Financial Development, Trade Costs and Bilateral Trade Flows: Connecting the Nexus in ECOWAS

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1 Introduction

The surge in the number of regional trade agreements (RTAs) notified to the World Trade Organisation (WTO) shows increasing attention on trading among countries within a given region. For example, the reported RTAs across the globe have grown more than threefolds between 1990 and 2011 (WTO 2011; Osabouhien et al. 2014). Estevadeordal et al. (2013) observe that the *impasse* of multilateral trade talks, have given an opportunity to RTAs to take the centre stage. Almost all countries of the world are members to at least one RTA, and most countries belong to two or more. One possible reason adduced for it is that multilateral negotiations are complex and cumbersome. A related argument lies in the fact that RTAs can be viewed as a means to an end, while multilateral trade negotiations can be likened as ends in themselves (Evenett 2014; Osabouhien et al. 2014).

The proliferation of RTAs has also raised some concerns amongst economists. For example, Bhagwati (2008) described RTAs as '*termites in the global trading system*' because, in his opinion, RTAs undermine free trade and promotes preferential trading. Krueger (1997, 1999) shares a similar view, claiming that the formation of RTAs significantly affects the willingness of member countries to

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participate in further multilateral negotiations. The WTO (2003) holds contrary view noting that RTAs and Multilateral trade negotiations can co-exist.

The case of the European Union (EU) as a regional bloc has caused several other regions across the world (including Africa) to form, reform, and revive their RTAs. A critical assessment of regional blocs in the developed countries of Europe and America reveals some elements of success. While those in developing economies—like Africa, though making some elements of progress, still leaves much to be desired. Amongst the notable trading blocs (also called regional economic communities-RECs) in Africa include: Arab Maghreb Union (AMU); Community of Sahel-Saharan States (CEN-SAD); Common Market for Eastern and Southern Africa (COMESA); East African Community (EAC); Economic Community of Central African States (ECCAS); Economic Community of West African States (ECOWAS); Intergovernmental Authority on Development (IGAD); and Southern African Development Community (SADC). Five of them have established free trade area-FTA (namely: COMESA, ECCAS, ECOWAS, EAC and SADC) (African Union Commission-AUC 2011; Osabuohien and Efobi 2011).

One of the notable desires from the RTAs is the need to improve the financial sector in the member countries in order to enhance bilateral trade flow. A number of studies (e.g. Kletzer and Pranab 1987; Do and Levchenko 2004) have shown that financial development (hereafter FD) could be a source of comparative advantage for trading economies or trade partners. Hence, FD can be seen as an important determining factor of trade flows, which appears to be logical, considering the importance of finance in any economic activities. In effect, FD in both exporting and importing countries would be required to fund production and consumption, respectively. Thus, it could determine the extent to which trade finance is available for financing exports and imports among member countries.

In view of the foregoing, this study provides empirical evidence on the interplay between FD, trade flow and trade cost within the context of ECOWAS as a regional economic community (REC). Attention is given to ECOWAS because of some reasons: such as low level of intra-regional trade, some renewed efforts of ECOWAS countries to integrate and deepen their financial sector as witnessed by the growth of indigenous banks having branches in other member countries, and so on. In this study, it is argued that an improvement in FD in the member countries will provide a salient structure to enhance trade flow. To the best of the researchers' knowledge, this has not received considerable attention in the empirical literature. Extant literature that deals with the improvement of ECOWAS intra-regional trade has emphasised on infrastructural development (Deen-Swarray et al. 2012), institutional framework (Efobi and Osabuohien 2016), cost of trade (Ackah et al. 2012), among others. Thus, this study differs by examining the role of the financial sector development of member countries, which is germane as ECOWAS treaty on common market has witnessed an increase in the 'flow' of national banks into other member countries.

The study is structured in sections. Following this introduction is Sect. 2 that provides a brief review of the literature. Section 3 discusses the methodological approach including the model, technique of estimation and data sources. The

presentation and discussion of empirical results, and the conclusion are encapsulated in Sects. 4 and 5, respectively.

2 Brief Insights from the Literature

From the literature, financial development (FD) is seen as a source of comparative advantage for trading economies (or trade partners), and an important determining factor for trade flows (Kletzer and Pranab 1987; Do and Levchenko 2004). First, FD entails a set of policies and drivers of such policies, intermingling together within, and in the global community to foster economic growth and development. It denotes the ability of the financial sector to actively play its intermediating role to enhance economic growth and development (Olayiwola et al. 2012). FD in the exporting and importing countries are essential in funding productive activities and consumption, respectively. In addition, FD will influence the availability of trade finance in an economy.

Given the challenges of adverse selection and moral hazard that characterise economic relationship; it is essential that the financial sector is guided and guarded by meaningful regulations. This is to avoid decrease in economic growth through increased economic fragility that is caused by higher chances of severe crises or financial instability (Ductor and Grechyna 2015). Another negative consequence that regulations will help to prevent is resource misallocation. There are instances of sub-optimal resource allocation, where the growth of the financial sector attracts and absorbs skilled workers from other sectors, thereby causing a *skill-lacuna* in the other sectors.

The way to prevent the possible adverse effects (notably moral hazard and adverse selection) that may be associated with financial transactions is to strengthen regulation (Griffith-Jones et al. 2014). Some studies have been able to establish a linkage between these two variables; however, without a direct implication for ECOWAS countries. Some of the earliest studies in this category include Pramesti (2010), who examined the extent to which financial development in an economy has an effect on the degree of bilateral trade flows. Specifically, financial development in Pramesti (2010) was measured by the access to external financing (in form of loans) and some other measures of international financial indicators. Access to loans (external financing) was found to have a strong positive relationship with bilateral trade. Another important connection between these two variables is tied to the linkage that is provided by banks between economic agents, to aid in the transfer of fund for transactions. Sending and receiving of fund between economic agents that are located in different member countries will be made easier with the development of the financial sector. More so, the time and economic resources that is attributable to indulging in the transfer of fund through the services of Money Transfer Organisations (MTO) would be reduced with the development of the financial sector (Efobi et al. 2014). This will make intra-regional trade transactions cheaper, swifter and even more efficient.

