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RESEARCH ARTICLE

ASSESSMENT OF REGIONAL ECONOMIC INTEGRATION AND THE NIGERIAN ECONOMY: A CASE STUDY OF ECOWAS

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ABSTRACT

Assessing the regional economic integration taking as a case study the Economic Community of West African (ECOWAS), we set off to empirically validate its essence in terms of benefits to its member countries in relation to the possible factors that might determine these benefits so as rationalize the decision to belong in an economic integration. Employing the random effect estimation methods on the longitudinal series from inception of the economic integration till 2014, we discovered that the member states benefit from being the economic community and these benefits are unequal as shown by the arrow plot. However, we also found out that these benefits do not depend on the level of openness of each member state. We hereby recommend that the ECOWAS body should take all necessary actions to ensure that all member states benefit positively.

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INTRODUCTION

Regional Economic Integration is a combination of two or more economies in geographical locations to establish economic relationship that will improve the standard of living of her citizenry. In other words, it is the unification of economic policies between different economies through the partial or full abolition of tariff and non-tariff restrictions on trade taking place among them prior to their integration. This is meant in turn to lead to lower prices for distributors and consumers with the goal of increasing the level of welfare, while leading to an increase of economic productivity of the states. Every economy wants to grow and develop more than it would have been if it operates at self-sufficiency. In other to do this, economies have to open up for relationships with one another. This means that economies come together to form an economic integration and as a result moves the economy from a closed to an open economy with import and export now playing a major role in economic wellbeing. It is important to note however, that distances amongst these economies will play a significant role in determining cost and prices of imports and exports. Therefore, economies in a region try to form an integration to boost their economies. There are several examples of Regional Economic Integrations (REI):

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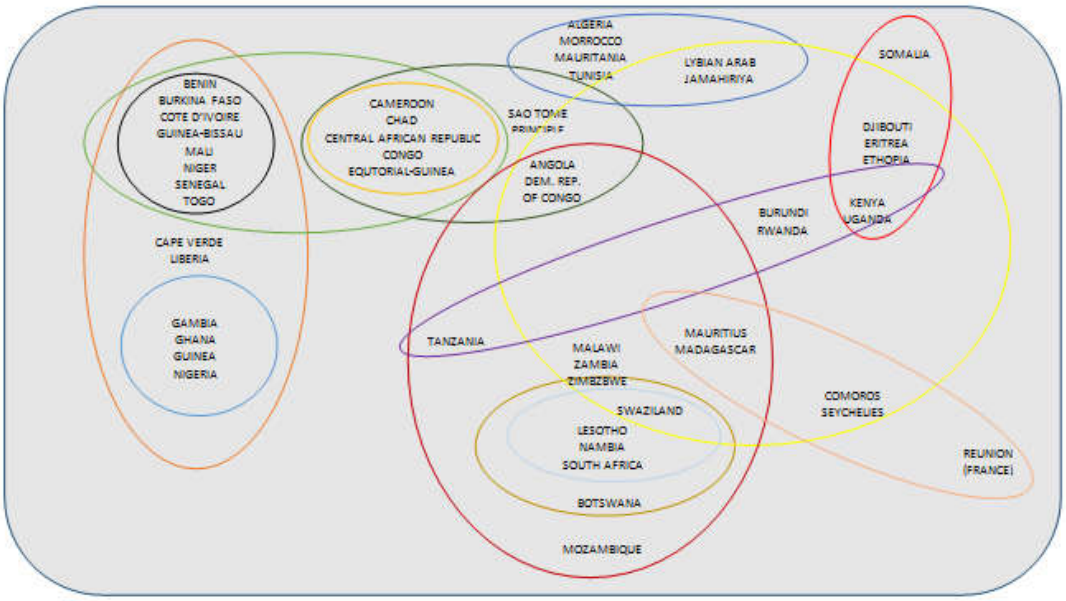
The Euro Zones (EZ) and European Union (EU) in Europe, African Unity (AU) in Africa, Economic Community of West African States (ECOWAS) in West Africa, Economic Community of Central African States (ECCAS) in Central Africa, Common Market for Eastern and Southern Africa (COMESA) in southern Africa, South African Development Community (SADC), etc. Regional integration ideas in Africa dated back to the introduction of the South African Customs Union (SACU) in 1910 and also the introduction of the East African Community (EAC) in 1919. Since then, other regional economic integrations have been formed worldwide. Therefore, Regional Economic Integration has now become the global phenomena. The above examples are shown diagrammatically in Figure 1 below. ECOWAS as a case study: The Economic Community of West African States is a regional organisation of fifteen (15) West African countries as shown in figure 1 above. It was established on 28th May 1975. It is main objective is to promote economic wellbeing of its member states and to enhance development in West Africa. ECOWAS is the cardinal pillar for African Economic Community (AEC).The establishment of ECOWAS was proposed by Liberian President William Tubmen in 1964. The first agreement was signed among Cote d'Ivoire, Guinea, Liberia, and Sierra Leone in February 1965, but it was a futile action. In April 1972, General Yakubu Gowon of Nigeria and General Eyadema of Togo re-lunched this idea and drew up proposals, which finally brought together fifteen (15) West



= UEMOA (West African Economic & Monetary Union)
= WAMZ (Weat African Monetary Zone)
= ECOWAS (Economic Community of West African States)
= CEMAC (Central African Economic & Monetary Community)
= CFA (France Zone)
= ECCAS (Economic Community of Central African States)
= UMA (Arab Maghreb Union)
= COMESA (Common Market for Eastern and Southern Africa)
= IGAD (Inter-Governmental Authority on Development)
= SADE (Southern African Development)
= EAC (East African Community)
= IOC (Intergovernmental Oceanographic commission)
= CMA (Common Monetary Area)
=SACU (South African Custom Union)

Figure 1. Regional Integration in Africa Source

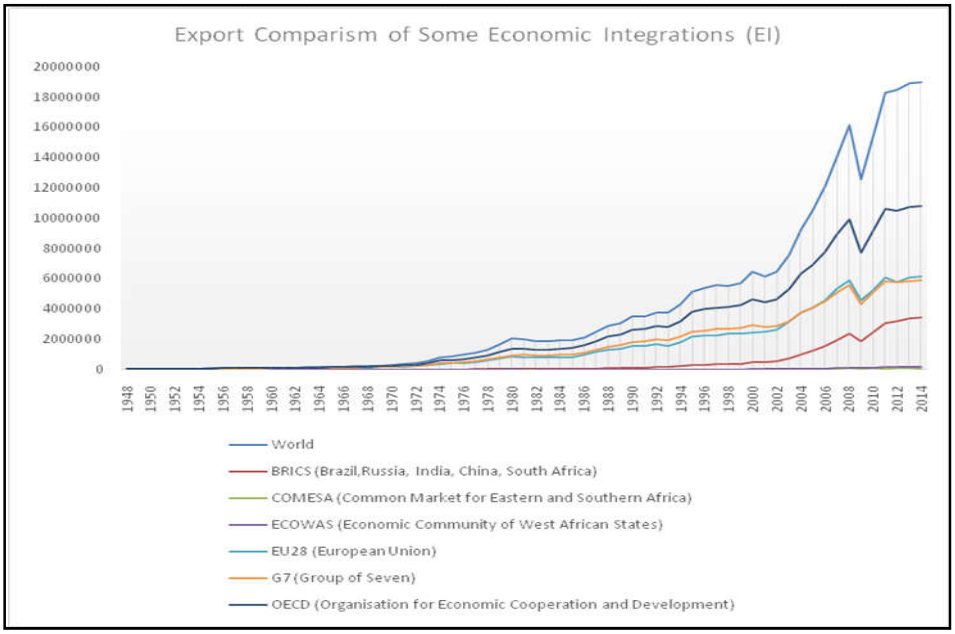


Figure 2. Exports of some Economic Integration

African Countries into consenting the Agreement on 28th May 1975 (Lagos Treaty) while the protocol lunching ECOWAS were signed at Lome in Togo on 5th November 1976. In addition to regional level agreements, efforts have also been made to create economic cooperation among African countries. These effortsled to the adoption of the African Economic Community Treaty in 1991, effective from 1994. (Johnson, 1995, Lyakurwa, 1997, Foroutan and Prichett 1993). A number of reasons have been identified as causes for the slow progress in most regional integration in Africa. Chief among these reasons, are unwillingness of governments to:

- surrender sovereignty of macroeconomic policy making to regional authorities.
- face potential consumption costs that may arise by importing from a high cost member country.
- accept unequal distribution of gains and losses that may follow an integration agreement.
- discontinue existing economic ties with non-members.

(Johnson, 1995, pg. 213, Lyakurwa et al, 1997, pg. 176) There are conscientious efforts to invigorate the process of integration of African economies. First and foremost, by formulating and strengthening various regional blocks in Africa. Secondly, the idea of trade liberalization undertaken by most African countrieshas created a favourable environment for economic cooperation and trade liberalization policies. Whether these factors, among others, are sufficient to take the integration initiative to a higher level or not is subject to investigation. The ECOWAS organization was founded in order to achieve "collective self-sufficiency" for its member states by creating a single large trading bloc through an economic and trading union. It also serves as a peacekeeping force in the region.

From the foregoing, the position of ECOWAS in export among other economic integrations is apparent as shown in Figure 2. As shown by the chart above, it is evident that ECOWAS is amongst the least exporting Economic Integration. This means that ECOWAS contribution to the rest of the world when it has to do with the export of goods and services is very poor and almost insignificant in the world market. This implies that the ratio of ECOWAS' exports is approximately zero. The implication is that ECOWAS is not fulfilling its goals in the member countries as it has to do with the production and distribution of goods and services in these economies. Figure 3 below shows the ratio of the exports and imports of ECOWAS to that of the total world exports and imports respectively, the highest attained percentage of ECOWAS contribution on

