



DETERMINANTS OF BILATERAL TRADE BETWEEN GHANA AND OTHER MEMBERS OF THE ECONOMIC COMMUNITY OF WEST AFRICAN STATES*

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ABSTRACT

We analyze bilateral merchandise trade flows between Ghana and the other 14 members of the Economic Community of West African States (ECOWAS). The analysis involves the use of the modified gravity model based on most recent data from 1995 to 2006. We establish that per capita gross domestic product of ECOWAS countries and the population of these countries drive trade levels between Ghana and these countries in a positive manner as expected from the theoretical gravity model. The physical distance between Ghana and ECOWAS member countries has the expected negative impact on trade flows with longer distances reducing trade flows. Political instability in ECOWAS countries hinders bilateral trade between Ghana and these countries. We also establish that Ghana trades more intensively with French-speaking countries than other countries in the ECOWAS region. This result is partly due to Ghana sharing its border with three French-speaking countries. However the trade volumes between Ghana and other French-speaking countries in the Region with which it does not share borders are also significant. The widespread teaching and learning of the French language in Ghana is one of the recommendations of the study.

JEL Classification: F0, F1, F4, Q1

Key words: Bilateral trade, ECOWAS, Gravity trade model

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1. INTRODUCTION AND PROBLEM STATEMENT

Over the last four decades, the world has witnessed an unprecedented global economic integration. This is reflected in an increase in international interdependence through both trade flows and capital movements. Globalization has occurred before in the history of the world economy, but not as rapidly as the phenomenon of the last four decades. The value of world trade in goods and services as well as capital movements are rising continuously. A related and equally relevant factor is the direction and composition of world trade over the period. An important factor responsible for this new wave of globalization is the successful and relatively quick integration of a large group of developing countries into major global markets. These countries are mainly from East Asia and include China, Malaysia, Singapore and South Korea. Although capital movements among countries have assumed higher proportions in explaining the new trend of global economic integration, the role of bilateral trade flows remains important for at least two reasons. First, bilateral trade flows, their patterns and compositions, on their own, partly explain the new wave of globalization. Second, the volume of trade flows is one of the key factors which determines the size and direction of capital movements. Bilateral trade flows have been especially influenced by the General Agreement on Tariffs and Trade which was first signed in 1947 with the motive of providing an international forum that encourages free trade between member states by regulating and reducing tariffs on traded goods and by providing a common mechanism for resolving trade disputes. The agreement with its various rounds of trade negotiations have sought to pull down trade-restricting structures, particularly quota and tariff structures. The negotiations, which are ongoing, have taken different dimensions, making the reaching of consensus much more difficult today than earlier times. The latest round of talks, the Doha Round, has stalled due to disagreements between developed and developing countries.

The difficulties involved in reaching agreements regarding liberalization of markets and integration have arisen especially because countries often exaggerate the negative impacts of the flows of goods and services across their borders to other countries while undervaluing the positive impacts of such flows of goods and services to their own people. In addition, it has become critical to compromise, often with difficulty, on certain crucial domestic policies that enhance 'domestic

competitiveness' and 'create local jobs' but which are largely protectionist in nature. Another aspect of the phenomenon is the need to safeguard the natural environment for future generations through the pursuit of sustainable development policies. This need in itself and especially how it is pursued has varying implications for the pattern as well as composition of trade flows among countries.

Parallel to these above-mentioned developments is the renewed desire among regional groupings to integrate their economies more than they would otherwise do with other groupings. An example of a regional economic grouping is the Economic Community of West African States (ECOWAS), the subject of this paper of which Ghana is a member. The 15 countries of ECOWAS are Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea Bissau, Cote d'Ivoire, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. Benin, Burkina Faso, Guinea, Cote d'Ivoire, Mali, Niger, Senegal and Togo are former colonies of France and use French as an official language. Gambia, Ghana, Nigeria, Sierra Leone are former colonies of Great Britain and use English as an official language. Liberia is a former colony of the United States founded by freed slaves and also uses English as an official language. Guinea Bissau and Cape Verde are former colonies of Portugal and use Portuguese as an official language.

Ghana is an English-speaking country where Muslims account for about 25% of the population. Muslims account for the majority of people in West Africa. Ghana is one of the six countries in the West African Region with minority Muslim populations. The other five countries are Benin, Cape Verde, Cote d'Ivoire, Liberia and Togo. The majority of members of ECOWAS are also members of the Organisation of the Islamic Conference (OIC) and Ghana has an observer status in the OIC. Historically, during the pre-colonial era, trade between the inhabitants of the present day Ghana and its West African neighbors was extensive especially with the practising Muslims such as the Hausas and Fulanis who travelled extensively in the West African Region carrying out their trade businesses. Pre-colonial trade was underpinned by transactions involving commodities such as gold, palm oil and salt with fewer restrictions on the movements of people and goods across borders compared to modern times. During the 1950s and early 1960s, African leaders realized that after political independence, regional cooperation would be essential for the maximization of the continent's vast potentials and resources. ECOWAS was created on May 28, 1975

in Lagos, Nigeria. ECOWAS was established to promote cooperation and integration in order to create an economic and monetary union to advance economic development in West Africa. The main objectives of ECOWAS are the eventual elimination of all tariffs and barriers between members, the establishment of a customs union, unified fiscal policy and coordinated regional policies in transport, communication, energy and other infrastructural facilities to enhance international trade.

Despite the establishment of ECOWAS 35 years ago, lower levels of merchandise trade transactions exist among ECOWAS countries unlike what pertains to the trade levels that ECOWAS countries have with other regions and blocs especially those in Western countries. According to Oteng-Gyasi (2006), only 11% of trade in West Africa was within the region whereas the European Union had achieved about 70% intra-regional trade. Further the leading economies of West Africa such as Côte d'Ivoire, Ghana and Nigeria have often behaved in such a way as to secure better deals in international trade negotiations by pursuing their cause as individual countries rather than as a group. An understanding of intra-ECOWAS trade is useful to ascertain the factors that can help to promote trade within the region so as to expand the economies of the region and promote economic wellbeing of its people.