Studies that have considered the factors that can improve intra-regional trade within ECOWAS countries have focused on infrastructural development (Limao and Venables 2001; Deen-Swarray et al. 2012; Efobi and Osabuohien 2016); depreciation of exchange rates and trade openness; improvement of the institutional infrastructure among member countries (Osabuohien and Efobi 2011); improvement of complementary national production, ease of movement of people and goods among member countries, and the improvement of efficient financial sector development to aid payment (Seck 2013). The issue of financial sector development has not received attention as a determinant of intra-regional trade performance, at least for ECOWAS member countries. Thus, this study makes its contribution by filling this observed gap.

3 Methodological Approach

3.1 Methods of Analysis

The study, with a view to achieving its objectives, uses two main methods of analysis. They include descriptive and econometric techniques. The former employs Tables and Graphs to assess the trade flow and the level of financial development in ECOWAS. While the econometric analysis starts by formulating an augmented gravity model, which is estimated with Panel Ordinary Least Squares (POLS), Poisson Pseudo-Maximum Likelihood (PPML) and Generalised Methods of Moments (GMM) techniques. This is in order to examine the relationship between financial development, trade cost and trade flow.

3.2 The Empirical Model and Estimation Technique

The study employs the augmented gravity model of trade.[1] The gravity model of trade considers trade flows between two countries as a function of the economic mass of both countries and the distance between them. It supposes that the trade flow between two countries is positively related to their economic mass or size (usually proxied by gross domestic products-GDP), and inversely related to the distance between them. This is mathematically represented by the following expression:

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[1] The choice of gravity model is mainly due to the need to capture bilateral trade flows within ECOWAS member countries in the light of their financial development. Hence, other econometric modeling approach will be applicable when examining trade flows among ECOWAS and the rest of the world, which can be taken up in further studies.

$$X_{ij} = \frac{Y_i Y_j}{D_{ij}} \tag{1}$$

In multiplicative form, Eq. (1) is re-written as:

$$X_{ij} = Y_i^{\beta} Y_j^{\gamma} D_{ij}^{-\delta} \tag{2}$$

Where X_{ij} represents the flow of trade (exports) from country i to country j, Y_i and Y_j are country i's and country j's GDP, while D_{ij} is the distance between the countries.

The above expression is linearised by logarithmic transformation as:

$$Ln(X_{ij}) = \alpha + \beta ln(Y_i) + \gamma ln(Y_j) + \delta ln(D_{ij}) \tag{3}$$

The formulation specifies distance as a kind of trade barrier. In empirical trade literature, however, the barriers to trade extend beyond physical distance. Therefore, D_{ij} represents a vector of trade barriers, and thus in several works, it has been represented by various measures depending on the key issue of interest. In this study, an augmented gravity model of trade is applied to empirically examine the effect of financial development on bilateral trade flows. The augmented gravity model for this study is such that:

$$lnX_{ijt} = \beta_0 + \beta_1 lnY_i + \beta_2 lnY_j + \beta_3 lnD_{ij} + \beta_4 lnZ_{ij} + \beta_5 lnFD_i + \beta_6 lnFD_j \\ + \beta_7(CT) + \mu_{ijt} \tag{4}$$

Where X_{ijt} is the exports of country "i" to country "j" at time "t"; Y_i is the GDP of the exporting country "i", while Y_j is the GDP of the importing country "j". The distance between the importing and exporting country is represented as D_{ij}. Trade cost that shows the costs of trading for each country pair using bilateral trade and gross national output for all sectors, is represented by Z_{ij}, as one of the major trade barriers that distort bilateral trade flow among ECOWAS countries is included in the model as it has possible influence on bilateral trade flow (Limao and Venables 2001; Deen-Swarray et al. 2012). Some additional control variables (CT) that will likely affect the estimates of the gravity model are included in Eq. (4). These CT are included in order to reduce the tendency of omitting some important variables that affect bilateral trade among ECOWAS countries. Some of them include: common coloniser, common language and contiguity. These variables can exert some influence on the volume of intra-regional trade (Dada and Adeleke 2015).

The main variable of interest is the extent of financial development in the ECOWAS exporting and importing countries represented as FD_i and FD_j, respectively. It is measured using credit to the private sector as percentage of GDP. This approach has been favoured for capturing financial development, and more so, its relevance can be seen from its ability to capture the extent of reach-out of the financial sector to the private sector (Beck 2002). μ_{ijt} represents the error term, which takes into account other variables that are not captured in the model.

   Three estimation techniques were applied in the estimations of the gravity model. They include POLS, Poisson Pseudo-maximum likelihood (PPML) and GMM estimates. As baseline estimation, the POLS was applied to understand the relationship between the variables in order to ensure that they conform to classical hypotheses of the Gravity model: that is, trade flow is inversely related with distant and positively related with income (size).

   We are mindful of some of the shortcomings of the POLS technique, which include the tendency of the technique to violate some of the assumptions of the classical linear regression model (CLRM). Furthermore, applying the POLS technique on panel data, fixed or random effects,[2] cannot account for the possibility of endogeneity in the model. Finally, economic relationships are perceived to be dynamic and not static, so the inclusion of the lagged dependent variable in the model specified makes it a dynamic model as shown in Eq. (5) below:

$$
\begin{aligned}
lnX_{ijt} = {} & \beta_0 + \beta_1 lnY_i + \beta_2 lnY_j + \beta_3 lnD_{ij} + \beta_4 lnZ_{ij} + \beta_5 lnFD_i + \beta_6 lnFD_j \\
& + \beta_7 (CT) + \beta_8 lnX_{ijt-1} + \mu_{ijt}
\end{aligned}
\tag{5}
$$

This inclusion of the lagged dependent variable could lead to the problem of autocorrelation. To this end, the Generalised Method of Moments (GMM) was utilised, due to its ability to address the issue of endogeneity and reverse causality.[3]

   The study further utilised the Poisson Pseudo-maximum likelihood (PPML) technique of estimation as proposed by Santos Silva and Tenreyro (2006). This was necessitated by the tendency of log-linearised gravity models to be misleading in the presence of heteroscedasticity because of the Jensen's inequality. The Jensen's inequality simply states that:

$$
E(\ln Y) \neq \ln E(Y)
$$

Given any variable say (Y), the expected value of the logged variable given as $[E(\ln Y)]$ is not equal to the log of the expected value of the same variable $[\ln E(Y)]$.