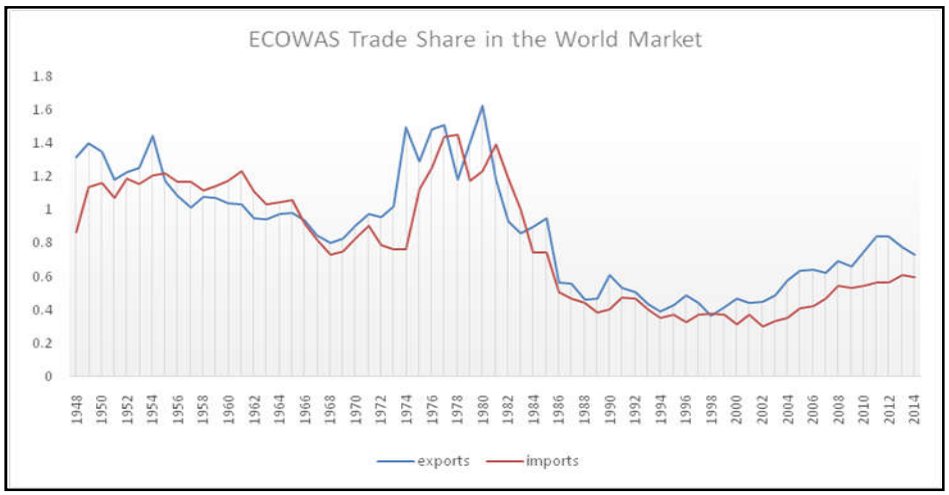


Figure 3. ECOWAS Trade Share in the World Market

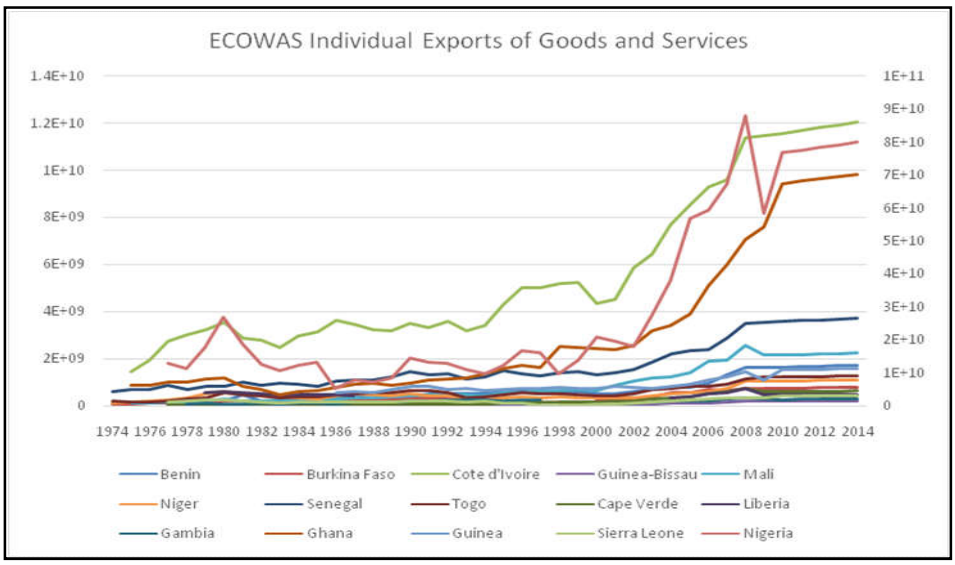


Figure 4. ECOWAS member states' exports

My worry is that ECOWAS is not focused on her main objective as stated above. Unlike other Regional Economic Integrations, ECOWAS has not been doing so well in Trade with respect to other economic integrations. Nigeria is supposed to be growing more than its actual rate of growth annually, for being a member of ECOWAS. Even at being a member, there are several macroeconomic problems inherent in Nigeria which is not supposed to be. This may include rapidly depreciating exchange rate, rapid growth of the unemployment rate, low productivity, high rate of crime, starvation, poverty, deficit balance of trade, etc.

Exports to the rest of the world is 1.6%. This raises cause for worry, why is other regional economic integrations doing better than ECOWAS, what needs to be done, what have not been done to boost the economies of the member states of ECOWAS? Considering the individual exports of the fifteen (15) member states of ECOWAS, it is observed that Nigeria contributes about 40% of the total exports followed by Ghana and Cote D'Ivoire but with a big gap between them and Nigeria. In addition, looking at the composition of the exports of Nigeria, one would see that it is almost 95% crude oil exportation.

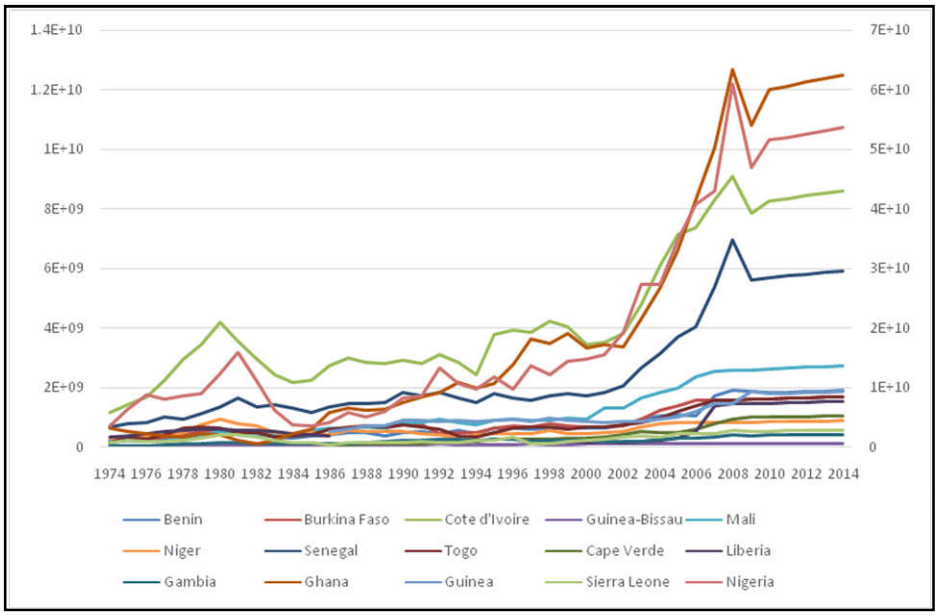


Figure 5. ECOWAS member states' imports

This is a problem for Nigeria and ECOWAS. From the above figure 5, it is obvious that Just as Nigeria is taking the upper hand in the exports of ECOWAS economies, so it's taking the upper hand in the imports of ECOWAS. It is not really about the percentage or ratio of imports or exports in these ECOWAS economies but their net exports. Are they importing less than they export and vice versa? Every economy that strives to grow and develop is to import less than it exports and this will imply that the real sector is efficient and encourages foreign direct investments (FDI) from other economies of the world. This research work will establish whether Nigeria is benefitting from being a member of a Regional Economic Integration (REI) known as ECOWAS or not. If Nigeria is benefitting, what is the force of the relationship that exists between Nigeria and the rest of ECOWAS economies? Does the benefits of each member state depends on the level of trade openness of that member state? These findings will be helpful to decision makers at all levels as regards the growth and development of Nigeria. Policy Makers at the federal level will be able to rationalize polices that will make Nigeria to benefit from belonging to a Regional Economic Integration. Specialists in the academia will also be able to understand the intricacies of Nigeria belonging to a REI and even research further to find the possibilities of Nigeria benefiting from being a member of any regional community or not.

This research work will be guided by the following research questions:

- Is Nigeria benefiting from being a member of ECOWAS?
- Is there any force of gravity (attraction)between Nigerian economy and other ECOWAS economies?
- Does the benefit of an ECOWAS member state depend on the level of trade openness of that state?

THEORETICAL LITERATURES

The issue of whether economic integration through trade and increased openness would lead to higher rate of economic growth is an age-old question which has sustained debate between pro-traders and protectionists over the years from classicalists like Adam Smith, John Stuart Mill, to John Maynard Keynes, Raul Prebisch, Hans Singer, Paul Krugman and so on. The protectionist school of thought believes that protecting infant and domestic industries from imported goods will lead to a higher economic growth. This is a general statement of the "Infant-Industry Hypothesis," which states that manufacturing sectors in underdeveloped economies must be protected from competition in order to have the incentive to invest capital, learn how to produce goods efficiently, take advantage of scale economies through large-scale production, and develop innovative or distinctive products that can be sold on world markets. The broadest application of the infant-industry argument for Isolation from global markets emerged in the widespread use of import substitution policies in developing countries. A policy of import substitution for Industrialization purposes (ISI) involves extensively controlling virtually all components of the economy in order to direct resources into manufacturing. It is an old idea, but its modern origins come from economists writing in the 1950s and1960s (Arthur Lewis, Raul Prebish, Hans Singer, Gunnar Myrdal), who claimed that developing economies faced two fundamental problems.

First, their status as primary-commodity exporters left them vulnerable to world swings incommodity prices (e.g., oil, sugar, tin, copper, etc.) and in the long run, commodity prices would decline relative to manufacturing prices and costs of new technologies. Second, because developing countries have high population growth rates and abundant labour supplies, it would be difficult to absorb workers into primary production. Rather than waiting for comparative advantage to push resources into labour-intensive manufacturing, it would be better to force industrialization through ISI policies. Such programs became common in the1950s throughout Latin America, Africa, the Middle East, South Asia and Southeast Asia. However, the question is whether such policies have limited growth. Evidently, many other factors are at work. What seems clear is that such countries which have not performed well in terms of acquiring and improving technologies, have lagged significantly behind in product innovation and adaptation. Thereby experiencing inefficient and distorted agricultural and manufacturing sectors. They have not performed well in building human capital, physical

capital, and infrastructure. Thus, these sources of growth have likely been limited in countries pursuing ISI programs. The pro-tractor school of thought on the other side believes that opening an economy for trade like economic integration leads to economic growth and development. This is the basic hope underlying trade-reform programs that involve extensive liberalization of trade and investment barriers, reduction of controls on technology transfers, unification of tariff rates and domestic tax rates, removal of consumption and production subsidies, deregulation of industry and privatization of state owned enterprises. It is the essential philosophy behind World Bank loans to facilitate restructuring and IMF lending packages that require microeconomic structural reforms. It is also a very old idea (going back to Adam Smith and David Ricardo) but its modern translation into trade liberalization largely began with the reforms in Chile in the 1970s advocated by the "Chicago School" of economists (e.g. Milton Friedman, George Stigler).A somewhat different version of this approach is (to contrast it with ISI) called Export promotion, which is the policy followed largely by East Asian and Western countries. These approaches are not necessarily liberal in the sense of free competition. There are many examples of sheltered and subsidized domestic firms or industrial groupings; much of this protection was designed to encourage infant industries to mature and export. However, the key component of export promotion programs is not to encourage exports.

THEORY OF CUSTOMS UNIONS AND FREE TRADE AREAS

Since the end of the World War II, there had been several attempts to promote trade through the creation of international and regional trade agreements in the form of customs unions and free trade areas. Free trade area is a form of economic union in which all members of the group remove tariffs on each other's products, while at the same time each member retains its independence in establishing trading policies with non-members. In other words, the members of a free trade area can maintain individual tariffs and other trade barriers on the outside world. That means, in a free trade area, barriers to trade are removed within the area, but there is no common external tariff. Also, free trade areas create trade, but the extent of trade diversion is likely to be much less, with the presumption that on narrow economic grounds free trade areas are superior. On the other hand, a customs union is a form of economic integration in which all tariffs are removed between members and the group adopts a common external commercial policy toward non-members. Furthermore, the group acts as one body in the negotiation of all trade agreements with non-members. The existence of the common external tariff takes away the possibility of transhipment by non-members. Customs Unions create trade, but also divert it from lower cost suppliers to higher cost suppliers within the Union. Thus, the question is whether the benefits of trade creation exceed the costs of trade diversion. Apart from trade creation and trade diversion, Customs Unions may also have other important effects associated with the enlargement of the market which are neglected by the static analysis. Firstly, the larger market may generate economies of scale. Secondly, integration is likely to promote increased competition which is likely to affect favourably prices and costs, and the growth of output. Thirdly, the widening of markets within a Customs Union is likely to attract international investment. Producers will prefer to produce within the Union rather than face a common external tariff from outside. Finally, if the world supply of output is not infinitely elastic, there are terms of trade effects to consider. Specifically, if there is trade diversion, the world price of the good will fall, moving the terms of trade in favour of the Customs Union. This term of trade effect represents a welfare gain which may partly offset the welfare loss of trade diversion. The two forms of economic integration discussed above are likely to be inferior to a policy of unilateral tariff reductions, and therefore need to be justified on other economic or non-economic grounds. Thus, De Melo, Panagariya and Rodrik (1993) suggest three channels through which regional integration could alter economic outcomes for the better. Firstly, a regional trade agreement entails a larger political community which might lessen the scope for adverse discretionary actions by governments and in particular restrict the power of growth-retarding political interest groups, unless politically powerful lobbies can form alliances across countries. Secondly, when a regional institution is set up, better choices may be made than at the nation-state level, where policy-makers have to contend with existing institutions that accommodate factional interests. Thirdly, when participating countries have different economic institutions, policy-making at the regional level will entail a compromise between those institutions and may lead to a superior outcome for at least some member countries. For example, if a Customs Union adopts as its common external tariff, the average tariff of the Union, at least some members must benefit. Nevertheless, the World Bank is generally hostile to regional trading blocs, despite the potential political and economic benefits, because of their relatively inward-looking nature (Thirlwall, 2000).