Increased intra-regional trade can also promote peace within the region and reduce the levels of political conflicts that have tarnished the region over the last 46 years since the advent of military coups in the region starting in Togo in 1963. It is, therefore, necessary to analyze the trends and composition of intra-regional trade and factors influencing the levels of trade among various countries within the West African region. In the light of the above discussion, the main objective of the study is to ascertain the factors affecting the level of merchandise trade between Ghana and each of the ECOWAS member countries using a gravity model based on more recently available data from 1995 to 2006. The rest of the paper is organized as follows: the next section reviews some relevant literature on bilateral trade and the applications of gravity models. The next section, Section 3 is devoted to the methodology including a discussion of econometric techniques. The results, presented in Section 4, are those derived from the simple statistical analysis of Ghana-ECOWAS bilateral trade and econometric results based on gravity models of trade. The conclusions and policy implications follow in Section 5.

2. LITERATURE REVIEW

International trade deals with flows of goods and services from one country to another to promote domestic economic growth. International trade allows countries to specialize in producing goods and services that they have comparative advantage in and import those goods and services they do not have comparative advantage. The concept of international trade, which is a very important aspect of a country's economic development, can be analyzed using a number of approaches. The theory of comparative advantage is one approach of analyzing trade between countries. Comparative advantage or what is commonly called the 'Ricardian model' proposes that a country have comparative advantage in the production of a good if it can produce that good at a lower opportunity cost than another country. In this model, one country specializes in its 'comparative advantage' goods, trade them to other countries and then buy or import those goods it cannot produce at a lower cost. Another approach is the Heckscher-Ohlin or the factor endowment theory which is an extended Ricardian model (Todaro, 2000). The Heckscher-Ohlin trade theory states that efficiently produced goods of one country are traded for the efficiently produced goods of another country (Hanink, 1994). One other approach used to analyze international trade is the gravity model, which is commonly used for bilateral trade flows.

According to the generalized gravity model of trade, the volume of exports between pairs of countries is a function of their incomes, their populations, their geographical distance and a set of dummies. The simplest form of the gravity model is shown in a study by Feenstra, Markusen and Rose (2001). Assume that there are M nations ($i = 1, \dots, M$), and zero transportation costs between any two nations, i and j . Assume also that any two nations completely specialize in the production of different goods.

Let Y_{ik} be the value of production of good k by nation i , GDP_i is the income of nation i and $WorldGDP$ is world income. Assuming there are identical tastes in all the M nations, then each nation j will demand $(GDP_j)/(WorldGDP)$ of the value of any good k produced. Therefore, exports of good k from nation i to nation j will be:

$$Y_{ik} \left(\frac{GDP_j}{WorldGDP} \right).$$

Hence, for all k goods, the total exports from country i to country j is:

$$BTRADE_{ij} = GDP_i \left(\frac{GDP_j}{WorldGDP} \right).$$

The exports from country i to j is determined by the logarithmic function of equation $BTRADE_{ij}$. That is:

$$\ln(BTRADE_{ij}) = -\ln(WorldGDP) + \ln(GDP_i) + \ln(GDP_j)$$

where $-\ln(WorldGDP)$ can be considered a constant at a point in time for cross-sectional analytic work involving several countries.

In empirical analysis, the levels of bilateral trade flows are regressed against the domestic country GDP, partner country GDP and other controlling factors including physical distance based on the theoretical derivation of the gravity models. The controlling factors consist of a number of elements such as common language, political stability and membership in a common international or regional organization (Hellvin and Nilsson, 2000). The latter factors are often expressed using dummy variables. Broadman (2006) suggests that the gravity model of bilateral trade can be expanded to include variables indicating formal trade policies (*at-the-border factors*) and the degree of production and other business/political constraints affecting the domestic economy (*behind-the-border factors*). He also argues that the emergence and development of institutions and infrastructure that enhance trade through lower transaction costs such as electronic commerce and enhanced mobile telephony networks can be considered between-the-border factors.

Tinbergen (1962) and Pyöhönen (1963) were the first authors to apply the gravity model to analyze international trade flows but they only provided empirical evidence without supplying any theoretical justification. Following their analyses, for a period of about 20 years, the gravity model, in spite of its perceived empirical success, did not receive much attention from economists due to its weak theoretical foundation. However, with the increasing importance of geographical factors in international trade theory, the gravity model started to attract a reawakening interest in the 1980s. Since then, the gravity model has

become a popular instrument in empirical foreign trade analysis. The model has been applied successfully to varying types of flows such as migration, transportation, foreign direct investment and specifically bilateral trade flows.

Linneman (1966) added population to the set of explanatory factors of bilateral trade for the first time, and attempted to justify the model theoretically using the Walrasian general equilibrium system. However, the general equilibrium system includes too many regressors for each trade flow to be reduced to the gravity equation. In 1970 and beyond, the gravity equation witnessed somewhat radical departures from the usual approach to its estimation. Leamer and Stern (1972), believed to be following Savage and Deutsch (1960), devised gravity equation from a probability model of transactions. They hypothesized that the proportionality of bilateral trade to the product of GDP shares could be referred to as the 'potluck assumption'. Here, outputs of countries are presumed to be in a pot and each country draws out its consumption mix out of the pot. The drawings (as well as the production) of a country's consumption bundles were found to be proportional to that country's income. In that scenario, the expected value of country i 's consumption produced by country j was related to country i 's share of world GDP multiplied by country j 's share of world GDP.

Anderson (1979) provided clear theoretical bases that rely on standard assumptions. The epitome of Anderson's hypothesis rested on the assumption that each country produced a unique commodity that is imperfectly substitutable with goods produced by other countries. He therefore assumed Cobb-Douglas as well as Constant Elasticity of Substitution (CES) preferences. Bergstrand (1985), like Anderson, used CES preferences to derive reduced form equations for bilateral trade involving price indices. In particular, he developed a theoretical connection between bilateral trade and factor endowments. Additional efforts in 1989 by Bergstrand explored these theoretical justifications further. Helpman (1987) used the close fit of the gravity equation as an evidence for a model of monopolistic competition.