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[2]The fixed effect (FE) model considers the relationship between the predictor and outcome variables within an entity, where each sample has its own individual characteristics that may or may not be caused by the predictor. The FE model expunges all time invariant features in order to observe the net effect of the predictor on the outcome variable. In essence, the FE model controls for all time-invariant differences between the individuals. An important assumption of the FE model is that the time invariant feature of the model is unique to the individuals and independent of themselves. The random effect model (RE) does not control for time invariant features of the samples. The main assumption of the RE model is that the error terms of the samples are not correlated with the predictors and this allows for the allowance of time-invariant variables as explanatory variables.

[3]Endogeneity and reverse causality are the two fundamental issues that confront panel data analysis. Endogeneity problems occur when the explanatory variables are deterministic. This can be said as the explanatory variables are correlated with the error term. In such a case, the estimates of the regression analysis will be biased in some form. Reverse causality imply that the dependent explained variable also plays the role of an explanatory variable in the same model.

By implication, Santos Silva and Tenreyro (2006) showed theoretically how the problem of heteroscedasticity might cause biased results when estimating log-linearized gravity models and interpreting the elasticities. They posited that results could be misleading, and recommended PPML, although, according to them, a few authors in the empirical literature have addressed the problem with some other methods. In addition to solving the problem of heteroscedasticity, the PPML estimator also addresses the problem that X_{itj} sometimes takes the value of zero, in which case lnX_{ijt} is not defined.[4]

3.3   Sources of Data and Variable Definitions

The 15 members of the Economic Community of West African States (ECOWAS) are covered namely: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The scope of the study is the period 2006 to 2013, which is informed by data availability and to circumvent the problem of having highly unbalanced panel.[5] The variables identifier, the definition, the indicators, and a summary statistics and the source of data are presented in Table 1.

A glance at the summary statistics in the last but one column of Table 1 shows that, on the average, the total export value of an ECOWAS country was about USD 485.25 million, while the average income (GDP) stood at about USD 15, 912.50 million. The values in the Table also indicate that average distance between ECOWAS countries as trading partners is about 1313.00 km, while the level of their financial development 18.72 %. This appears low as the level of credit to private sector in their economies is lower than 20 %, which reveals that financial sector influence on their economies is less than one-fifth.

4   Empirical Results and Discussions

4.1   Trade Patterns of ECOWAS Countries

The major trade products and direction of trade of ECOWAS countries are presented in Table 2. The table indicates the top five countries that constitute the major export destination of ECOWAS countries, the top five countries where

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[4]The variables (except those that are dummies, namely: *common coloniser*, *comlang_off* and *contiguity*) are presented in their logarithmic form to bring them in a more comparable unit of measurement and also to reduce the issue of heteroscedasticity (Olokoyo et al. 2009).

[5]However, the descriptive analysis spans 2000–2013; since a number of them dealt with average values.

Table 1 Variables definition, mean and source of data

Identifier	Definition	Measurement	Mean (S.D.)	Source
Exporter $_{ij}$	Exports of country i to country j	Total merchandise export at constant 2005 USD	485.26 (397.61)	World Bank, WDI
Exporter_GDP	Income (GDP) of exporting country	Real GDP at constant 2005 USD	15912.5 (3726.67)	World Bank, WDI
Importer_GDP	Income (GDP) of importing country	Real GDP at constant 2005 USD	15912.5 (3726.67)	World Bank, WDI
Distance	Distance between the exporting and importing country	Distance between the capital cities of the exporting and importing countries	1313.00 (721.80)	Index by Mayer and Zignago (2011)
Bilateral Trade Costs	Bilateral trade cost	Measures as the trade costs for each country pair using bilateral trade and gross national output for all sectors	111.05 (99.87)	World Bank UNESCAP Trade costs Database
Exporter_FD	Financial development of exporting country	Credit to the private sector as percentage of GDP	18.72 (12.65)	World Bank, WDI
Importer_FD	Financial development of exporting country	Credit to the private sector as percentage of GDP	18.72 (12.65)	World Bank, WDI
Common coloniser	Binary variable indicating whether or not both partners share the same colonial heritage	Dummy variable. Yes = 1, 0 otherwise	0.33 (0.47)	Hopkins (2006), Posner (2004)
Comlang_off	Binary variable indicating whether or not both partners have the same official language	Dummy variable. Yes = 1, 0 otherwise	0.37 (0.48)	Hopkins (2006), Posner (2004)
Contiguity	Binary variable indicating whether or not both partners share the same border.	Dummy variable. Yes = 1, 0 otherwise	0.24 (0.43)	Hopkins (2006), Posner (2004)

Source: The Authors'

ECOWAS imports originate as well as the top five export and import products. This is aimed at assessing the trade patterns of countries within ECOWAS as a regional bloc.

It is discernible from Table 2 that the product traded (especially from the *export angle*) by countries in ECOWAS have low value-added. In essence, the products being exported are either in their raw state or semi-processed. Most of the ECOWAS countries do not process their products. As a result of this, they are not able to create opportunities for further production of goods as well as processing such goods for both local and international markets. This reduces the length of the value-chain within the country, which reduces the economic activities and the