THEORY OF TRADE

The doctrine that trade enhances welfare and growth has a long and distinguished ancestry dating back to Adam Smith (1723-90). In his famous book, An Inquiry into the Nature and Causes of the Wealth of Nations (1776), Smith stressed the importance of trade as a vent for surplus production and as a means of widening the market thereby improving the division of labour and the level of productivity. He asserted that "between whatever places foreign trade is carried on, they all derive two distinct benefits from it. It carries the surplus part of the produce of their land and labour for which there is no demand among them, and brings back in return something else for which there is a demand. It gives value to their superfluities, by exchanging them for something else, which may satisfy part of their wants and increase their enjoyments. By means of it, the narrowness of the home market does not hinder the division of labour in any particular branch of art or manufacture from being carried to the highest perfection. By opening a more extensive market for whatever part of the produce of their labour may exceed the home consumption, it encourages them to improve its productive powers and to augment its annual produce to the utmost, and thereby to increase the real revenue of wealth and society."(Thirlwall, 2000). We may summarise the absolute advantage trade theory of Adam Smith thus; countries should specialise in and export those commodities in which they had an absolute advantage and should import those commodities in which the trading partner had an absolute advantage. That is to say, each country should export those commodities it produced more efficiently because the absolute labour required per unit was less than that of the prospective trading partner. (Appleyard and Field, 1998) In the 19th century, the Smithian trade theory generated a lot of arguments.

Thisled to David Ricardo (1772-1823) to develop the theory of comparative advantage and showed rigorously in his Principles of Political Economy and Taxation (1817)that on the assumptions of perfect competition and the full employment of resources, countries can reap welfare gains by specialising in the production of those goods with the lowest opportunity cost and trading the surplus of production over domestic demand, provided that the international rate of exchange between commodities lies between the domestic opportunity cost ratios. These are essentially static gains that arise from the reallocation of resources from one sector to another as increased specialisation takes place based on comparative advantage. These are the trade-creation gains that arise within Customs Unions or Free Trade Areas as the barriers to trade are removed between members. Once the tariff barriers have been removed, and no further reallocation takes place, the static gains are exhausted. The static gains from trade stem from the basic fact that countries are differently endowed with resources and because of this the opportunity cost of producing products varies from country to country. Opportunity cost is measured by the marginal rate of transformation between one good and another, as given by the slope of the production possibility curve; that is, by how much one good has to be sacrificed in order to produce another. The law of comparative advantage states that countries will benefit if they specialise in the production of those goods for which the opportunity cost is low and exchange those goods for other goods, the opportunity cost of which is higher. That is to say, the static gains from trade are measured by the resource gains to be obtained by exporting to obtain imports more cheaply in terms of resources given up, compared to producing the goods oneself. In other words, the static gains from trade are measured by the excess cost of import substitution; by what is saved by not producing the imported good domestically. The resource gains can then be used in a variety of ways including increased domestic consumption of both goods (Thirlwall, 2000).

On the other hand, the dynamic gains from trade continually shift outwards the whole production possibility frontier of countries if trade is associated with more investment and faster productivity growth based on scale economies, learning by doing and the acquisition of new knowledge from abroad, particularly through foreign direct investment. The essence of dynamic gains is that they shift out wards the whole production possibility frontier by augmenting the availability of resources for production through increasing the productivity of resources and increasing their quantity. One of the major dynamic benefits of trade is that export markets widen the total market for a country's producers. If production is subject to increasing returns, export growth becomes a continual source of productivity growth. There is also a close connection between increasing returns and the accumulation of capital. For a small country with no trade there is very little scope for large scale investment in advanced capital equipment; specialisation is limited by the extent of the market. But if a poor small country can trade, there is some prospect of industrialisation and of dispensing with traditional methods of production. It is the dynamic gains from trade that are focused on in modern trade theory such as the Heckscher-Ohlin trade theory.

MODELS OF EXPORT-LED GROWTH

The three main models of export-led growth that will be discussed are the Neo-classical supply-side model, the balance of payments constrained model which is also known as the Hicks super-multiplier model and the virtuous circle model.

THE NEOCLASSICAL SUPPLY-SIDE MODEL

This model shows the relationship between exports and growth, and assumes that the export sector confers externalities on the non-export sector, because of its exposure to foreign competition and secondly that the export sector has a higher level of productivity than the non-export sector. Thus, the share of exports in GDP, and the growth of exports, matters for overall growth performance. Feder (1983) was the first to provide a formal model of this type to explain the relation between export growth and output growth. The output of the export sector is assumed to be a function of labour and capital in the sector; the output of the non-export sector is assumed to be a function of labour, capital and the output of the export sector (so as to capture externalities), and the ratio of respective marginal factor productivities in the two sectors is assumed to deviate from unity by a factor d. Feder tests the model takinga cross section of 19 semi-industrialised countries and a larger sample of 31countries over the period 1964-73. He finds that there are substantial differences inproductivity between the export and non-export sector and also evidence of externalities. The externalities conferred are part of the dynamic gains from trade which are associated with the transmission and diffusion of new ideas from abroad relating to both production techniques and efficient management practices. The cross-section work on exports and growth assumes, however, that all countries in as ample conform to the same model, with the same intercept and coefficient parameters linking exports and growth. In practice, this is highly unlikely to be the case; and it transpires, in fact, that when time series studies are conducted for individual countries, the relation between exports and growth is much weaker.

BALANCE OF PAYMENTS CONSTRAINED GROWTH MODEL

No country can grow faster than that rate consistent with balance of payments equilibrium on current account in the long run, unless it can finance ever-growing deficits which, in general, it cannot. Ratios of deficit to GDP of more than 2%-3% start to make the international financial markets nervous, and all borrowing eventually has to be repaid. A country's balance of payments equilibrium growth rate can be modelled by stating the balance of payments equilibrium condition, specifying multiplicative (constant elasticity) import and export demand functions in which imports and exports are a function of domestic and foreign income respectively and of relative prices by substituting these functions in the equilibrium condition. Since imports are a function of domestic income, the model can be easily solved for the growth of income consistent with balance of payments equilibrium. Nureldin-Hussain (1995) applied this model to Africa to contrast the experience of slow growing African countries with the faster growing countries of Asia over the period 1970-90. He uses an extended model which also includes terms of trade effects and the effects of capital flows. The major explanation of the difference in growth rates between Africa and Asia turns out to be the difference in the growth of exports. He finds that the average growth of the African countries, excluding oil exporters, was 3.4 percent per annum, and of the Asian countries 6.6percent. The contribution of export growth in Africa was 1.99 percentage points and in Asia 5.91 percentage points. Differences in capital flows and terms of trade movements made only a minor contribution to

growth rate differences. Thus, he concluded that exports are unique as a growth-inducing force from the demand side because it is the only component of demand that provides foreign exchange to pay for the import requirements for growth. In this sense, it allows all other components of demand to grow faster in a way that consumption-led growth or investment-led growth does not.

VIRTUOUS CIRCLE MODELS OF EXPORT-LED GROWTH

There is a need to recognise the fact that exports and growth may be interrelated in a cumulative process. This raises the question of causality; but more importantly, such models provide an explanation of why growth and development through trade tends to be concentrated in particular areas of the world, while other regions and countries have been left behind. These models provide a challenge to both orthodox growth theory and trade theory which predict the long run convergence of living standards across the world. A simple cumulative model, driven by exports as the major component of autonomous demand, is to assume that:

- output growth is a function of export growth;
- export growth is a function of price competitiveness and foreign income growth;
- price competitiveness is a function of wage growth and productivity growth, and
- productivity growth is a function ofoutput growth (this is referred to as Verdoorn Law which works through static and dynamic returns to scale, including learning by doing).

It is this induced productivity growth that makes the model 'circular and cumulative' since if fast output growth (caused by export growth) induces faster productivity growth, this makes goods more competitive and therefore induces faster export growth. The Verdoorn relation not only makes the model 'circular and cumulative'; but also gives rise to the possibility that once an economy obtains a growth advantage it will tend to keep it. Suppose, for example, that an economy obtains an advantage in the production of goods with a high income elasticity of demand in world markets, such as high technology goods, which raises its growth rate above other countries. Through the Verdoorn effect, productivity growth will be higher and the economy will retain its competitive advantage in these goods, making it difficult, without protection or exceptional industrial enterprise, to establish the same commodities. In such a cumulative model, it is the difference between the income elasticity characteristics of exports (and imports, if balance of payments equilibrium is a requirement, as argued earlier) that is the essence of divergence between industrial and agricultural economies, or between 'centre' and 'periphery (Thirlwall, 2000).

From the foregoing, we can conclude that trade liberalisation does not necessarily imply faster export growth, but in practice the two appear to be highly correlated. The impact of trade liberalisation on economic growth probably works mainly through improving efficiency and stimulating exports which have powerful effect son both supply and demand within an economy. There are several different measures of trade liberalisation or trade orientation, and all studies seem to show apositive effect of liberalisation on economic performance. Likewise, there are several different studies of the relation between exports and growth and the evidence seems overwhelming that the two are highly correlated but the relative importance of the precise mechanisms by which export growth impacts on economic growth are not always easy to quantify.

EMPIRICAL EVIDENCE

Assessing regional trade agreements with developing countries, considering shallow and deep integration, trade, productivity, and economic performance in Sussex with the central purpose of producing a framework for officials and their advisers in order to be able to assess the economic implications and desirability of specific RTAs (Regional Trade Agreements). The RTA framework provides the basis for such assessments, which are then based on readily available information and statistics, including information on institutions and policies. A key conclusion emerging from this report and the RTA framework is that there are potentially significantly higher welfare gains possible from integration if the process of regional integration includes appropriate elements of deep integration. Indeed, inter alia. They added that this may help to explain the manifest rise in the popularity of regional trade agreements (Evans, 2006).

Examining the Trade Policies and Regional Integration in African (AfDB, OECD, UND, 2014). Africa's exports, driven by strong commodity prices, grew faster than any other region in the world in 2012 at 6.1%. In the same year Africa accounted for 3.5% of world merchandise exports and still contributed this low over the years. Intra-African trade with value-added manufacturing grew faster than exports to the rest of the world. However, they suggested that Africa can further increase this trade by cutting bottlenecks and strengthening industrialization. This would help the continent gain a stronger foothold in global value chains. This must be carried out at both regional and national levels. Also, the share of African suppliers in the continent's imports has been falling compared to imports from outside Africa. Imports have grown twice as fast as exports, averaging 13.8% per year. They conclude that African states have not participated fully in this import growth. Likewise, African suppliers need an appropriate enabling trade environment, to scale-up involvement in services value chains. They added that Regional bodies have launched important initiatives to boost regional industrialization and investment in regional infrastructure but these need to be strengthened.

Maruping (2005) in the paper titled Challenges for Regional Integration in Sub-Saharan Africa: Macroeconomic Convergence and Monetary Coordination. He highlighted that in spite of some difficulties like membership issues, slow ratification of protocols and reluctant implementation of agreed plans, Socio-economic policy divergence, Limited national and regional capacities, etc. in the area of trade and mobility of factors of production, African integration has been relatively more outward-looking at the expense of intra-regional trade. Also that Xenophobia has partly hampered labour movement among members, while capital mobility has been constrained by largely undeveloped financial markets. On the other hand, domestic, regional and international financial and investment constraints have also hampered regional integration, which requires considerable resources to plan, coordinate, implement, and monitor progress in its implementation.