Frankel (1997) formulated a more complex and advanced form of the gravity equation where he emphasized the role of geographical factors, such as distance, landlockedness and population, as determinants of bilateral trade flows. He also included regional trading blocs in his gravity equation in order to estimate the impact of regional integration on bilateral trade flows. In addition, Wall (1999) used the gravity model to estimate the costs of protectionism in the U.S. economy and Tamirisa

(1999) applied the gravity model to analyze the effect of capital and exchange controls on bilateral trade flows. There are two competing models of international trade that provide theoretical justification for the gravity model. These are the Differentiated Product Model and the Heckscher-Ohlin Model. Anderson (1979) in a study made an attempt to derive the gravity equation from a model that assumed product differentiation. Bergstrand (1985, 1989) also explored the theoretical determination of bilateral trade in a series of papers, in which gravity equations were associated with simple monopolistic competition models. In a study, Helpman and Krugman (1985) used a differentiated product framework with increasing returns to scale to justify the gravity model.

According to Helpman and Krugman (1985), under the imperfect substitute model, where each firm produces a product that is an imperfect substitute for another product and has monopoly power in its own product, consumers show preference for variety. When the size of the domestic economy (or population) doubles, consumers increase their utility, not in the form of greater quantity but of greater variety. International trade can provide the same effect by increasing consumers' opportunity for even greater variety. Therefore, when two countries have similar technologies and preferences, they will naturally trade more with each other in order to expand the number of choices available for consumption.

Helpman (1987) empirically proved the correspondence between the gravity equation and the differentiated products model by applying his test on OECD countries data. His results supported the argument that the gravity equation can be applied to the trade flows among industrialized countries where intra-industry trade and monopolistic competition are well developed. In contrast, Hummels and Levinsohn (1995) conducted a similar empirical test with a set of non-OECD countries where monopolistic competition was not so plausible. They however proved that the gravity equation was efficient in explaining the trade flows among developing countries where inter-industry trade was dominant with scarce monopolistic competition. There are quite a number of empirical applications in international trade which have also contributed to the improvement of the performance of the gravity model. For example, Deardoff (1995), Chen and Wall (1999), Breuss and Egger (1999) and Egger (2000) improved the econometric specification of the gravity equation. Using a gravity equation, Feenstra, Markusen and Rose (2001) showed that a wide range of trade theories is consistent with a gravity-type equation. These alternative theories regard, to an

extent, varying conditions of entry. In their work, these conditions predicted subtle differences in key parameter values that were expected to come out from an estimated gravity equation. These differences were, according to them, the bases for the distinction among alternative trade theories referred to above, although they are consistent. They, thus, concluded that gravity type model is not inconsistent from other trade models such as product differentiation, oligopoly and segmented markets.

Recognizing the “home-country effects” (Krugman, 1980) or its reversal, Feenstra, Markusen and Rose (2001) examined whether this effect can be determined by the nature of the commodity in question. They achieved that by estimating gravity equations for bilateral export trade between country-pairs. In this respect, they used Rauch’s (1999) classification of five-digit SITC products into homogenous, differentiated or an in-between category. Matzan, Anaman and Duraman (2003) examined the dynamics of trade between Brunei Darussalam and the other nine members of the Association of Southeast Asian Nations (ASEAN) from 1970 to 2000. They specified and estimated separate gravity models for import and export and found variables such as distance, common historical connection that Brunei has with other members, and population of those countries to be significant in influencing bilateral trade. Anaman and Al-Kharusi (2003) analyzed bilateral trade flows between Brunei Darussalam and the European Union and showed that trade flows were linked to the economic size of the various European countries as measured by population as well as historical connections.

Adam and Cobham (2007), following Anderson and van Wincoop (2003) who developed a somewhat new version of the gravity model that included multilateral trade resistance, modeled multilateral trade resistance in the gravity model with exchange rate regime. Adam and Cobham were particularly interested in obtaining accurate estimates of the effects of exchange rate regimes on trade. Krugman (1991) identified and made more formal the role played by geographical proximity in the process of regionalization. Specifically, he analyzed how proximity leads to agglomeration of production thereby creating regional bias in trade flows. Yu and Song (2008) examined the factors that determine bilateral trade between China and Australia using a modified gravity model. In order to explain how comparative advantage affect trade between these countries, the authors, following Balassa (1965) and Hillman (1980), computed the revealed comparative advantage indices for merchandise

exports at two-digit commodity level. The indices were then included as an explanatory variable in the gravity model. These comparative advantage indices were subsequently found to be a very important factor in promoting trade between China and Australia. Using Input-Output Analysis, they also showed positive and increasing gains from trade between the two countries, with Australia apparently deriving greater benefits from the trade.

Specific to West Africa, Ogunkola (1998) evaluated trade potentials in ECOWAS using an augmented gravity model. Specifically, he investigated the existence of potential trade gains that could accrue to member states if trade barriers were removed. He empirically demonstrated that if, for instance, the ASEAN experience is imbibed in ECOWAS, intra-regional trade will increase to the mutual advantage of all member countries. He also drew the attention of ECOWAS to the roles of export oriented strategies and country specific multilateral trade liberalization adopted by ASEAN. Balolgun (2008) also carried out a research to empirically test the trade gravity model criteria for West African Monetary Zone (WAMZ). The member states of WAMZ are Nigeria, Gambia, Ghana, Guinea and Sierra Leone. He assessed the effects of factors like output co-variability, intra-industry intensity of trade and endogenous factors such as common language, border or colonizer on bilateral trade among members of WAMZ. Anyawu (2003) examined some theories and paradigms relating to trade and output in a monetary union. Coulibaly (2004) argued that a major factor explaining low trade volumes among West African countries was the high travel and related transaction costs in moving goods across landlocked countries.