Table 2 Major trade partners and top five trade products of ECOWAS countries

Country	Export destination	Import origin	Export products	Import products
Benin	India (24), China (23), Lebanon (19), Mali (16), Viet Nam (3.9)	China (40), United States (7.7), India (7), Malaysia (5.6), France (5.5)	Gold (19), coconuts, Brazil nuts, and cashews (17), raw cotton (17), refined petroleum (16), rough wood (9.8)	Light pure woven cotton (11), cars (10), rice (7.7), palm oil (5.5), poultry meat (5.3)
Burkina Faso	Turkey (30), China (29), Belgium-Luxembourg (6.2), Côte d'Ivoire (4.4), and Mali (4.2)	Côte d'Ivoire (17), Ghana (16), France (14), Togo (6.6), and Mali (4.1)	Raw cotton (43), gold (36), other oily seeds (2.9), refined petroleum (2.4), and other pure vegetable oils (1.8)	Beauty products (5.8), packaged medicines (5.2), refined petroleum (4.9), cement (4.8), and mixed mineral or chemical fertilizers (3.8)
Cape Verde	Spain (64), Portugal (11), United States (4.3), El Salvador (4.1), and India (3.2)	Portugal (38), Netherlands (12), United States (8.8), Spain (8.4), and China (4.8)	Non-filet frozen fish (34), processed fish (27), crude petroleum (8.3), footwear parts (5.3), and water (3.6)	Refined petroleum (12), planes, helicopters, and/or spacecraft (7.2), cement (2.5), rice (2.4), and cars (2.2)
Côte d'Ivoire	Germany (9.2), United States (8.9), Netherlands (7.6), Nigeria (7.2), and France (6.2)	Nigeria (24), France (13), China (8.1), India (4.2), and Thailand (3.0)	Cocoa beans (22), refined petroleum (15), crude petroleum (10), rubber (7.8), and cocoa paste (6.6)	Crude petroleum (24), rice (7.1), special-purpose ships (4.1), non-filet frozen fish (3.2), and packaged medicines (2.6)
The Gambia	China (52), India (19), Mali (6.9), France (4.4), and United Kingdom (3.6)	China (29), Senegal (10), Brazil (8.5), United Kingdom (6.7), and India (6.3)	Rough wood (48), coconuts, Brazil nuts, and cashews (18), refined petroleum (6.8), ground nut oil (4.3), and titanium ore (4.0)	Light pure woven cotton (15), refined petroleum (5.6), raw sugar (5.3), rice (5.1), and palm oil (4.9)
Ghana	South Africa (27), United Arab Emirates (9.9), Switzerland (7.9), France (7.3), and Italy (6.7)	China (20), United States (9.6), Belgium-Luxembourg (5.2), United Kingdom (5.0), and Netherlands (5.0)	Gold (44), crude petroleum (18), cocoa beans (15), cocoa paste (2.3), and manganese ore (1.3)	Cars (5.5), delivery trucks (4.5), refined petroleum (3.8), large construction vehicles (2.4), and rice (2.2)
Guinea	India (13), Spain (12), Chile (12), United States (8.5), and Germany (8.2)	China (24), Netherlands (15), India (6.1), France (5.8), and United Kingdom (5.0)	Aluminium ore (51), petroleum gas (12), crude petroleum (11),	Refined petroleum (19), rice (4.7), rubber footwear (3.1), motorcycles (3.0), and

Table 2 (continued)

Country	Export destination	Import origin	Export products	Import products
			aluminium oxide (4.6), and gold (3.8)	packaged medicines (2.3)
Mali	South Africa (47), China (17), Switzerland (10), Burkina Faso (3.2), and Côte d'Ivoire (2.5)	Senegal (20), France (12), China (11), Côte d'Ivoire (8.2), and Benin (4.4)	Gold (59), raw cotton (14), prepared cotton (8.5), mixed mineral or chemical fertilizers (3.7), and bovine meat (2.9)	Refined petroleum (22), cement (4.7), packaged medicines (3.7), telephones (3.4), and rice (2.3)
Niger	France (40), Mali (7.4), United States (7.0), China (6.9), and India (5.6)	China (19), France (12), United States (6.1), Japan (5.0), and Togo (4.9)	Radioactive chemicals (41), refined petroleum (16), uranium and thorium ore (12), used clothing (5.1), and petroleum gas (5.0)	Rice (7.5), excavation machinery (4.0), cars (4.0), delivery trucks (3.9), and packaged medicines (3.5)
Nigeria	United States (17), India (11), Spain (7.3), Brazil (6.7), and South Africa (5.1)	China (19), United States (11), India (6.4), Netherlands (6.1), and United Kingdom (4.9)	Crude petroleum (72), petroleum gas (14), refined petroleum (5.3), rubber (2.2), and cocoa beans (1.4)	Refined petroleum (14.43), cars (6.54), rice (3.16), wheat (3.10), and telephones (2.80)
Senegal	Mali (22), India (11), Switzerland (10), Guinea (3.7) and Italy (3.1)	France (13), Nigeria (12), United Kingdom (7.0), China (6.4), and India (6.0)	Refined petroleum (19), gold (11), phosphoric acid (8.8), cement (6.9), and non-filet frozen fish (6.4)	Refined petroleum (16), crude petroleum (10), rice (6.2), packaged medicines (2.4), and petroleum gas (2.2)
Togo	Cameroon (10), India (9.5), Burkina Faso (8.5), Lebanon (8.2), and Ghana (7.7)	China (26), Netherlands (16), Belgium-Luxembourg (6.2), France (5.4), and Ghana (4.6)	Refined petroleum (12), cement (12), calcium phosphates (11), gold (11), and crude petroleum (3.8)	Refined petroleum (39), palm oil (2.3), petroleum gas (2.2), synthetic filament yarn woven fabric (2.1), and motorcycles (1.9)

Note: The values reported show the top five for each category and represent averages for 2012. The values in parentheses are the percentage share of each product in the total export/import basket of the country

Source: Authors' compilations based on Hausmann et al. (2011) and Simoes and Hidalgo (2011)

expected benefits in terms of job creation, service provision and the general multiplier effects (Table 2).

There are some reasons that could account for the above pattern. First, the cost of processing these products could require large initial investments that are not readily

available in some of the ECOWAS countries. In this case, the investment could be tied to the sophisticated technology necessary for value addition (Morrissey and Mold 2006). Second, most of the producers of the export products like cocoa and coffee are *atomistic* smallholders or are dominated by small number of large firms, who are involved in the production of raw value of these products and are at the bottom of the value chain, as well as, and suffer from the non-competitive behaviour of other agents along the chain (Depetris-Chauvin and Porto 2014). Third, the transaction costs to create value from these products could be high. High transaction costs include the cost of licensing, cost of transportation, cost of protecting property rights, etc., are regular features in the business environment of many ECOWAS countries, with Nigeria being at the forefront (Osabuohien and Efobi 2011; Asongu 2013, 2014; Efobi et al. 2014; Efobi 2015; Efobi and Osabuohien 2016).

In some of the member countries, there is a higher demand and taste for imported products than the locally produced substitute. For instance, Nigeria (like many other ECOWAS countries) has the capacity to be involved in rice production and export due to its fertile land and rich agro-climatic conditions. However, the country's local rice still accounts for less than 50 % of its local consumption. Instead, the country imports rice from Thailand, India and Brazil as urban consumers (who constitute a huge percentage of domestic consumers) prefer the imported rice to the locally grown rice (Depetris-Chauvin and Porto 2014).

