,246	76,410,637	28,556,072	17,472,198	59,434,429
2000	44,414,191	74,487,499	27,546,741	13,562,039	39,507,860
2001	58,024,469	64,926,961	35,939,368	18,116,060	51,388,615
2002	51,489,092	98,438,880	48,871,121	29,127,984	66,319,162
2003	52,332,021	73,967,385	52,532,156	32,420,705	60,231,779
2004	43,917,698	75,566,133	56,977,018	33,094,021	52,679,527
2005	46,398,197	45,536,626	73,672,063	32,461,425	76,683,239
2006	41,065,125	45,988,789	63,679,814	25,829,042	93,397,073
2007	51,495,373	62,011,818	83,251,267	20,534,216	80,249,967
2008	58,943,380	69,260,533	148,311,071	18,151,607	90,775,654
2009	58,574,331	47,883,557	76,119,830	18,915,475	90,453,318

Source: Eurostat



## Appendix 3

**Table 4: Annual import quantity of canned to the EU-27: (1989 -2009) in (1000 kg)**

PERIOD	GHANA	COTE D'IVOIRE	ECUADOR	MADAGASCAR	THAILAND
1999	172,015	313,628	119,637	81,104	276,899
2000	155,041	350,978	127,806	72,735	192,568
2001	203,447	283,984	150,340	83,547	239,187
2002	184,218	370,687	189,143	120,649	303,540
2003	226,423	284,223	244,281	158,341	338,517
2004	225,449	331,971	283,547	167,633	271,643
2005	219,559	184,448	334,338	161,852	370,345
2006	171,835	190,280	268,767	125,689	435,732
2007	188,841	230,232	339,191	86,934	327,301
2008	196,805	232,921	486,332	61,612	311,793
2009	183,388	155,175	276,496	58,705	357,620

Source: Eurostat