3. METHODOLOGY

3.1 SPECIFICATION OF THE RELEVANT GRAVITY MODELS

This section specifies particular modified gravity equations and defines the various variables, both dependent and independent. In order to have a good picture of what really determine bilateral trade between Ghana and other members of ECOWAS, separate gravity equations are specified and estimated for imports as well as exports. The section also elaborates on expected signs of the coefficients and data sources.

This version of the gravity equation is a modification of the general equation specified by Bergstrand (1989). Gross bilateral trade flows

across pairs of countries are explained by the product of the countries' incomes, their population, distance linking the economic centers of the countries, and other factors aiding or resisting trade among the countries. The linear gravity equations for imports and exports are specified in Equations 1 and 2 below.

$$(1) \quad \begin{aligned} \text{IMPORT}_{ijt} = & \beta_0 + \beta_1 \text{PCGHGDP}_{it} + \beta_2 \text{GHAPOP}_{it} \\ & + \beta_3 \text{PCECGDP}_{jt} + \beta_4 \text{ECOPOP}_{jt} + \beta_5 \text{DIST}_{ij} \\ & + \beta_6 \text{TREND}_t + \beta_7 \text{PSHOCK}_{jt} + \beta_8 \text{FRENCH}_t \\ & + \beta_9 \text{PORTUG}_t + \gamma_{ijt} \end{aligned}$$

$$(2) \quad \begin{aligned} \text{EXPORT}_{ijt} = & c_0 + c_1 \text{PCGHGDP}_{it} + c_2 \text{GHAPOP}_{it} \\ & + c_3 \text{PCECGDP}_{jt} + c_4 \text{ECOPOP}_{jt} + c_5 \text{DIST}_{ij} \\ & + c_6 \text{TREND}_t + c_7 \text{PSHOCK}_{jt} + c_8 \text{FRENCH}_t \\ & + c_9 \text{PORTUG}_t + \mu_{ijt} \end{aligned}$$

where IMPORT_{ijt} represents the real value of annual merchandise imports from ECOWAS country j to Ghana (country i) at time t expressed in constant year 2000 Ghana cedis; EXPORT_{ijt} is the real value of merchandise exports from Ghana to ECOWAS country j at time t expressed in constant year 2000 Ghana cedis; PCGHGDP_{it} is the real per capita gross domestic product of Ghana in constant year 2000 Ghana cedis at time t ; PCECGDP_{jt} is the real per capita gross domestic product of ECOWAS country j at time t expressed in constant year 2000 Ghana cedis based on relevant exchange rate conversions; GHAPOP_{it} is the population of Ghana at time t ; ECOPOP_{jt} is the population of ECOWAS country j at time t ; DIST_{ij} is the distance in kilometres from Accra to the major economic city of the ECOWAS country j ; TREND_t is a trend variable meant to capture sustained changes in trade flows not explained by other variables in the model. It takes the value 1 for 1995 and increases by one each year till 12 for 2006;

PSHOCK_t is a dummy variable meant to capture the impact of a political instability or shock experienced by countries within ECOWAS. The variable takes a value of zero if for that year there was no political instability as indicated by military coups or attempted coups. The variable

takes a value of 1 otherwise; $FRENCH_t$ is a dummy variable aimed at capturing the significance of French-speaking countries to bilateral trade between Ghana and other ECOWAS countries. It takes a value of 1 if the member country speaks French and zero otherwise; $PORTUG_t$ is also a dummy meant to capture the importance of Portuguese speaking countries. The variable takes a value of 1 for Portuguese-speaking countries and zero otherwise; and \tilde{a}_{ijt} and μ_{ijt} are disturbance terms.

For the estimation of the models in this study, log-linear gravity models are used. The log-linear gravity models are expressed in Equations 3 and 4 below.

$$(3) \quad \begin{aligned} LIMPORT_{ijt} = & \beta_0 + \beta_1 LPCGHGDP_{it} + \beta_2 LGHAPOP_{it} \\ & + \beta_3 LPCECGDP_{jt} + \beta_4 LECOPOP_{jt} + \beta_5 LDIST_{ij} \\ & + \beta_6 TREND_t + \beta_7 PSHOCK_{jt} + \beta_8 FRENCH_t \\ & + \beta_9 PORTUG_t + \gamma_{ijt} \end{aligned}$$

$$(4) \quad \begin{aligned} LEXPORT_{ijt} = & c_0 + c_1 LPCGHGDP_{it} + c_2 LGHAPOP_{it} \\ & + c_3 LPCECGDP_{jt} + c_4 LECOPOP_{jt} + c_5 LDIST_{ij} \\ & + c_6 TREND_t + c_7 PSHOCK_{jt} + c_8 FRENCH_t \\ & + c_9 PORTUG_t + \mu_{ijt} \end{aligned}$$

where $LIMPORT$, $LEXPORT$, $LPCGHGDP$, $LPCECGDP$, $LGHAPOP$, $LECOPOP$, $LDIST$ are the variables in natural log.

We expect that $LPCGHGDP$, $LPCECGDP$, $LGHAPOP$ and $LECOPOP$ would exert positive influences on the import and export dependent variables. This is consistent with gravity theory that the greater the masses of the countries involved, the higher the levels of observed trade. The $DIST$ and $PSHOCK$ variables are expected to hinder levels of bilateral trade observed among the sample countries. $FRENCH$ is expected to have positive influence on trade whilst $PORTUG$ is expected to hinder trade. The reason being that there are about eight member countries of ECOWAS that are French-speaking with three of them sharing borders with Ghana. Only two ECOWAS member countries are Portuguese-speaking, all of them geographically far from Ghana.

TREND can have either negative or positive impact on bilateral trade between the countries depending on which variables were not considered.

3.2 ESTIMATION OF THE GRAVITY IMPORT AND EXPORT MODELS

The gravity models were estimated separately for imports and exports based on panel data estimation using fixed effects and random effects equations. The estimation is done with Time Series Processor (TSP) software. In both cases the random effects estimates of the parameters are preferred over their fixed effects counterparts. The random effects models were estimated using the Generalized Least Squares (GLS) method. The choice of random effects over fixed effects, in both cases, is informed by the Hausman specification test which failed to reject the null hypothesis of random effects at the 5% significance level. More so random effects models allow for the estimation of time-invariant variables, in our case the *DISTANCE*, *FRENCH*, and *PORTUG* variables. The results from both models have, however, been reported.