Another relevant point to highlight from Table 2 is that there are a lot of similarities in the main export products of ECOWAS countries. For instance, most of these countries export agricultural products like cotton, tobacco, cocoa, sesamon, coffee, bovine animals, among others. Some others export natural resources like crude oil, gold, uranium, ore concentrates, among others. The main explanation for the similarity of exports can be traced to the inability of the ECOWAS countries to drive value addition by ensuring that some of the major export products are processed within the country and more sophisticated products are created from such a process (Efobi and Osabuohien 2016). This would not only increase trade diversity, but also increase the competitiveness of products from these countries in the global market. This is tied to the arguments of the contributors to the New Trade Theory that a country tend to witness economics of scale as it specialises in the value addition processes. Processing of the products would equally increase their shelf-lives and overcome the challenge of losing a large quantity of perishable agricultural products. This has remained a major problem in some ECOWAS member countries (Olayemi et al. 2012).

Taking a look at the top five export destination of ECOWAS countries, it is evident from Table 2 that most of ECOWAS exports are directed towards developed countries in Europe and America, and emerging countries in Asia. Countries like China, France, Germany, India, Indonesia, Netherlands, Spain, Switzerland, United Kingdom, and USA dominate the export destination of most of the ECOWAS countries. On a related note, it will be difficult to raise demand for ECOWAS export in the face of their production of similar primary products. The implications from the foregoing include: primary products and commodities remain

the major exporting products of ECOWAS countries. Processing these products could create diversity and then enhance specialisation, which will boost intra-regional tradability. This essential step will require a resilient and reliable financial sector to support such activities, which makes financial development a relevant factor of trade flows.

4.2 Analytical Framework: Financial Development and Trade

Beck (2002) provides a theoretical explanation on the possible linkage between financial sector development and trade by focusing on the role of financial institutions in facilitating high-return manufacturing projects. The main intuition from the author's model is that countries with a better-developed financial system have a higher export share and trade balance in manufactured goods. Pramesti (2010) tested this linkage by focusing on the bilateral trade relationship between United States, Japan and Germany, and 47 partner countries for the period 2003 to 2007. The author concurred with Beck's finding that financial development matters for trade. Thus, this study argues that value addition that will enhance intra-regional trade flow will require viable financial sector, which will provide capital to the firms for value adding activities.

With respect to trade, the financial sector plays important role to two key beneficiaries. It provides finance to facilitate the activities of the consumers as well as those of the producers. The major activity of the consumers, in relation to intra-regional trade is to import the produced goods from member countries and make it available for the local market (see Left hand side-LHS of Fig. 1). The producers, on the other hand, require the financial sector to fund their productive activities in both the primary sector as well as in value addition. This facilitates the volume of goods made available for export (see the right hand side-RHS of Fig. 1). Importantly, the financial sector provides finance in the form of trade credits and loans as an alternative source of funds to agents involved in international trade.

The value addition to enhance intra-regional trade flow will require a viable and resilient financial sector, which will provide capital to the households and firms for value adding activities. In essence, the development of the financial sector in ECOWAS member countries will provide support for firms to realise their potential of participating in international trade; for example by capturing markets within the regional bloc. This can be achieved by increasing the production of value-added commodities to reduce the extent of product similarity that can hinder trade among member countries. The common market structure of the ECOWAS commission makes it possible for the financial sector of member countries to play their intermediation role within the entire region. This implies that the financial sector of one member country can freely provide services in other member countries, thereby
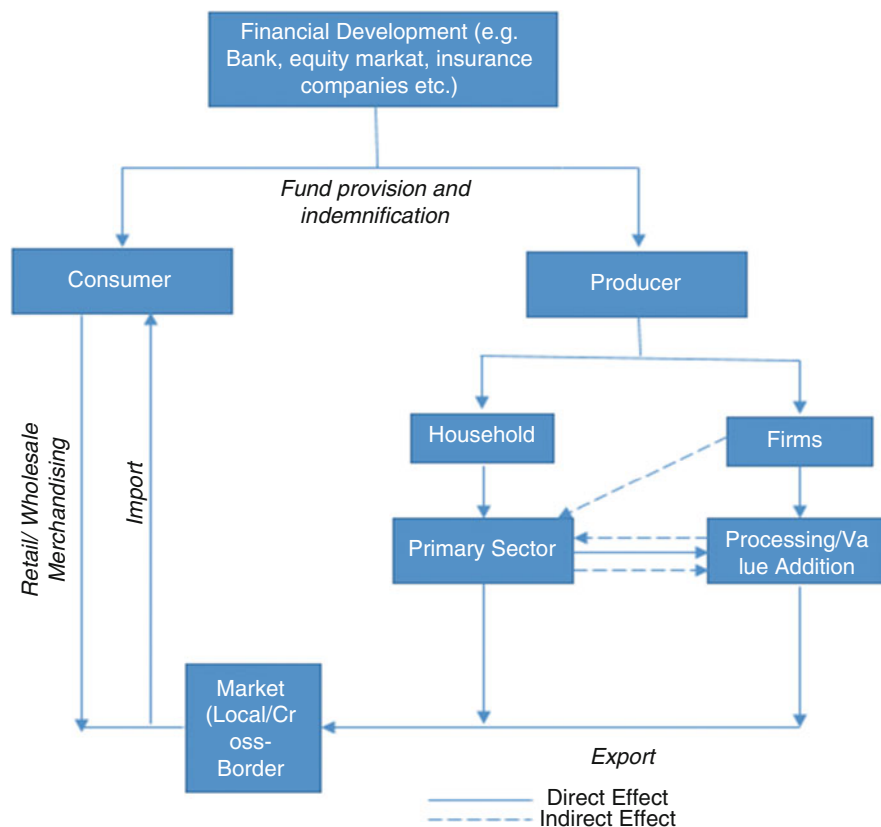
Fig. 1 Analytical linkage between financial development and trade flows. *Source:* Authors'

creating a broader network of financing opportunities for the development of industries.