Thus, the researcher concluded a high degree of vulnerability to exogenous shocks, including heavy and unsustainable external debt burdens, inadequate and erratic external resource inflows, adverse weather patterns, natural disasters, un-favourable terms of trade and on the whole, Africa's monetary and financial integration remains largely elusive, with marked variation among individual sub-regions and their respective member states. Jang, (2011) on Financial Integration and Cooperation in East Asia:Assessment of Recent Developments and Their Implications, examines the current situation pertaining to trade and financial integration in East Asia from various approaches and discusses potential linkages between intra-regional trade and financial integration and offers policy suggestions based upon its analyses that take full account of the post-global crisis policy landscape. However, the conclusions drawn from this study are as follows: the overall degree of intra-regional trade and financial integrations in East Asia still remain insufficient, as the region's financial integration lags far behind its trade integration; inter-regional links appear stronger than intra-regional links in East Asian economies; and intra-regional trade and portfolio investment flows in East Asia generally show positive correlations. The researcher also noted that the developing East Asia would benefit from wider regional mechanisms with the enhancement of intra-regional trade and financial integration. Further suggesting that East Asian countries strive to strengthen the regional mechanisms with smoothly functioning, integrated regional markets while effectively controlling its risks and focus especially on enhancing trade policy cooperation, expediting capital market development, effectively managing cross-border portfolio investments, and strengthening regional safety networks.

Investigating the Trade Effects of Regional Economic Integration in Africa: The Case of SADC (Evidence from Gravity Modelling Using Disaggregated Data), This study analyze trade creation and diversion effects of the Southern African Development Community (SADC) using disaggregated data from 2000 to 2007. Estimating augmented gravity model using panel data and random effect estimator methods. The results show that the intra -SADC trade is growing in fuel and minerals, and heavy manufacturing sectors while it displays a declining trend in agricultural and light manufacturing sectors. This implies that SADC has displaced trade with the rest of the world in both fuel and minerals, and heavy manufacturing sectors. SADC has served to boost trade significantly among its members rather than with the rest of the world. Countries participating in SADC have moved toward a lower degree of relative openness in these sectors trade with the rest of the world. However, the increasing trend of extra-SADC trade bias over the sample period in both agricultural commodities and light manufacturing sectors means that there has been a negative trade diversion effect. Simply put, the value of trade between members and non-members has been increasing for the two sectors. Suggesting that SADC member countries retained their openness and outward orientation despite signing the trade protocol for enhancing intra-SADC trade in agricultural and light manufacturing sectors (Negasi, 2009). Dion, (2004). In the work, Regional integration and economic development: An empirical approach. This work provided a quantitative measurement of the influence of regional trade integration on productivity and also noted that Economic integration encourages thus both new ideas and their di□usion. The research concluded that a country's productivity depends on its own R&D (Research an development) e□orts as well as the R&D e□orts of its trading partners. These R&D spillovers can then spread across countries and sectors and finally that regional trade integration has a positive impact on long-term growth.Examing the Civil Conflicts and Regional Economic Integration Outcomes in Africa, the researchers noted that civil conflicts are a major challenge to the economic development of a country and its neighbours. Analyzes the consequences of conflicts on regional economic integration outcomes among African nations. They found out that civil conflicts affect the economic fate of regional economic communities through their negative substantial impact on business cycle synchronicity. Yet, contrary to the findings of previous studies on the effects of conflict on bilateral trade flows. They however showed that experiencing conflict increases regional trade intensities. This only holds in the short run and is explained by a decrease in the conflict country's total trade and output, as well as by an increase in its intra-regional trade flows. By assessing the effects of conflict, their paper highlights that intrastate political events are also a major regional constraint and therefore found an additional reason to recommend that prevention and resolution of civil conflicts might be put on the top of the political agenda of African Regional Economic Communities (Bah & Jules-Armand , 2010).

Kawai, (2004) argued that the emerging East Asian economies have achieved sustained economic development and poverty reduction through domestic structural, institutional and governance reforms as well as through market-driven integration with the global and regional markets. Also that the OECD country policies, particularly those in Japan, Korea, the United States, Australia and Europe helped the East Asian economies to growth, develop and reduce poverty in at least six ways; helped maintain peace and security, which has been critical: Security and growth have been mutually reinforcing, they maintained a relatively stable macroeconomic and financial environment ensuring stable flows of capital, except at times of the crisis, they maintained an increasingly open trading system, with no reversal or backtracking, they enacted pro-FDI policies by sending inefficient industries abroad through industrial restructuring and adjustment and by expanding imports from East Asia of those manufactured products which would be costly to produce domestically, they facilitated transfers of production technology and organizational skills, ODA played a role in helping to build industrial infrastructure and human resource capacity and in social spending. ODA also helped, especially through the international financial institutions, to strengthen the recipient country's policy frameworks and institutional fundamentals.

Rethinking The (European) Foundations Of Sub-Saharan African Regional Economic Integration: A Political Economy Essay, a working paper of the OECD. The researcher noted that the Support for regional economic integration in Africa runs high amongst the continent's international development partners and African elites. However, its expression in European forms of economic integration is not appropriate to regional capacities and in some cases may do more harm than good. This lacuna is exacerbated by technical and theoretical analyses rooted either in economics or international relations literatures. The work sets out to reconceptualise the foundations of African economic integration through reviewing key debates within each literature and comparing the results across disciplinary boundaries. Overall, he therefore concludes that a much more limited approach is required, one

that prioritises trade facilitation and regulatory cooperation in areas related primarily to the conduct of business; underpinned by a security regime emphasising the good governance agenda at the domestic level. Care should be taken to design the ensuing schemes in such a way as to avoid contributing to major implementation and capacity challenges in establishing viable and legitimate states. In doing so, the presence of regional leaders with relatively deep pockets– South Africa in the Southern African case – points to the imperative of building such limited regional economic arrangements around key states(Draper, 2010).

Bruce & Jan, (2014). They pointed that Regional integration is crucial for economic transformation in Africa. Yet despite support for this regional agenda, implementation is slow due to numerous complexities and obstacles. Narrowing the focus on transport and on two specific transport corridors in Southern Africa helps unpack these complexities. It contributes to identifying obstacles to reforms and opportunities for reforms. The strength of political and economic coalitions within states prevail over commitments made within regional institutions. "Signaling" support to regional integration does not equate implementation of these signals. Yet careful alignment of reform coalitions around cross-border projects such as corridors may contribute to trust and capacity building between countries in support of incremental and functional regional integration. They however noted that applying a political economy analysis to corridors implies examining the historical and structural factors that underpin corridor initiatives and the different inter and intra-country interests. Their findings includes: the Maputo Development Corridor and North-South Corridor are very different in length, scope and number of countries involved, and the success of the Maputo Development Corridor results from the alignment of national and cross- border interests at a critical juncture in the history of the two countries involved: South Africa and Mozambique. They concluded that in the case of the North South Corridor, the Zambian government has signed up to regional corridor development, the scope and complexity of the corridor partly explains the differences in potential degrees of effectiveness, the degree to which private sector stakeholders can or do form coalitions around the regional agenda is also key, and varies across the regio, and the development success of a transport corridor also depends on its socio-economic impact.

Olayiwola, (2013). This study examined the interaction between economic integration and trade facilitation in ECOWAS and how the regional bloc has performed in promoting agricultural export. Statistical and econometric analyses were utilized to examine the effect of economic integration on trade facilitation as well as the role of trade facilitation and economic integration in promoting agricultural exports in ECOWAS. The findings suggest that on the average, the level of trade facilitation in ECOWAS is below world average, also found that ECOWAS members with more bureaucratic processes experience greater costs of exporting/importing. Evidence from the study also reveals a sustained growth in agricultural production and a close relationship between agricultural production and agricultural exports in the region. Results from econometric analyses indicate that economic integration significantly helps in facilitating trade within the ECOWAS sub-region. Economic integration and trade facilitation were also found to be significant in influencing agricultural exports in the ECOWAS sub-region, while agricultural production had direct and significant impact on agricultural exports. However, the researcher concluded notably that there is a need to create incentives for greater level of implementation of the ECOWAS agricultural policy (ECOWAP) and the ECOWAS Trade liberalization Scheme (ETLS) protocols by individual member states to enhance economic integration in the sub-region. Examining the history and motivation of regional integration in Africa, the different initiatives that African governments have pursued, the nature of the integration process, and the current challenges. Regional integration is seen as a rational response to the difficulties faced by a continent with many small national markets and landlocked countries. As a result, African governments have concluded a very large number of regional integration arrangements, several of which have significant membership overlap. They have a dismally poor implementation record. Part of the problem may lie in the paradigm of linear market integration, marked by stepwise integration of goods, labour and capital markets, and eventually monetary and fiscal integration. This tends to focus on border measures such as the import tariff. However, supply-side constraints may be more important.The work concludes that a deeper integration agenda that includes services, investment, competition policy and other behind-the-border issues can address the national-level supply-side constraints far more effectively than an agenda which focuses almost exclusively on border measures. (Hartzenberg, 2011)

Alemayehu & Haile, (2002). Major issues of regional economic integration in Africa could be grouped into two interrelated broad areas: issues of implementation and the limitation of insight form both the theoretical and empirical literature regarding the specific approaches that are appropriate for the continent. Implementation issues cover both the economic, political and institutional constraints that surface at the implementation stage of economic integration treaties. The approach issue refers to the menu of options available to pursue economic integration.

These options range from a step-wise bilateral cooperation to continent-wide integration. Their work critically reviews these issues and tests the determinants of trade flows using the experience of COMESA as a case study. The major conclusions that emerge form the study are: First, bilateral trade flows among the regional groupings could be explained by standard variables as demonstrated by the results of the conventional gravity model, while regional groupings has had insignificant effect on the flow of bilateral trade. And, second, the review of the issues indicates that the performance of regional blocs is mainly constrained by problems of variation in initial condition, compensation issues, real political commitment, overlapping membership, policy harmonization and poor private sector participation. These problems seem to have made building successful economic groupings in African a daunting task, despite its perceived importance in the increasingly globalized world. Thus, countries' need to take integration not only as lingering pan-African ideology but more importantly as economic survival strategy aimed at combating marginalization from the global economy. Using a statistical model of commodity trade, the researchers quantified the evolution of regional economic integration within Russia during 1995-1999, and explore potential determinants of this evolution. They stated that Russian integration measure exhibits rich regional variation that, when aggregated to the national level, fluctuates substantially over time. In accounting for this behaviour, they drew in parts on theoretical models that emphasize the potential role of

openness to international trade and regional disparities in income in threatening economic integration. Controlling for a host of additional regional- and national-level variables, they found a strong negative correspondence between openness to international trade and internal economic integration (Daniel & David, 2003). Sergey, et al (2013) designed scenarios for impact assessment that explicitly address policy choices and uncertainty in climate response in their work titled Integrated Economic and Climate Projections for Impact Assessment. Economic projections and the resulting greenhouse gas emissions for the "no climate policy" scenario and two stabilization scenarios: at 4.5 W/m2 and 3.7 W/m2 by 2100 are provided, which are used for a broader climate impact assessment for the US and other regions, with the goal of making it possible to provide a more consistent picture of climate impacts, and how those impacts depend on uncertainty in climate system response and policy choices (Luc, et al., Economic Integration in the Euro-Mediterranean Regio, 2009).

The long-term risks, beyond 2050, of climate change can be strongly influenced by policy choices. In the nearer term, the climate we will observe is hard to influence with policy, and what we actually see will be strongly influenced by natural variability and the earth system response to existing greenhouse gases. They concluded that the nature of the system is that a strong effect of policy, especially directed toward long-lived GHGs, will lag by 30 to 40 years in its implementation. Studying the e□ects of economic and political integration by presenting a model in which firms compete with each other in both an economic market; where they produce a good and compete for market share and in a political (rent seeking) market; where they compete for transfers from the government. The Researchers pointed that Growth is driven by firms' cost-reducing innovation activity and economic and political integration a□ect firms' incentive to innovate di□erently. In this setting, economic and political integration can be seen as complementary.