The TSP econometric software estimates the fixed effects model using the *Within* estimator. The *Within* estimator measures the association between individual-specific deviations of regressors from their time-averaged values and individual-specific deviations of the dependent variable from its time-averaged value (Cameron and Trivedi, 2006). Essentially, this estimator demeans the data in order to “wipe out” the incidental parameters (individual effects). Though it assumes individual effects, it no longer estimates them directly. For a detailed discussion on various techniques of estimating panel data models together with underlying assumptions refer to Cameron and Trivedi (2006).

3.3 DATA AND DATA SOURCES

The data on trade flows were collected from the Ghana Statistical Service whereas those on gross domestic product and population were compiled from the *International Financial Statistics* (2007). Conversions of some values, for instance into cedis, and other computations were done by the authors. The export and import figures for 2004 were considered to be statistical outliers since they appeared to be too low. As such the 2004 export and import data were not included in the gravity model analysis.

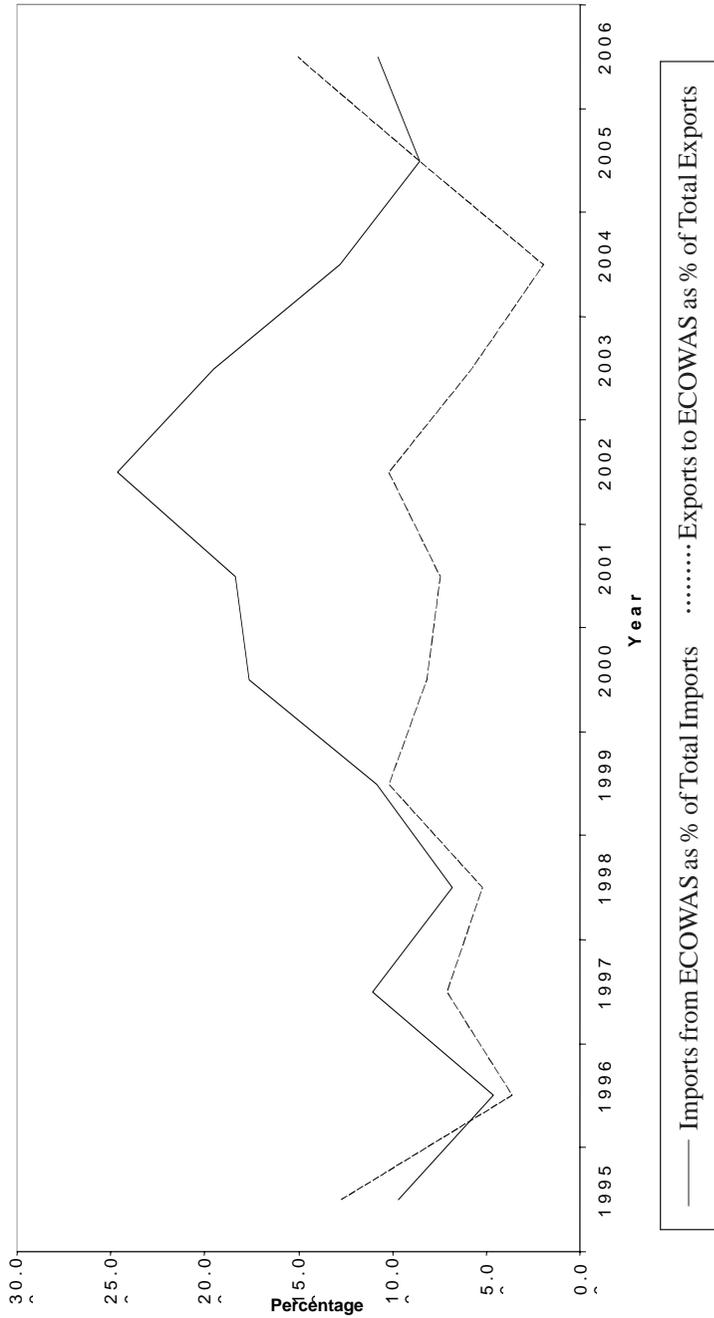
TABLE I
Ghana's Trade with ECOWAS and the World-1995 to 2006 (Nominal Ghana Cedis)

Year	Imports from ECOWAS	Total Imports (Worldwide)	Imports from ECOWAS as % of Total Imports	Exports to ECOWAS	Total Exports (Worldwide)	Exports to ECOWAS as % of Total Exports
1995	19,213,611	198,222,205	9.69	19,880,763	156,334,091	12.72
1996	19,065,683	409,162,358	4.66	15,105,131	417,385,448	3.62
1997	75,252,843	682,024,997	11.03	23,759,022	336,169,136	7.07
1998	50,591,746	744,878,060	6.79	20,403,306	388,994,671	5.25
1999	94,444,721	869,439,761	10.86	48,064,351	472,428,192	10.17
2000	278,991,783	1,578,879,769	17.67	72,195,311	878,753,871	8.22
2001	411,543,046	2,240,895,522	18.37	91,653,823	1,230,183,283	7.45
2002	591,932,589	2,404,609,204	24.62	145,655,948	1,427,050,108	10.21
2003	543,618,075	2,786,754,539	19.51	117,003,574	2,020,504,674	5.79
2004*	470,745,853	3,672,262,153	12.82	43,122,184	2,206,342,312	1.95
2005	697,919,729	8,184,946,860	8.53	435,241,703	5,077,123,866	8.57
2006	527,615,774	4,880,731,305	10.81	507,395,556	3,378,539,681	15.02

Source: Authors' computations based on data obtained from the Ghana Statistical Service.

Note: *2004 data, particularly exports, are considered to be statistical outliers.