An example of the participation of the financial sector is seen in the across border activities of some players in the Nigerian financial sector. Table 3 provides evidence on how the development of the financial sector in Nigeria has spanned across the ECOWAS sub-region. Most importantly, the presence of these banks in other countries in Africa will provide a wider span of development of the banking sector in the respective countries. This arises as a result of competition in the sector, thereby making other players to improve on their service delivery in order to maintain their market share. Another important outcome from this form of cross-border financial sector development is that it will create a uniform financial sector development trajectory for the member countries. For instance, the financial sector in ECOWAS member countries can portray uniform indices of development since other players (banks) can learn from the presence of these regional banks.

In assessing the relevance of financial sector development to the economies of ECOWAS countries, some indicators like broad money supply, domestic credit

Table 3 Cross border branches of selected Nigerian banks

Banks	Cross-border branches
Access Bank	Cote d'Ivoire, The Gambia, Ghana and Sierra Leone
United Bank for Africa (UBA)	Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea, Liberia and Sierra Leone
Guaranty Trust Bank (GTBank)	The Gambia, Ghana, Liberia and Sierra Leone
Zenith Bank	Ghana, Sierra Leone and The Gambia
Keystone Bank Limited	The Gambia, Ghana, Liberia and Sierra Leone

Source: Dada and Adeleke (2015: 102)

provided by the banking sector, and domestic credit to private sector all as a percentage of GDP are presented in Fig. 2a–c. Most of the countries experienced a slow but rising trend in their broad money supply to GDP; this is apart from Ghana that experienced marked fluctuations between the periods presented. Ghana's trend experienced a drastic reduction from 2009, which may be related to the global financial crisis.

The extent of domestic credit by the banking sector to the private sector as a percentage of GDP in Fig. 2b reveals that the banking sector contributes marginally to the economy. In effect, they have not been able to maximally support the real economy in terms of adequate provision of credit. Most of the banks engage in short term loans, which do not support much for business development with long gestation period such as agricultural and the manufacturing sectors. Most of the countries presented have the values below 35 % in terms of credit to the private sector for the period 2002–2010. Afterwards, some countries like Togo and Ghana witnessed slight increase.

Likewise, Fig. 2c presents the trend in domestic credit to private sector as a percentage of GDP for ECOWAS countries. A cursory look at the figure shows that most of the countries had values lower than 20 % for the period 2002–2010. Just a very few of the countries had values above this threshold. The value of the total domestic credit to the private sector in Nigeria between 2006 and 2009 witnessed sharp decline. The consolidation in the domestic banking sector in 2005, along with abundant capital in the wake of rising oil prices, can be associated with the rise of credit creation with significant flows to the private sectors. This boom ended in a burst with a systematic banking crisis in 2009: this accounts for the drastic reduction of the trend to almost 10 % for the remaining periods after 2009.

The reason for the low contribution of the financial sector to the economy of most countries in ECOWAS region can be traceable to a number of factors. Some of which include the size and structure of the players: many of the large banks in this region are relatively smaller when compared to mid-sized banks in high-income countries. The inaccessibility of capital seekers to funding from the financial sector players is another important drawback. In some of these countries, large segments of small firms, and even those in the agricultural sector, have limited access to formal financial services, thus resort to informal financials services (Osabuohien
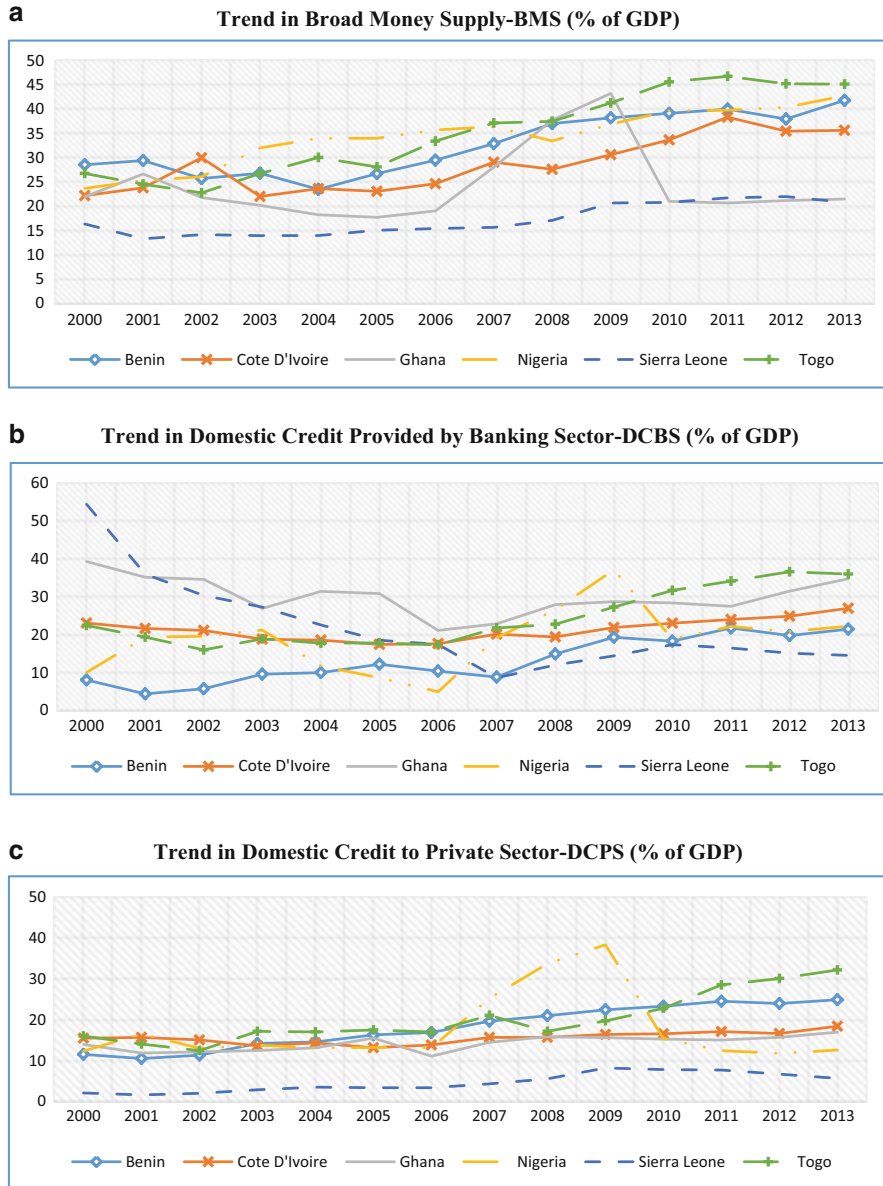
a