They concluded that Economic integration, when not accompanied by political integration, can lead to less innovation and slower growth as firms respond to increased competition in the economic market by focusing more on rent seeking activity. When economic integration is accompanied by political integration, innovation and growth will be stronger and welfare higher. (Daniel & Michele, 2007).McIntyre, (2005) analyzed the potential trade impact of the East African Community (EAC) customs union. It examines the trade linkages among the member countries of the EAC and the extent to which the introduction of the EAC common external tariff will liberalize their trade regimes. To gauge the potential trade impact of the formation of the customs union, simulations are conducted for Kenya. The empirical results indicate that the customs union will have a beneficial effect on Kenya's trade. The paper does not draw any conclusions on the potential welfare impact of the customs union. Finally, factors other than enhanced trade might influence Kenyan policymakers to pursue regional integration, and these include regional cooperation in "behind the border" reforms and the provision of public goods. At this point, the researcher wishes to note that the previous works done on economic integrations and mostly on regional economic integrations has been awesome and great. However, none of the previous works have been able to ascertain if the fact that an economy belongs to a regional economic integration is of a benefit or cost to that economy and if that benefit from the regional integration depends on the openness of that economy to trading with the rest of the world economies. These and other things like establishing the existing force between an economy and other economies in a regional economic integration (ECOWAS) are the objectives of this research work which serves as value added.

THE MODEL

Gravitational force acting in an environment is a significant force that compels an object in that environment to move towards any direction as the force acts on the object. This force does not act on an object that is not in the environment. Researchers like A. Geda & H. Kibret in 2002 (Regional Economic Integration in Africa: case study of COMESA), David-Pascal Dion in 2004 (Regional Integration and Economic development: an empirical approach), M. Y. Negasiin 2009 (Trade Effects of Regional Economic Integration in Africa: case of SADC), etc. have utilized this gravity model to analyse and examine the impact of membership in one economic integration or the other. This research work will utilize the gravitational force model. The gravitational field which is the region or space surrounding a mass in which the gravitational force can be felt is the regional economic integration, in this case, the Economic Community of West African States (ECOWAS). The gravity model seeks to establish the relationship between masses of objects, distance, and gravitational force in its surrounding, which is called the law of universal gravitation. Based upon Newton's Law of Gravitation; the gravity model predicts that the flow of people, ideas or commodities between two locations is positively related to their size and negatively related to the distance.

The relationship is mathematically shown as:

$$F \approx \frac{M_1 M_2}{r^2} \tag{1}$$

F = gravitational Force, M_i = Mass of the body i, and r = the distance between the bodies

In other to eliminate the approximation phenomena, a constant G, which balances the both sides of the equation is introduced as the magnitude of a gravitational force.

$$F = \frac{GM_1 M_2}{r^2} \tag{2}$$

Linearizing this equation by first taking the log of both sides and then obeying the laws of logarithm.

$$logF = log\left[\frac{GM_1 M_2}{r^2}\right] \tag{3}$$

$$logF = log[GM_1 M_2] - logr^2 \tag{4}$$

$$logF = logG + logM_1 + logM_2 + logr^2 \tag{5}$$

$$generally: \quad lnY_{it} = \alpha_0 + \alpha_{1it} lnX_{1it} + \cdots + \alpha_{nit} lnX_{nit} + \mu_{it} \tag{6}$$

The Trade balance (TRADE) of the ECOWAS member states will be the proxy for the gravitational force in the model, the Gross Domestic Products (GDP) of the member states for the Mass of the objects and the Distance between the objects will be the trade openness (TP)of the member states and this is to ensure the variability of the exogenous variables. The model is therefore modified thus:

$$lnTRADE_{it} = \alpha_0 + \alpha_{1it} lnGDP_{1it} + \alpha_{2it} lnTP_{nit} + \alpha_{3it} lnTP * lnGDP_{nit} + R_{it} + \mu_{it} \quad (7)$$

The first, second and third objectives of this study will be captured by this model as the direction of the relationship and significance of the exogenous variables (GDP and TP) will however answer the question of whether there exists a gravitational force among the member states (clarified by an arrow plot) and if Nigeria is surely benefiting from being a member of ECOWAS respectively. The interaction term will basically show if these benefits of member countries depends on their individual level of trade openness with the rest of the world economies. R_{it} is a vector containing control variables which are necessary to make the estimates of this study to be unbiased, consistent and efficient relative to other estimation techniques. According to the World Trade Report (2013) other factors that determine trade volume includes Demography, Investment, Technology, energy, transportation cost, institutional framework, and other natural resources.

As it is mentioned earlier, the Newtonian physics notion is the first justification of the gravity model. Anderson (1979) provides the first theoretical explanation for the gravity equation based upon the properties of expenditure systems. Since Anderson's synthesis, Bergstrand (1985, 1989), Helpman and Krugman (1985), and Deardorff (1998) also contribute to improvements of the theoretical foundation of the gravity model. As a result, the theoretical underpinnings of the gravity model have become apparent, well understood, and hence widely accepted in recent years. Its shortcoming has also been solved by the studies of Anderson and Wincoop, (2003), Feenstra, (2002), A. Geda & H. Kibret (2002), David-Pascal Dion (2004), and M. Y. Negasi (2009). The nature of relationships that exists between the endogenous and exogenous variables of interest are shown in the table below:

Exogenous variables	Expected Relationships
Gross Domestic Products	+
Trade Openness	±
Interaction term	±

The more the real sector of any economy grows as it produces more output which is more than the domestic demand, international trade becomes inevitable. Therefore, as more an economy produces, the more they trade with other economies of the world. In the same vein, the more an economy is open to trading with other economies of the world, the more they can develop (grow) or retard. If the economy makes more export than imports from the rest of the world, the more it grows and if more importations from the rest of the world's economies than exports, the more the economy retard vice versa. Furthermore, given that the more an economy produces, the more it trades, does its growth as an economy depend on the degree to which that economy trades with the rest of the world?

ESTIMATION TECHNIQUE

To control for threats to internal validity of the estimates of this study, we resort to adopting a longitudinal dataset. Time and individual units have been a crucial factor to consider in this study because these two factors may result to bias in conclusions as changes in time might be significant in explaining a phenomenon, but ignored, also individual characteristics might result to differences in the impact of a variable on another.

Wald test will be used to econometrically establish if the time and individual differences in the study is statistically significant or not so as to know if the estimation will have individual slopes or time differences. The panel linear model as specified above could be estimated using either the fixed effect estimation techniques or random effect estimation techniques using data on the variables of interest from all the members of ECOWAS which includes: Benin, Burkina Faso, Cote D'ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo, Cape Verde, Liberia, Gambia, Ghana, Guinea, Nigeria, and Sierra-Leone (1975-2014). The choice of which to use is econometrically backed up with the Hausman test. Hausman test has its null hypothesis as Random effect estimation is preferred over fixed effect estimation, if it's established that the exogenous variables and the stochastic term are correlated, otherwise, the fixed effect estimation is preferred.

Stationarity of the variables is a prerequisite for estimating using either the random effect or fixed effect methodologies just like most other estimations. This work will test for unit root of the variables of interest using Levin-Lin-Chu unit root methodology. The Levin-Lin-Chu (LLC) (2002) test assumes that all panels have the same autoregressive parameter, that is, that rho_i = rho for all i. Then the alternative hypothesis is simply that rho < 1. The LLC test requires that the panels be strongly balanced. The LLC test is based on a regression t-statistic.

Formally, if there is no deterministic term in the model (α_{it} = 0), then the test allows the number of time periods, T, to tend to infinity at a slower rate than the number of cross-sectional units, N, though T must go to infinity sufficiently fast that square root of (N)/T tends to 0. If fixed effects or time trends are included in the deterministic part of the model, then T must tend to infinity at a rate faster than N so that N/T tends to 0.The existence of no stationarity at levels implies that the estimation results using the variables at their level forms are spurious. However, the next option for establishing the robustness of the estimation result is to test if the model is co-integrated. The pedroni co-integration testing techniques will be used to establish if the variables are co-integrated or not as a pre-estimation test. No co-integration is the null hypothesis of Pedroni co-integration test techniques. The nature of the variance of the model to whether it is constant or not is a great assumption of these estimation techniques (Random/Fixed effect). The null hypothesis is; there is homoscedasticity in all individual units. If the null is rejected, we use the options of robust to obtain Huber or white or sandwich estimators. The test of serial correlations will be carried out to test if the stochastic term of the panel system is serially correlated. If it is serially correlated, then the assumption is violated and the estimation result will be spurious. The null hypothesis of this test is; there is no serial correlation. All the variables used in the estimation of the model are extracted from the World Development Indication (WDI) index. Moreover, the data plotted in the first chapter of this study are gotten from the United Nations Community for Trade and Development (UNCTAD) database. The econometric software employed in this study are Microsoft Excel and Stata13.

VARIABLE DESCRIPTIVE STATISTICS

The summary statistics of the variables of interest as explained in the previous chapter is presented below in order to examine the measure of central tendency and dispersion of these variables to assure the spread of these variables.

Table 1. Variable Summary Statistics

		mean	s.dev	min	max	obs
$ln(gdp)_{it}$	*overall*	25.94828	3.448556	13.17742	31.00203	N=600
	Between		3.000766	19.74585	29.57007	n=40
	Within		1.863829	19.37985	30.72788	T=5
$ln(trade)_{it}$	*overall*	30.02938	3.451261	16.80929	35.23623	N=600
	Between		2.918276	23.57152	33.50753	n=40
	Within		1.987213	23.26715	35.1372	T=5
$ln(tp)_{it}$	*overall*	4.083734	0.4149902	1.843773	5.389889	N=600
	Between		0.3111899	3.575506	4.621785	n=40
	Within		0.2857952	2.079158	4.989393	T=5
Emission (co2)	*overall*	6161.998	17473.47	33.003	104689.2	N=600
	between		1943.183	3723.961	9826.338	n=40
	within		17367.63	3407.65	101842.6	T=5
Energy Use	*overall*	217.5319	225.3731	1.08	1640.781	N=600
	between		44.93216	173.424	397.544	n=40
	within		220.9555	155.712	1572.372	T=5
Renewable Energy	*overall*	66.48245	31.62239	0.001742	206.6	N=600
	between		11.62268	43.74249	81.68398	n=40
	within		29.46262	0.556823	207.0377	T=5
Household Con. Exp(US $)	*overall*	8.89E+09	3.49E+10	1.04E+08	4.45E+11	N=600
	between		9.53E+09	2.92E+09	3.86E+10	n=40
	within		3.36E+10	-2.89E+10	4.15E+11	T=5
Foreign Direct Investment	*overall*	-2.67E+08	8.22E+08	-8.02E+09	7.39E+08	N=600
	between		2.86E+08	-1.09E+09	-2.71E+07	n=40
	within		7.72E+08	-7.20E+09	1.36E+09	T=5
Govt Con. Exp(% of GDP)	*overall*	14.14988	5.259494	3.541602	54.51542	N=600
	between		1.513645	11.91842	17.55363	n=40
	within		5.042292	2.730942	51.81864	T=5
Gross Capital Formation	*overall*	1.87E+09	7.22E+09	-2.06E+07	8.98E+10	N=600
	between		2.12E+09	4.81E+08	8.42E+09	n=40
	within		6.91E+09	-6.48E+09	8.33E+10	T=5
Gross Domestic Savings	*overall*	7.621566	18.81088	-152.537	68.78947	N=600
	between		3.89715	-2.34965	12.3265	n=40
	within		18.4124	-142.847	65.43267	T=5
Industry Value Added	*overall*	3.10E+09	1.29E+10	3000000	1.40E+11	N=600
	between		3.10E+09	7.61E+08	1.16E+10	n=40
	within		1.25E+10	-8.37E+09	1.32E+11	T=5
Manufacturing Value Added	*overall*	8.43E+08	3.67E+09	3429204	5.48E+10	N=600
	between		9.75E+08	3.01E+08	4.41E+09	n=40
	within		3.54E+09	-3.55E+09	5.12E+10	T=5
Lending Interest Rate	overall	20.94434	11.07231	6	69.13142	N=600
	between		5.253349	12.38227	28.09212	n=40
	within		9.779745	3.488571	61.98363	T=5
Broad Money(% of GDP)	overall	26.53019	14.23663	6.546494	101.8799	N=600
	between		4.89258	20.39613	39.73224	n=40
	within		13.39044	6.3425	102.1266	T=5
Official Exchange Rate	overall	454.771	884.9818	0.000115	7014.119	N=600
	between		317.3913	105.8918	1057.578	n=40
	within		827.5324	-600.03	6411.312	T=5
Import Trans Services	overall	54.09215	14.38341	9.998392	90	N=600
	between		2.339035	48.86229	60.30922	n=40
	within		14.19645	10.65572	88.15794	T=5
Export Travel Services	overall	37.37176	24.54299	0.138058	100	N=600
	between		7.102262	24.80849	51.73833	n=40
	within		23.51798	-13.0685	107.644	T=5

Source: Researchers' computation using Stata13.