FIGURE 1
Ghana's Trade with ECOWAS as a Percentage of Ghana's Total Trade



4. RESULTS

4.1 RESULTS FROM THE SIMPLE STATISTICAL ANALYSIS OF GHANA-ECOWAS BILATERAL TRADE FROM 1995-2006

As shown in Table 1, bilateral trade flows (both imports and exports), measured in Ghana cedi in absolute terms, between Ghana and other ECOWAS member countries generally increased over the study period. One Ghana cedi was worth about 0.69 United States dollar in mid-January 2010. In terms of the percentage of total imports and exports, trade flows appear to have fluctuated over the period. Trade flows in the sub-region as a percentage of Ghana's total imports and exports are also shown in Table 1 and illustrated in Figure 1. Imports from ECOWAS in percentage terms peaked in 2002, registering nearly a quarter of total imports absorbed by Ghana in that year. The year 1997 witnessed the lowest level of imports by Ghana from ECOWAS in relative terms, with imports accounting for about 5% of total imports worldwide. Exports from Ghana to ECOWAS countries, in percentage terms, on the other hand, peaked in 2006 when about 15% of Ghanaian exports were absorbed by the regional grouping. This ratio registered its lowest of about 4% in 1996 (the percentage of about 2% in 2004 is highly suspicious).

The decomposition of bilateral trade flows between Ghana and ECOWAS based on Standard International Trade Classification (SITC) at one-digit level can be found in Appendices 1 and 2. The figures, which are in percentages of total ECOWAS trade, show that imports from ECOWAS countries into Ghana have been largely dominated by the mineral fuel, lubricants and related materials group. On the average, the group accounts for 80% of imports into Ghana. This comprise of mainly petroleum products from the sub-region, particularly Nigeria. The decomposition of exports also revealed that Ghanaian exports to ECOWAS were largely dominated by manufactured goods classified by material grouping. This also, on the average, accounted for nearly half of the total exports. It is important to note that this variable largely fluctuated over the sample period. Manufactured goods accounted for over 80% of total exports in 1995 but just around 25% in 2001.

Other relevant groupings, so far as imports and exports are concerned, are miscellaneous manufactured articles (textiles), and food and live animals. Crude materials inedible except fuel and mineral fuel, lubricants and related materials have also been quite important groups, especially in the past. Ghana's major trading partners within the sub-region are shown in Appendices 3 and 4. Nigeria undoubtedly stood

TABLE 2
Results of the Estimated Gravity Model for Imports

Independent Variable	Fixed Effects Model Estimates	<i>t</i> -statistic (<i>p</i> -value)	Random Effects Model Estimates	<i>t</i> -statistic (<i>p</i> -value)
<i>Constant</i>	-	-	155.149	1.7660 (0.077)*
<i>LPCGHGDP_{it}</i>	16.3905	0.8973 (0.372)	17.3837	0.9552 (0.339)
<i>LGHAPOP_{it}</i>	-100.897	-1.6059 (0.112)	-78.2752	-1.2979 (0.194)
<i>LPCECGDP_{jt}</i>	1.5434	2.0989 (0.038)**	1.4482	2.7391 (0.006)**
<i>LECOPOP_{jt}</i>	21.7770	1.4298 (0.156)	3.5227	3.8523 (0.000)**
<i>LDIST_{ij}</i>	-	-	-1.9906	-2.8459 (0.004)**
<i>TREND_t</i>	5.5709	1.4529 (0.149)	5.5474	1.4516 (0.147)
<i>PSHOCK_t</i>	-0.0173	-0.0197 (0.984)	-0.4313	-5.666 (0.571)
<i>FRENCH_t</i>	-	-	6.0202	2.2091 (0.027)**
<i>PORTUG_t</i>	-	-	1.4851	0.6008 (0.548)
<i>R²</i>	0.6929		0.5759	
<i>Adjusted R²</i>	0.6308		0.5392	

Notes: The probability of significance of the Hausman test with the null hypothesis that there is no significant difference between the fixed effect model and the random effects model is 0.8011. This means that the null hypothesis cannot be rejected.

** denotes statistical significance at the 5% level.

* denotes statistical significance at the 10% level.

TABLE 3
Results of the Estimated Gravity Regression Model for Exports

Independent Variable	Fixed Effects Model Estimates	<i>t</i> -statistic (<i>p</i> -value)	Random Effects Model Estimates	<i>t</i> -statistic (<i>p</i> -value)
<i>Constant</i>	-	-	168.557	2.3648 (0.018)**
<i>LPCGHGDP_{it}</i>	16.7382	1.1226 (0.265)	14.2108	0.9562 (0.339)
<i>LGHAPOP_{it}</i>	-47.6775	-0.9284 (0.356)	-75.8751	-1.5439 (0.123)
<i>LPCECGDP_{jt}</i>	1.1862	1.9662 (0.052)**	0.9799	2.6513 (0.008)**
<i>LECOPOP_{jt}</i>	-26.5383	-2.1118 (0.037)*	1.6141	2.6764 (0.007)**
<i>LDIST_{ij}</i>	-	-	-1.7874	-4.1557 (0.000)**
<i>TREND_t</i>	6.2317	1.9883 (0.050)*	5.9678	1.9107 (0.056)*
<i>PSHOCK_t</i>	-1.9636	-2.7539 (0.007)*	-1.2109	-2.0197 (0.043)**
<i>FRENCH_t</i>	-	-	3.6305	1.9803 (0.048)**
<i>PORTUG_t</i>	-	-	-3.1748	-2.0270 (0.043)**
<i>R</i> ²	0.6704		0.5985	
<i>Adjusted R</i> ²	0.5984		0.5613	

Notes: The probability of significance of the Hausman test with the null hypothesis that there is no significant difference between the fixed effect model and the random effects model is 0.4262. This means that the null hypothesis cannot be rejected.

** denotes statistical significance at the 5% level.

* denotes statistical significance at the 10% level.

high among other members. As far as imports are concerned, the country accounted for about 80%, on the average, of total imports to Ghana from the regional organization. In terms of imports again, Cote d'Ivoire, Togo, Benin, and Burkina Faso, in that order, have established themselves over the period as important trading partners of Ghana. The relevance of these countries when one considers exports does not change much.