b

c

Fig. 2 (**a**) Trend in broad money supply-BMS (% of GDP). (**b**) Trend in domestic credit provided by banking sector-DCBS (% of GDP). (**c**) Trend in domestic credit to private sector-DCPS (% of GDP). *Note:* The countries plotted in the graphs are those with complete data within the period considered. BMS includes the sum of all money in circulation as a percentage of GDP; DCBS measures banking sector depth and financial sector development in terms of size. DCPS measures the amount of credit transmitted to the private sector for production, consumption and capital formation. *Source:* Authors' computation using data from World Development Indicators

and Duruji 2007; Griffith-Jones et al. 2014). The bottlenecks confronted in enjoying the services of banks accounts for a major explainer of the reasons for the limited access to financial services. Some of the criteria for accessing fund from the banks, in terms of collateral and documentations, are so high (Beck and Cull 2013); this discourages small firms. This leaves these firms disadvantaged—in terms of capital base—compared to competitors. As a consequence, most of these firms depend on internal cash flow as a major source of investment finance. This is probably why most of them have not been able to engage in huge capitalisation to break into the export market.

Noting the trend in the extent of development of the financial sector and the performance of intra-regional trade flow among ECOWAS countries, we test, using the gravity model, our intuition on the performance of the financial sector having a contributory effect on the extent of intraregional trade flow.

5   Results from Econometric Estimations

The regression results for the augmented gravity model are presented in Table 4. The Table comprise estimates from the Panel Ordinary Least Squares (POLS), the fixed and random effects, the Poisson Pseudo-Maximum Likelihood (PPML), as well as the Generalised Method of Moments (GMM) estimation techniques. The POLS results constitute the benchmark analysis, in which it is observed whether the variables included in the model significantly explains the level of bilateral trade flows before proceeding to the PPML and GMM results.

As a check, the overall significance of the POLS model is examined. Columns 1–3 of Table 4 present the Wald statistics at the lower segment. It reveals that the overall model is significant, implying that the independent variables jointly have explanatory power in explaining the dependent variable. Specifically, the POLS results show the following: the income levels of both the exporter and importer countries are important in determining bilateral trade flows in ECOWAS countries. A 1 % increase in exporter GDP explains a 0.26 % increase in trade, while a 1 % increase in importer GDP explains a 0.18 % increase in trade. The results from the POLS are treated with some elements of caution given the weaknesses of POLS; hence, the results from the PPML and GMM are discussed herein.

The PPML and the GMM are alternative estimation techniques that attenuate the weaknesses of the POLS. As a result, more reliable estimates from the PPML and GMM estimation compared to the POLS are presented in Columns 5 and 6 in Table 4. Compared to the POLS results, the coefficients obtained from PPML point to the same direction but are considerable smaller. From the table, income of the exporter and importer countries, distance, bilateral trade cost, common language and common coloniser are important determining factors that explain bilateral trade flow in ECOWAS sub-region.

Focusing on the financial development of the exporting country, the variable is significant using both the PPML and the GMM estimators (i.e. Columns 5 and 6).

Table 4 Econometric results on the determinants of trade flows

Dependent variable: bilateral trade flow

	(1)	(2)	(3)	(4)	(5)	(6)
	POLS	Random effects	Random effects (robust)	Fixed effects	GMM (system)	PPML
Exporter_GDP	0.260***	0.253***	0.253***	0.813	0.812	0.0465***
	(0.041)	(0.057)	(0.068)	(0.951)	(0.574)	(0.008)
Importer_GDP	0.183***	0.180***	0.180***	1.647*	0.789	0.034***
	(0.039)	(0.055)	(0.057)	(0.929)	(0.594)	(0.007)
Exporter_FD	−0.254*	−0.077	−0.077	−0.0418	1.329**	0.047**
	(0.131)	(0.159)	(0.159)	(0.261)	(0.518)	(0.020)
Importer_FD	−0.171	−0.084	−0.084	−0.140	1.546***	0.0333**
	(0.111)	(0.139)	(0.217)	(0.248)	(0.507)	(0.029)
Bilateral trade costs	0.178***	0.126***	0.126***	0.129***	0.035*	0.033***
	(0.024)	(0.023)	(0.033)	(0.0276)	(0.057)	(0.005)
Distance	−0.400***	−0.375**	−0.375**	−	−18.620***	−0.073***
	(0.111)	(0.157)	(0.186)		(6.519)	(0.021)
Common coloniser	−0.273	−0.342	−0.342		−31.390***	−0.046*
	(0.265)	(0.375)	(0.222)		(8.743)	(0.027)
comlang_off	0.936***	0.992***	0.992***	−	22.480***	0.165***
	(0.261)	(0.368)	(0.256)		(4.577)	(0.032)
Contiguity	0.029	0.007	0.007		58.99***	0.007
	(0.151)	(0.214)	(0.216)		(20.300)	(0.023)
Btrade_l	−		−	−	−0.134	
					(0.124)	
Constant	4.940***	4.321***	4.321**	−15.47**	−132.2***	1.606***
	(1.015)	(1.402)	(1.740)	(6.009)	(42.34)	(0.187)
Observations	805	805	805	805	671	805

(continued)

Table 4 (continued)

Dependent variable: bilateral trade flow

	(1)	(2)	(3)	(4)	(5)	(6)
	POLS	Random effects	Random effects (robust)	Fixed effects	GMM (system)	PPML
R-squared	0.189	–	–	0.037	–	0.170
F-test (Wald tests)	20.63	90.43	35.05	5.14	98.56	–
F-test (p-values)	0.0000	0.0000	0.0001	0.0001	0.000	–
Hansen	–	–	–	–	0.515	–
AR (1)	–	–	–	–	0.002	–
AR (2)	–	–	–	–	0.780	–
AR (3)	–	–	–	–	0.624	–
Number of Instruments	–	–	–	–	17	–

Some robustness checks were carried out such as the inclusion of the variable *remoteness*. There was no much change in the pattern of the result; hence, not reported for space

Note: Btrade_1 is the bilateral trade flow of the previous years. The variables are in their logged values. Standard errors are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1

Source: Authors'

This suggests that an improvement in the exporter's financial sector is an important factor in accounting for the variation in bilateral trade flow of ECOWAS countries. Since we are relying on the PPML and SGMM estimation techniques for inference, the results from Table 4 confirm the importance of the financial development in ECOWAS countries can exert influence on the bilateral trade flows in ECOWAS sub-region.