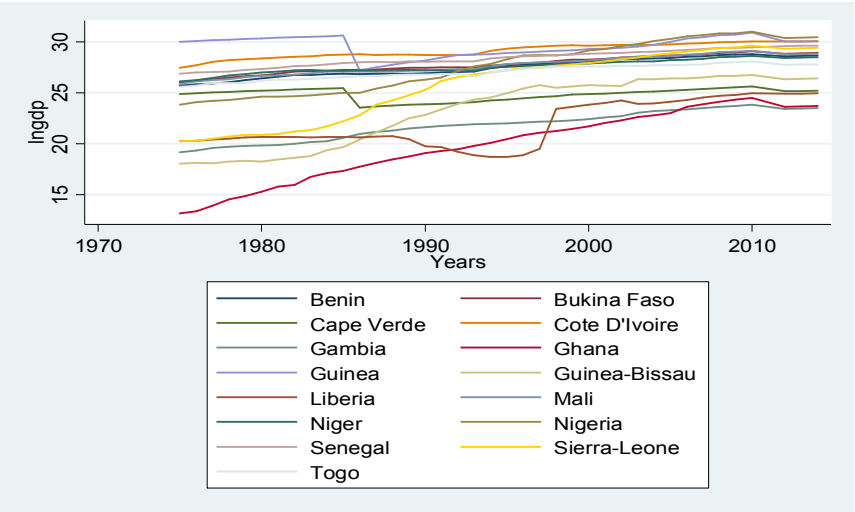


Figure 6. ECOWAS member country GDP in logarithmic form

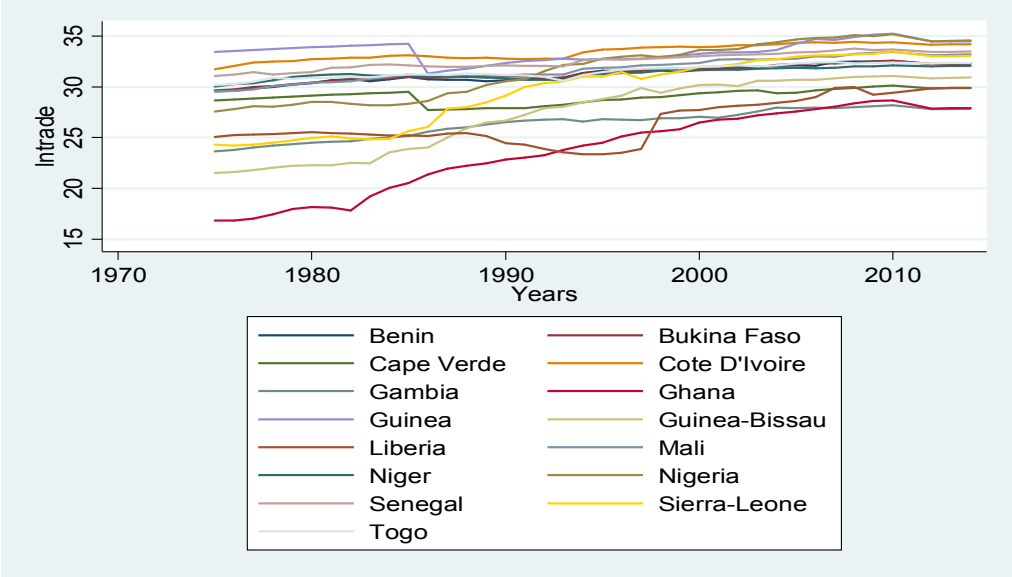


Figure 7. ECOWAS member country Trade level in logarithmic form

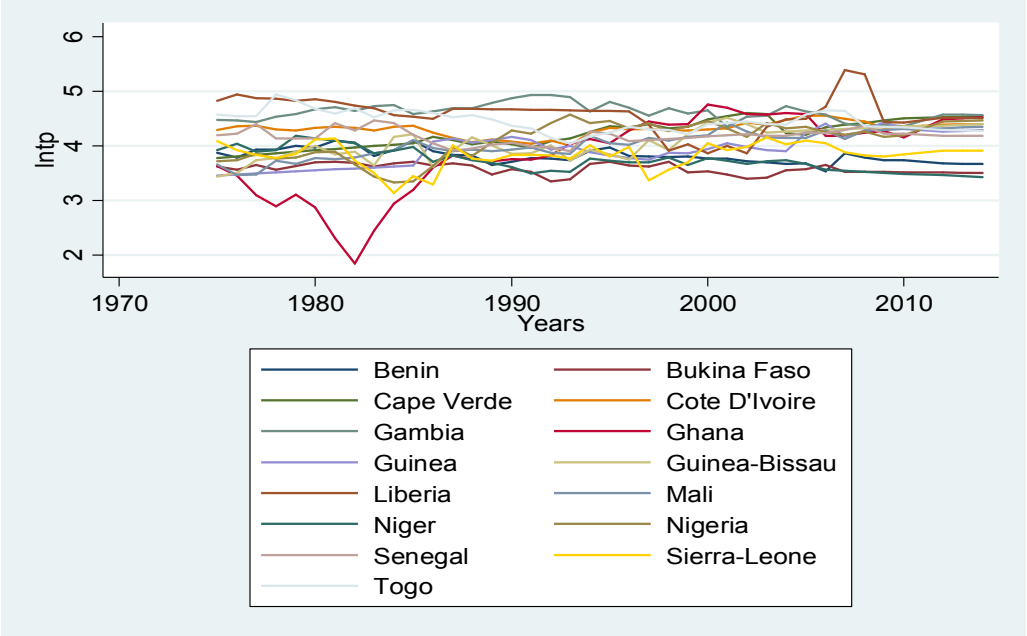


Figure 8. ECOWAS member Trade Openness in logarithmic form

From the overall result shown above, it is obvious that the variability of the variables is assured and each data point does not lie far above its mean values. The maximum and minimum values of the variables amongst the 600 observations are also shown. It is important to also note that the variations within these ECOWAS countries are low but the variations between them are relatively high. There are fifteen (15) ECOWAS countries and data from these economies are collected for period of thirty-nine (40) years from 1975 to 2014. The nature of these variability can also be shown with a chart as shown above. The gross domestic product of the ECOWAS member countries has been increasing overtime with little fluctuations same with the level of their trade and trade openness.

H_0: *Panels contain unit root*

The unit-root test result using the techniques by Levin, Lin, and Chu (2002) for panel data is shown on the table above, using AR parameter as common, excluding time trend and including panel means so as to find the nature of mean reverting (with ADF regressions of lag 1) of each variable with respect to its within effects. It can be observed that the variables are found stationary at levels. First, we check for time effect which is to statistically test if there are shocks in each of the ECOWAS member states in any particular year(s) that might affect the outcome of this model. Next we carry out individual country effect to see cases of differences in the significance of a country's exogenous variable on its dependent variable even when the overall effect of that exogenous variable proves otherwise. These tests are carried out using time and individual unit dummy variables. It is important to note that the overall effect or significance follows chi-square distribution with (T-1) degrees of freedom, where T is the number of years.

H_0^*: *time dummies* $= 0$
H_0^{**}: *countries dummies* $= 0$

From 1975 ECOWAS till 2014, there have been several shocks on the member states at different times but none of these shocks have proved statistically significant in determining the

Table 2. Panel unit-root test result

variables	constriant	stat.	p-val.	level	conc.
$ln(gdp)_{it}$	Unadjusted t	-4.4426			
	Adjusted t*	-3.6823	0.0001	I(0)	Stationary
$ln(trade)_{it}$	Unadjusted t	-4.1875			
	Adjusted t*	-2.9294	0.0017	I(0)	Stationary
$ln(tp)_{it}$	Unadjusted t	-6.7783			
	Adjusted t*	-2.9827	0.0014	I(0)	Stationary
$lngdplntp_{it}$	Unadjusted t	-4.7890			
	Adjusted t*	-2.1675	0.0151	I(0)	Stationary
mission (co2)	Unadjusted t	-18.900			
	Adjusted t*	-10.749	0.0000	I(0)	Stationary
Energy Use	Unadjusted t	-17.360			
	Adjusted t*	-9.597	0.0000	I(0)	Stationary
Renewable Energy	Unadjusted t	-15.196			
	Adjusted t*	-7.494	0.0000	I(0)	Stationary
Household Con. Exp(US $)	Unadjusted t	-18.71			
	Adjusted t*	-10.74	0.0000	I(0)	Stationary
Foreign Direct Investment	Unadjusted t	-19.07			
	Adjusted t*	-11.23	0.0000	I(0)	Stationary
Govt Con. Exp(% of GDP)	Unadjusted t	-19.14			
	Adjusted t*	-12.21	0.0000	I(0)	Stationary
Gross Capital Formation	Unadjusted t	-19.14			
	Adjusted t*	-10.83	0.0000	I(0)	Stationary
Gross Domestic Savings	Unadjusted t	-20.69			
	Adjusted t*	-11.85	0.0000	I(0)	Stationary
Industry Value Added	Unadjusted t	-18.89			
	Adjusted t*	-10.77	0.0000	I(0)	Stationary
Manufacturing Value Added	Unadjusted t	-18.68			
	Adjusted t*	-11.31	0.0000	I(0)	Stationary
Lending Interest Rate	Unadjusted t	-12.33			
	Adjusted t*	-2.99	0.0014	I(0)	Stationary
Broad Money(% of GDP)	Unadjusted t	-16.89			
	Adjusted t*	-6.14	0.0000	I(0)	Stationary
Official Exchange Rate	Unadjusted t	-24.52			
	Adjusted t*	-14.19	0.0000	I(0)	Stationary
Import Trans Services	Unadjusted t	-18.35			
	Adjusted t*	-8.23	0.0000	I(0)	Stationary
Export Travel Services	Unadjusted t	-29.75			
	Adjusted t*	-21.51	0.0000	I(0)	Stationary

Source: Researchers' computation using Stata13.

Table 3. Time Differences versus Individual Differences test result

tests	stat.	p-val.	conclusion
Td	9.40	1.0000	There are no Time Differences (TD)
id	50.17	0.0000	There are Individual Differences (ID)

Source: Researchers' computation using Stata13.

Table 4. Hausman RE versus FE test result

Hausman	stat.	p-value	conclusion
fe versus re	11.96	0.0754	Use PFEET

Source: Researchers' computation using Stata13.