4.2 RESULTS OF REGRESSION ANALYSIS INVOLVING GRAVITY MODELS

The regression results of the log-linear gravity equations for imports and exports are presented in Tables 2 and 3, respectively. Based on the Hausman specification test, there was no statistically significant difference between the fixed effects model and the random effects models (refer to Tables 2 and 3). The random effects models are used for this analysis due to the severe singularity problem encountered with the estimation of the fixed effects models for both imports and exports. This severe singularity problem was due to the absence of certain data for some countries for a number of years, especially for countries such as Guinea and Cape Verde. Hence the attempt to estimate different intercepts, inherent in the fixed effects model, was fraught with difficulties given the data limitation. However, the random effects model involves estimation of a single intercept and could be done with limited data or absence of data for certain years without encountering a severe problem of singularity. Hence, random effects models are used for further discussion of the analysis even though the results of both fixed effects and random effects models are provided.

The results for the import gravity equation (random effects model) summarized in Table 2, generally conformed to the *a priori* expectations based on the theory, with the exception of the variable *LGHAPOP*. The results indicate that per capita gross domestic product of member countries as well as population had their expected positive signs showing the positive impact of these variables on import trade. These positive coefficients, thus, implied that Ghana tended to trade more with neighboring countries with greater population and per capita gross domestic product. This outcome conforms to a number of studies conducted on trade using the gravity model. Anaman and Al-Kharusi (2003), Matzan, Anaman, and Duraman (2003), and Yu and Song (2008) are a few of these studies. The *DIST* variable also had its expected negative sign and was significant, indicating that imports would be hindered by long distances. The *DIST* variable, understandably, captures

both physical and economic distance between Ghana and her neighboring countries. This, therefore, implies that bilateral trade will be hindered if a country is, though physically close to Ghana, yet has considerably high economic cost involved in traveling and/or shipping.

The *TREND* variable turned out to be positive, but not significant. This *TREND* variable, if significant, would capture several factors that aided imports but were not accounted for by the model due to data limitations. These variables might include the noted impact of exchange rate on bilateral trade. The interpretation of this trend variable has to be handled with some caution given its statistical insignificance. The political shock (*PSHOCK*) variable had its expected negative sign but was not statistically significant. The *FRENCH* variable had its expected positive sign and was statistically significant, stressing the relevance of French-speaking countries for the import of goods by Ghana in the West African Region. An important phenomenon captured by this variable is the fact that most of the French-speaking countries within ECOWAS use the same currency, the CFA. It, therefore, stresses the gains attributable to the existence of a single currency. The *PORTUG* variable on the other hand also had a positive sign but was not statistically significant.

The results of the exports gravity model (random effects model), presented in Table 3, were generally good and in line with *a priori* and theoretical expectations. Eight out of the ten coefficients were found to be statistically significant. The results are similar to those for imports discussed above. Population of ECOWAS countries together with the per capita gross domestic product variables had their expected positive signs. Political shock and distance turned out negative coefficients, as expected. The trend variable also had a positive sign, and was significant, suggesting that some export-abetting variables were not captured by the model. The *FRENCH* and *PORTUG* variables had their expected positive and negative signs, respectively, and were both significant. This suggests that francophone countries are relevant for bilateral export trade between Ghana and other ECOWAS member countries. This result is partly due to the relative prominence of Ghana as a major producer of manufactured goods exported to the Region. As indicated earlier, Ghanaian exports to ECOWAS were dominated by manufactured goods. Anaman and Osei-Amponsah (2009) established that the export-import ratio was a major determinant of the level of manufacturing output of Ghana during the 1974 to 2006 period.

Broadman (2006) categorizes shifters of the levels of bilateral trade into three groups as follows: (a) at-the-border factors), (b) behind-the-

border factors, and (c) between-the-border factors. It is clear from this study that the factors enhancing trade flows between Ghana and other members of the ECOWAS are largely behind the Ghana border. That is, the degree of production and other business/political constraints affecting the domestic economy are currently largely instrumental in shaping the level of bilateral trade between Ghana and other countries in the West African Region. However, between-the-border factors through the development of institutions and infrastructure enhance trade through lower transaction costs such as through electronic commerce and enhanced mobile telephony networks offer a chance for greater trade flows.

5. CONCLUSIONS AND POLICY IMPLICATIONS

The main objective of this study was to identify factors that aid and/or hinder bilateral trade flows between Ghana and other ECOWAS member countries. A modified gravity model was therefore estimated for imports and exports separately in order to identify factors that significantly influence trade flows. Generally, per capita GDP of the countries involved in the study as well as their population showed a positive impact on trade flows. As expected, distance between Ghana and ECOWAS member countries had negative impact on trade flows. Political shocks sustained by other ECOWAS member countries hindered bilateral trade, both imports and exports, between Ghana and those ECOWAS member countries. It was also established that Ghana tended to trade more intensively with French-speaking countries *vis-a-vis* other countries in the ECOWAS region. This result was partly related to Ghana sharing borders with three French-speaking countries. However, the trade volumes between Ghana and other French-speaking countries in the Region which it does not share borders are also significant.

As far as policy is concerned, there is a need to intensify the learning and use of the French language in Ghana among students, businessmen and exporters, especially those which have actual and potential trade links with French-speaking countries in the West African Region. Concerning distance, we are of the view that the case goes beyond physical distance between Ghana and other ECOWAS countries. The variable arguably reflects difficulties that traders are engulfed with when it comes to transporting their products to markets within the sub-region and possibly effecting some transactions. It is our recommendation that road and rail infrastructure be given serious consideration by regional

as well as national policy makers. It is also important that various bottlenecks along the roads, particularly check-points, be dealt with seriously and urgently. The West Africa Transport and Transit Project must be given a high priority by the new political administration in Ghana, in order to enhance regional integration. The other related issue regarding transportation of produce is sea transportation. Usual difficulties that traders go through in shipping and clearing goods must also be tackled with some sense of urgency.