The mechanisms through which financial sector development affects trade flows are twofold: First, the financial sector plays an intermediary role by receiving funds from the surplus unit of the society and making it available to the deficit unit for investment and production. In the case of ECOWAS countries, the financial sector can enhance intra-regional trade by providing finance to business activities especially those that are involved in trade, leading to the expansion and production prospects. Thus, allowing businesses to develop the capacity to supply neighbouring countries with their products. When business activities are supported, in terms of making capital easily accessible and less costly, they can expand, and neighbouring countries can benefit from the supply of this unique product. This result supports the UNCTAD (2015) report that the support of the private sector, especially through creation of cheaper and easily accessible credit, will bring about the realisation of regional integration.

Second, the improvement of the financial sector will reduce the transaction cost associated with banking services for intra-regional trade. Most cross-border transactions may not require the transfer of physical cash because of its diverse risks (e.g. theft and other security issues) and costs (e.g. time and economic resources). Policies geared towards improving transparency and efficiency in banking operations as well as curtailing money laundering will build public confidence in the financial sector of both the exporting and importing countries in ECOWAS. This is relevant because in countries where the financial sector is not developed, the transfer of funds between suppliers and customers slows down the execution of the business. Through these channels, financial sector development can influence intra-regional trade.

In furtherance, apart from the significance of the variable of interest, it is also important to comment on the elasticity of the variables. This is because as a double logged model, we interpret the estimates in terms of their elasticity. While the PPML reports that the significant relationship between the financial development and trade flows is inelastic (implying that changes in the independent variable would lead to less than proportionate change in the dependent variables), the GMM result shows that the parameter estimates are elastic. This implies that small changes in the independent variable would result in more than proportionate change in bilateral trade flow.

Since we are relying on the PPML and SGMM estimation techniques for inference, the results from Table 4 confirm the importance of the financial development sector in improving bilateral trade among ECOWAS countries. The mechanism through which the financial sector development affects trade flow can be explained in two facets: first, the financial sector plays an intermediary role by receiving fund from the surplus unit of the society and making it available to the

deficit unit for investment and production. In the case of ECOWAS countries, the financial sector can enhance intra-regional trade by providing finance to business outfits and small businesses, leading to the expansion and production prospects. This will make businesses to develop the capacity to supply neighbouring countries with their products. A relevant example is the textile industry in Nigeria. Some of the players in the industry are small-scale businesses that engage in *tie* and *dye* for small number of customers. When these businesses are supported, in terms of making capital easily accessed and less costly, they can expand their production and neighbouring countries can benefit from the supply of this unique product. For the importing country, the financial sector can provide upfront capital, guarantee loans and other source of relevant finance to facilitate the import of products from the neighbouring countries. The overall effect is that the value of the consumers in both the importing and exporting country will be enhanced.

Second, the improvement of the financial sector will reduce the transaction cost associated with banking services for intra-regional trade. Most cross-border transactions may not require the transfer of physical cash because of the diverse risks (e.g. theft and other security issues) and costs (e.g. time and economic resources) of this form of cross-border transaction. The above suggests that policies geared towards improving transparency and efficiency in the banking operations as well as curtailing money laundry will help in building public confidence in the financial sector of both the exporting and importing countries in ECOWAS. All of these will have influence on intra-regional trade.

6   Summary and Conclusion

This study, which is motivated, among others, by the debate on the role of financial development (FD) as a determinant of bilateral trade performance, provides an empirical investigation on the effects of FD and trade cost on bilateral trade flows in Economic Community of West African States (ECOWAS) for the period 2006 to 2013. This is deemed crucial based on the fact that low level of intra-regional trade is witnessed in ECOWAS and a number of countries within the ECOWAS sub-region have shown some efforts to integrate the financial sector. It argues that an improvement in FD in the member countries will provide one of the required structures that will increase bilateral trade flows.

To achieve its objective, the study engages both descriptive and econometric analyses. The econometric aspect utilises the augmented gravity model of trade to explain the effects of FD on bilateral trade flows, which is estimated using Panel Ordinary Least Squares, Poisson Pseudo-maximum Likelihood and Generalised Methods of Moments techniques. A number of findings are made and the major ones are summarised herein.

Most of the exported products by ECOWAS countries are of low value added composition: they are mainly in their raw state or in few cases semi-processed. The implication of this is that most ECOWAS countries do not process their products,

which reduces the value-chain and limits the associated potential to trade among themselves. Thus, efforts and policies such as increased investments in the processing of products in ECOWAS countries will be laudable in enhancing the intra-regional tradability as it will help to reduce the effects of too many similarities in the main line of export products. This will increase trade diversity and intensify the penetration as well as competitiveness of their products.

Evidences also show that the monetary assets available in many economies of the ECOWAS sub-region are quite low with minimal contribution of the banking sector to their economies. This might have resulted from a number of challenges such as low level of infrastructural provision faced by the banking sector in ECOWAS member countries, which limits their provision of broad-based financial services. This denotes that for the financial development to witness satisfactory improvement there is the need to boost the services from the banking sector, which will eventually enhance trade flows.

It is established that FD of both exporting and importing countries are significant determinants of bilateral trade flows in ECOWAS. This connotes that when there is increased credit availability to the private sector, there will be marked improvement in the level of bilateral trade flows. Thus, it is recommended that policies such as more transparent and efficient banking operations and curbing illicit money laundry be pursued with resilience with a view to enhancing the development and public confidence in the financial sectors of both the exporting and importing countries in ECOWAS. This will help to boost the flow of credit to firms that are involved in trading activities within the ECOWAS sub-region. The role of the ECOWAS Commission as a regional focal point in encouraging member countries to actively position their financial sector in this wise is essential.

As a suggestion for further research, it will be expedient to complement this study using other components of financial development that covers access, efficiency and stability. It is also recommended that further studies examine the role of financial development in influencing bilateral trade flows in other regional economic communities in Africa such as COMESA, ECCAS, EAC and SADC, with a view to comparing their experiences with that of ECOWAS.

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