Table 5. Individual Effect using Absorbing indicators

ln(trade)	estimates	t-test	p-value
$countries$	F(14, 565)	3.189	0.0000

Source: Researchers' computation using Stata13.

impacts of the exogenous variables in this model on the endogenous variable. On the other hand, there are country differences, which suggests that the overall significance of an independent variable cannot be used to infer decision for all the member states as some will prove significant and others will not.

Therefore, while estimating the model, individual country dummies will be introduced. The model to be estimated will now take the form:

$$lnY_{it} = \alpha_0 + \alpha_{1it} lnX_{1it} + \cdots + \alpha_{2it} lnX_{2it} + R_{it} + D_i + \mu_{it} \quad (8)$$

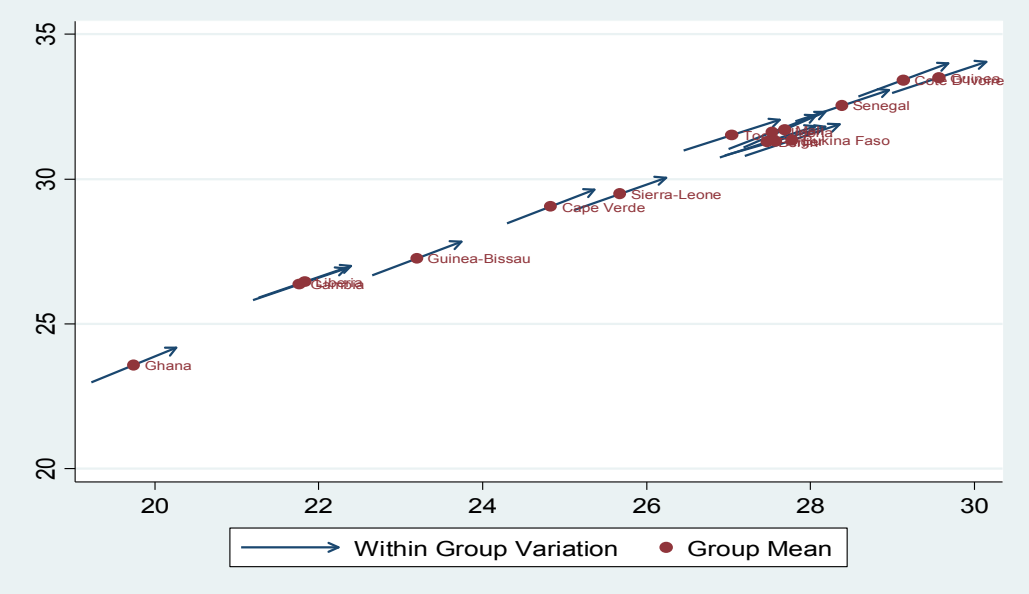


Figure 9. ECOWAS member states Trade and GDP relationship

PANEL INDIVIDUAL FIXED EFFECT AND TWO STAGE INSTRUMENTAL VARIABLE ESTIMATION RESULT

	FE(7)	FE(8)	FE(9)	FE(10)	FE(11)	FE(12)
LnGDP	1.001	1.001	1.001	1.003	1.003	1.004
	(167.87)**	(167.71)**	(160.71)**	(159.30)**	(159.30)**	(159.78)**
LnTP	1.013	1.013	1.010	1.023	1.023	1.029
	(28.25)**	(28.21)**	(26.66)**	(26.73)**	(26.73)**	(26.95)**
Interaction	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001
	(0.33)	(0.33)	(0.23)	(0.62)	(0.62)	(0.76)
Emission (co2)	0.000	0.000	0.000	0.000	0.000	0.000
	(0.46)	(0.46)	(0.49)	(0.60)	(0.60)	(0.98)
Energy Use	0.000	0.000	0.000	0.000	0.000	0.000
	(3.10)**	(3.09)**	(3.08)**	(3.27)**	(3.27)**	(3.26)**
Renewable	0.000	0.000	0.000	0.000	0.000	0.000
	(3.19)**	(3.19)**	(3.20)**	(2.99)**	(2.99)**	(2.79)**
Household Con.	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(7.04)**	(5.84)**	(5.83)**	(0.07)	(0.07)	(0.14)
FDI		0.000	0.000	0.000	0.000	0.000
		(0.10)	(0.11)	(0.78)	(0.78)	(0.85)
Govt. Con.			0.000	0.000	0.000	0.000
			(0.29)	(0.30)	(0.30)	(0.45)
Gross Capital				-0.000	-0.000	-0.000
				(2.14)*	(2.14)*	(2.04)*
Gross Savings						-0.000
						(2.46)*
_constant	-0.060	-0.060	-0.049	-0.097	-0.097	-0.123
	(0.42)	(0.42)	(0.33)	(0.65)	(0.65)	(0.84)
F statistic	201,198.0	175,733.0	155,948.1	141,269.1	141,269.1	129,608.0
Adjusted R-squared	1.00	1.00	1.00	1.00	1.00	1.00

	FE(1)	FE(2)	FE(3)	FE(4)	FE(5)	FE(6)
LnGDP	0.981	0.999	1.003	1.001	1.007	1.005
	(180.00)**	(1,115.10)**	(169.18)**	(167.37)**	(162.33)**	(162.29)**
LnTP		0.999	1.025	1.009	1.046	1.035
		(143.33)**	(28.83)**	(28.09)**	(28.04)**	(27.80)**
Interaction			-0.001	-0.000	-0.002	-0.002
			(0.74)	(0.27)	(1.29)	(1.00)
Emission (co2)				-0.000	-0.000	-0.000
				(2.51)*	(3.98)**	(3.92)**
Energy Use					0.000	0.000
					(3.32)**	(3.27)**
Renewable						0.000
						(2.95)**
Household Con.						
constant	4.581	0.028	-0.073	-0.019	-0.166	-0.139
	(32.15)**	(0.71)	(0.52)	(0.13)	(1.12)	(0.94)
F statistic	32,400.5	621,834.6	414,224.7	313,622.2	255,435.1	215,815.1
Adjusted R-squared	0.98	1.00	1.00	1.00	1.00	1.00

	FE(13)	FE(14)	FE(15)	FE(16)	FE(17)	FE(18)	FE(19)	IV
LnGDP	1.004	1.003	1.002	1.003	1.003	1.004	1.002	1.003
	(160.66)**	(162.69)**	(161.42)**	(161.12)**	(160.69)**	(160.53)**	(155.00)**	(152.50)**
LnTP	1.029	1.022	1.019	1.018	1.024	1.029	1.020	1.023
	(27.08)**	(27.30)**	(27.11)**	(27.12)**	(27.08)**	(27.06)**	(25.79)**	(25.05)**
Interaction	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.77)	(0.52)	(0.40)	(0.47)	(0.63)	(0.73)	(0.49)	(0.54)
Emission (co2)	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.67)	(1.63)	(1.54)	(1.50)	(1.44)	(1.64)	(1.53)	(1.50)
Energy Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(3.64)**	(4.63)**	(4.23)**	(4.15)**	(4.30)**	(4.26)**	(4.28)**	(4.28)**
Renewable	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(2.54)*	(2.46)*	(2.63)**	(2.87)**	(2.94)**	(2.67)**	(2.76)**	(2.76)**
Household Con.	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(2.28)*	(1.21)	(1.21)	(1.20)	(1.26)	(1.38)	(1.35)	(1.34)
FDI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(1.68)+	(3.90)**	(3.71)**	(3.64)**	(3.59)**	(3.76)**	(3.61)**	(3.59)**
Govt. Con.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.54)	(0.51)	(0.31)	(0.21)	(0.36)	(0.42)	(0.15)	(0.13)
Gross Capital	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(1.97)*	(0.49)	(0.50)	(0.44)	(0.43)	(0.44)	(0.37)	(0.35)
Gross Savings	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(2.59)**	(2.39)*	(2.24)*	(2.41)*	(2.44)*	(2.25)*	(1.93)+	(1.93)+
I. Value Added	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(2.66)**	(1.41)	(1.29)	(1.29)	(1.23)	(1.21)	(1.19)	(1.18)
M. Value Added		-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(4.19)**	(4.12)**	(4.03)**	(4.02)**	(4.14)**	(4.03)**	(4.00)**
Lending Int. Rate			-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
			(1.25)	(0.76)	(0.64)	(0.83)	(0.87)	(0.89)
Broad Money				0.000	0.000	0.000	0.000	0.000
				(1.28)	(1.51)	(1.13)	(1.27)	(1.30)
Exchange Rate					0.000	0.000	0.000	0.000
					(1.24)	(1.07)	(1.24)	(1.27)
Import T.S.						-0.000	-0.000	-0.000
						(1.24)	(1.21)	(1.12)
Export T.S.							0.000	0.000
_constant	-0.116	-0.103	-0.073	-0.088	-0.109	-0.106	-0.076	-0.086
	(0.79)	(0.71)	(0.50)	(0.60)	(0.74)	(0.72)	(0.50)	(0.55)
F statistic	120,124.1	114,236.5	106,188.0	99,223.4	93,114.4	87,725.1	82,806.8	78,316.1
Adjusted R-squared	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

+ p<0.1; * p<0.05; ** p<0.01

The Household Consumption Expenditure, Government Consumption Expenditures, and the Manufacturing Sector Value Added were used as instrumental variables for the log of GDP covariate. These instrument are tested for relevance and exogeneity (**see Appendix 9**) using the statistical method of Over identification and Hausman Test; the estimation result (with bootstrap standard error) is shown at the last column of the results in the next page. From the Tables we can observe that as more and more variables are controlled for, the causal effect of the core variables are statistically significant and relatively the same. This robustness test guarantees to an extent that what we have estimated is a causal effect which is BLUE.

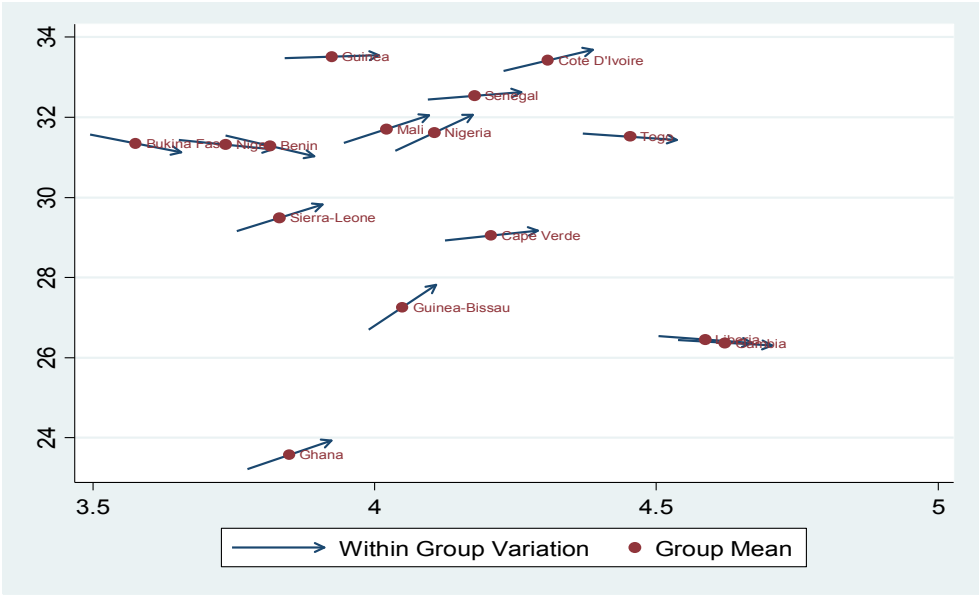


Figure 10. ECOWAS member states Trade and Trade Openness relationship

The choice of estimating a linear model with panel data using Panel Fixed Effect Estimation techniques (PFEET) or the Panel Random Effect Estimation techniques (PREET) is statistically determined by Hausman test. The null hypothesis of this test suggests that the independent variables are not correlated with the stochastic term implying the independent variables and the error term are independently and identically distributed. If that is true, the Random Effect Estimation is adopted to estimate the linear model. The estimation results of these two methodologies and the Hausmen's test result is shown below.

$$H_0: corr(X_i, \mu_i) = 0$$

The Hausman's test follows chi-square distribution and comparing the critical value with the test statistics or judging from the probability value of the test statistics with the level of significance of 5%, we reject the null hypothesis therefore we will estimate the model using the Panel Fixed Effect Estimation Techniques (PFEET). Using the linear regression absorbing indicators techniques to absorb the individual country significance in the model into an overall significance to estimate the model, the result below was estimated. It is important to note that the use of random effect estimation doesn't require Heteroscedasticity test. The table above shows that the individual country effects are significant statistically and the estimation results are shown below. The expected signs are satisfied and the nature of the elasticity of changes in the independent variables on the dependent variable is fairly inelastic suggesting that no matter the shocks in the economies of the member states of ECOWAS via its gross domestic product or its trade openness will result to a less than proportional change in the level of trade of ECOWAS member states. The result is robust to the inclusion of a large number of covariates (control variables) and to different specifications including one based on panel instrumental variable estimation. A 100 percentage change in log value of gross domestic product of the ECOWAS member states holding every other thing constant will lead to 99.1 percentage change on average in the trade level. Also, a 100 percentage change in the trade openness of ECOWAS member states will lead to a 94.6 percentage change on average in the trade level holding every other variable constant. The direction and statistical significance of the log values of the GDP and Trade Openness confirms that the member states, including Nigeria benefits from being a member of this integration. Moreover, due to the insignificance of the interaction term statistically, the benefits a member state receives does not in any way depend on the level of trade openness of that economy to the rest of the world.