Seven French-speaking West African countries use the CFA Franc as a common currency. These countries are Benin, Burkina Faso, Mali, Niger, Senegal and Togo. Portuguese-speaking Guinea Bissau also uses the CFA franc which was established based on the West African Economic and Monetary Union Treaty of Dakar in 1994. There has been a movement towards the establishment of a single West African currency for five West African countries which do not use the CFA Franc and belong to WAMZ. The Eco currency has been proposed for use by these five countries belonging to WAMZ – Gambia, Ghana, Guinea, Nigeria and Sierra Leone. The Eco currency was to have been operational in January 2010 but its implementation has now been postponed to January 2015. In the future, a single currency for all 15 West African countries will be useful to accelerate intra-West African through easier processing of import and export trade among these countries. This will be in line with the important role that the pan-West African bank, The Ecobank, has played in increasing trade among West African countries. The Ecobank was established in Lome, Togo, in 1985, originally as a regional bank for the ECOWAS Region and has grown to become one of the biggest companies in Africa. The bank has branches in all 15 West African countries and in 14 other African countries mainly in Eastern and Southern Africa and also in France.

While this study provides some useful conclusions about the determinants of bilateral trade between Ghana and other members of ECOWAS, further research is needed to analyze Ghana's trade relationships with non-ECOWAS partners especially Ghana's historically major trading partners such as the European Union and the United States of America and new major trading partners such as China, South Korea and India. This is necessary to draw more generalized conclusions about determinants of the levels of trade between Ghana and its major trading partners. This issue is being considered in our on-going research work on international trade.

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APPENDIX 1
Imports Composition Based on 1-digit SITC, as a Percentage of Total Imports from ECOWAS

Imports	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SITC 0	1.4224	6.3410	0.7022	1.7494	1.8058	4.7952	9.6292	12.0861	2.2085	0.4813	1.2780	1.6012
SITC 1	0.0215	0.0671	0.0178	0.0994	0.0130	0.9592	5.9651	2.1452	0.0013	0.0062	0.0088	0.0177
SITC 2	0.0231	0.9736	0.0489	0.0824	0.1025	0.4722	1.2239	0.3659	0.3916	0.2364	0.9584	0.8039
SITC 3	94.2537	83.4806	96.2999	86.2512	87.6459	77.2240	66.1348	61.2452	92.3565	97.4955	78.7926	86.0800
SITC 4	0.0000	0.0000	0.0000	0.0000	0.0082	0.2076	0.2555	0.6434	0.0003	0.0092	0.0102	0.0626
SITC 5	0.6665	2.1349	0.4893	0.4332	0.5439	1.6772	2.0618	1.9808	1.4496	0.1239	0.5398	0.5438
SITC 6	1.5050	4.0812	1.0543	9.9812	8.4609	7.3453	6.2482	12.5985	1.2899	1.1930	16.4944	8.5476
SITC 7	1.8945	2.3067	1.2774	0.8743	0.7848	6.0981	7.5593	7.3048	1.0369	0.2741	0.5880	0.6631
SITC 8	0.2135	0.6148	0.1103	0.5287	0.6350	1.2212	0.9222	1.6300	1.2655	0.1804	1.3300	1.6801
SITC 9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note: SITC 0-Food and live animals; SITC 1- Beverages and tobacco; SITC 2- Crude materials inedible except fuel; SITC 3- Mineral fuel, lubricants and related materials; SITC 4- Animal and vegetable oils and fats; SITC 5-Chemicals; SITC 6- Manufactured goods classified by material; SITC 7- Machinery and transport equipment; SITC 8- Miscellaneous manufactured articles (textiles); SITC 9-9-Commodities and trans. not classified by kind.

APPENDIX 2
Exports Composition Based on 1-digit SITC, as a Percentage of Total Exports to ECOWAS

Exports	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SITC 0	0.4554	15.7235	4.7373	13.4134	3.3433	17.0410	11.3570	16.5147	19.3138	25.5369	4.6931	3.3072
SITC 1	0.2294	1.4837	0.8392	0.6269	0.2089	9.0194	12.4341	1.4836	3.5890	0.6806	0.0463	0.0268
SITC 2	0.1152	8.8754	4.3479	13.6992	20.4058	3.7373	6.4781	7.3535	19.1121	5.1783	0.9336	0.8018
SITC 3	10.7823	30.3767	30.5090	34.5474	15.9416	16.8913	16.3693	20.1774	1.4793	6.5233	0.0000	0.2496
SITC 4	0.0044	1.6706	0.9842	0.3597	0.2279	0.9371	0.6701	0.6010	4.0937	0.1224	0.0026	0.0040
SITC 5	0.2167	2.8189	1.8606	1.5979	7.0637	5.4859	9.5989	20.4304	5.2256	4.9970	0.3747	2.0734
SITC 6	87.9701	28.6808	45.4087	21.0462	44.5576	25.0720	25.4400	18.1324	41.4670	19.0986	88.4431	53.9728
SITC 7	0.1271	6.5086	6.9873	4.5963	4.4862	2.0058	0.9408	4.7538	1.9322	16.3156	0.7158	0.3097
SITC 8	0.0909	3.8617	4.3258	10.0658	3.7632	19.3187	16.7116	10.0737	3.7874	21.5473	4.7908	39.2547
SITC 9	0.0085	0.0000	0.0000	0.0473	0.0017	0.4914	0.0000	0.4796	0.0000	0.0000	0.0000	0.0000
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note: SITC 0-Food and live animals; SITC 1- Beverages and tobacco; SITC 2-Crude materials inedible except fuel; SITC 3- Mineral fuel, lubricants and related materials; SITC 4- Animal and vegetable oils and fats; SITC 5-Chemicals; SITC 6- Manufactured goods classified by material; SITC 7- Machinery and transport equipment; SITC 8- Miscellaneous manufactured articles (textiles); SITC 9-9-Commodities and trans. not classified by kind.