However, the extent to which these fluctuations will affect the trade levels of each member state is not equal but a function of the country differences. This is shown by the significance of the country dummy in the absorbing indicators estimation techniques. Also, this result shows that every country in ECOWAS is benefiting from being a member including Nigeria and should continue being a member of ECOWAS and not opting out. The choice of control variables adopted in this study was informed by the world trade report (2013) which specified variables like Demography, Investment, Technology, energy, transportation cost, institutional framework, and natural resources as factors that determine the level of trade between an economy and the rest of the world. Due to data availability some of these factors where controlled for in this study such as the foreign direct investment which serves as a proxy to the level of investment in the economy and the to capture the level or amount of natural resources in an economy, we used the total natural resources rent as provided by the world development index others include capital formation, domestic savings, household consumption expenditure, government expenditure, etc. From the arrow plot above, it can be clearly seen that even though the overall relationship between trade and gross domestic product of ECOWAS member states are positively related, each individual country's relationship between its trade and gross domestic product is also positively related confirming that there exist a force of gravity pulling all the member states in the same direction. Therefore, all the member states benefit with respect to improving trade level in each member state which is the major objective of the ECOWAS regional integration. The plot above shows that the mass (GDP) of every member state is significantly and directly improving its trade level with the world economies. However, looking at the nature of individual ECOWAS country relationship between the trade and trade openness level, it is different in some countries from what the overall relationship predicted. For countries like Burkina Faso, Benin, Togo, etc. their trade openness is negatively related with their level of trade.

This suggest that the more these economies open their country to trade, the less will be the total trade (sum of import and export). This may suggest that trade in these countries are not profitable because of absence of a healthy trading environment and other factors. Moreover, countries like Nigeria, Ghana, Guinea-Bissau, Sierra-Leone, etc. there exist a positive relationship between their trade openness and total trade. While countries like Guinea and Senegal, it is not totally clear the nature of the relationship between these variables. Using the model deviation from trade observed values or the difference between observed values and model fitted values to explain the force of gravity amongst the member states. This force is the force that pulls objects together. Statistically, it's the force that seeks to make the observed values close to the fitted values. The differences might be linked to the funding of ECOWAS member states shown by ECOWAS Bank for Investments and Development (EBID) annual reports of 2011 to 2014. EBID was established in 1999 following the transformation of the former ECOWAS Fund which was established in 1975.

The vision of the Bank is to become the leading regional development and investment financing institution in West Africa, and also serve as an effective tool for poverty reduction, wealth creation and employment promotion so as to raise the living standards of the people of the region. The loan proportion of EBID in 2011 was 95% against equity of 1% and guarantee of 4%. This suggests that the commitment of EBID increased as they intervened in some sectors like service sector, industrial sector, infrastructural sector, etc.in the member state countries. This however resulted to a 74.1% decrease in the cash and bank accounts of EBID, end of the year balance of 6.8% with 6.7% as guarantee outstanding. In 2012, economies like Mali and Guinea-Bissau experienced recession of about 1.2% and 0.9% respectively as most of the other members were struggling to grow or increase their output levels. In that 2012, it is important to note that all ECOWAS member countries had a deficit current account balance except Nigeria which also affected the funding of EBID and its outstanding guarantee increased to 21.7% in relative terms.

These and a lot more has reduced that force that pulls ECOWAS member states towards each other. Adopting the modified Wald test for group-wise Heteroscedasticity test and the Wooldridge test for autocorrelation of the fixed effect estimation result, the null of homoscedastic errors and no autocorrelation (first order) were both rejected (see appendix 9 & 10) and thus we adopted the robust clustered standard errors, the Arellano Heteroscedasticity and Autocorrelation consistent standard errors to correct for autocorrelations and heteroscedasticity within the errors of an entity

CONCLUSION

Several views and theories have been reviewed from the inception of this work to establish the impact of belonging to a regional economic integration. Many theorists believe that there is always benefits gained from joining such an integration while others do not share this view. This work is therefore set out to investigate this claim of a benefit from belonging to an economic community or integration using the Economic Community of West African States (ECOWAS) and Nigeria as a case study from 1975 to 2014. This work answered three basic questions which has formed its research objective and hypothesis. Firstly, it answered the question of whether Nigeria benefits from belonging to this economic integration known as ECOWAS by using the Gravitational force model, which was stated and linearized in chapter three of this work. Secondly, it also established the force of attraction that holds or pulls the member states of this economic integration together if and only if such force exists amongst them. The arrow plot and gravitational force techniques were plotted to confirm this fact. Thirdly, it also finds out that Nigeria, being a member of this economic integration is of a positive impact to her economy and ascertained that the benefit of an ECOWAS member states is dependent on the level of trade openness in each economy. This objective was examined using the second order interaction approach in model estimation. To establish the true benefit of Nigeria belonging to this organisation, the fixed effect techniques was used to estimate the gravitational force model informed by the hausman selection test. The gravitational force model was estimated and the result shows that Nigeria is truly benefitting from being a member of this organisation from inception to date.

This was shown by the strong positive association and relationship that exists among the domestic output, trade, and trade openness in the member states including Nigeria. The arrow plots and force of gravity charts show that there exists a strong force among the member states pulling them together in growth and size. Although the nature of this force is relatively not equal but basically, this force is strongly felt in the Nigerian economy. In examining the nature of the relationship between trade and domestic product of these economies, it was observed that in all the economies, there exist a positive relationship between these two variables. However, there is no clear relationship in some economies and also a slightly negative relationship in others when the nature of the relationship between trade and trade openness was examined using the arrow plot even though it was clearly a positive relationship in some economies. From the statistical significance of the interaction term, it was shown that the benefits of being a member of ECOWAS is not dependent on the level of trade openness of the member states with the rest of the world economies.

Therefore, the member states all benefits from being a member irrespective of how open they are to trading with the rest of the world, that is to say that Nigeria should not leave this organisation but rather become more active to make sure that this organisation becomes more successful. In nutshell, the work found out that Nigeria as well as other countries in ECOWAS are benefiting from this regional economic integration. The research also discovered that the force of gravity that exist amongst the member states is strong as these countries trade with each other. Being a member of ECOWAS has proved to be profitable for Nigeria and also other member states. Nigeria should continue being a member and contributes its quota to the development of ECOWAS. Nigeria should also maintain its position in role and function in the ECOWAS community. This is a plausible adventure for Nigeria as being a member of ECOWAS will increase the overall performance of the economy of Nigeria vis-à-vis its economic relationship and activities with other economies in ECOWAS and the rest of the world. From all the findings of this work, we therefore conclude that Nigeria should continue being a member of the Economic Community of West African States (ECOWAS) because it has proved to be beneficial for the Nigerian economy and other economies that belongs to this regional economic integration irrespective of the individual member trade openness to the rest of the world economies.

REFERENCES

Abdoulie, Janneh; Jean, ping; Donald, Kaberuka. 2010. *Assessing regional integration in Africa IV*. Addis Ababa, Ethiopia: economic commission for Africa P.O. Box 3001.

Afdb, OECD, und. 2014. Trade policies and regional integration in Africa. *African economic outlook*, 73-88.

Aitkin, N. D. 1973. "The effects of the EEC and EFTA on European trade: a temporal cross-section analysis." American economic review 63 (5).

Aitkin, N.D. and R.S. Obutelewicz 1976. 'a cross sectional study of EEC trade with the association of African countries,' review of economics and statistics 58.

Alemayehu, G. & Haile, K. 2002. *Regional economic integration in Africa: a review of problems and prospects with a case study of comesa.* London.

Alemayehugeda 2002. Finance and trade in Africa: Macroeconomic response in the world economy context, Palgrave Macmillan.

Anderson, J. 1979. "A theoretical foundation of the gravity model." American economic review 69(1).

Anderson, J. and E.V. Win Coop 200). "Gravity with gravitas: a solution to the border puzzle." American Economic Review 106.

Anderson, K. and H. Norheim 1993. "Is world trade becoming more regionalized?" Review of International Economics 1.

Bah, A. &Jules-Armand , T. S. 2010. *Civil conflicts and regional economic integration outcomes in Africa.* France: Cerdi, etudes et documents.

Balassa, B. 1967. Trade creation and trade diversion in the European common market, in comparative advantage trade policy and economic development, New York University Press.

Balassa, B. and Stoutjesdjk, A. 1975. Economic integration among developing countries. Journal of Common Market Studies, 14(1).

Baldwin, R. 1997. "Review of theoretical developments on regional integration", regional integration and trade liberalization in sub Saharan Africa, Vol. 1: frame

work, issues and methodological perspectives, Aerc publication.

Baldwin, R. E. and Venables, A. J. (1995).Regional economic integration. In hand book of international economics, Vol 3. Gene Grossman and Ken Rogoff, Eds. Amsterdam, North Holland.

Bruce, B. & Jan, V. 2014. What drives regional economic integration? *European Centre for Development Policy Management*, pp. 1-56.

Chauvin, S. and Gaulier, G. 2002. Regional trade integration in Southern Africa. Cepii working paper no2002-12.

Cheng, I. and Wall, H. J. 2005. "Controlling for heterogeneity in gravity models of trade and integration", Federal Reserve Bank of St. Louis Review, 87 (1).

Chris Milner and Katarzynasledziewska 2005. Capturing regional integration effects in the presence of other trade shocks: the impact of the Europe agreement on Poland's imports .World Trade Net Business Briefing Research Paper 2005/40.

Clausing, K. A. 2001. "Trade creation and trade diversion in the Canada - United States free trade agreement." Canadian Journal of Economics 34: 677-96.

Cline, W. R. 1978. Benefits and costs of economic integration in cacm. In Cline, W. R. and Delgado, E. (eds). Economic integration in Central America. Washington: the bookings institution.

Colin Mccarthy 2004. The new southern African customs union agreement (sacua): challenges and prospects: a preliminary review in monitoring regional integration in southern Africa yearbook, vol. 4 – (2004) Namibian Economic Policy Research Unit (NEPRU).

Coulibaly, S. 2004. "On the assessment of trade creation and trade diversion effects of developing rtas," paper presented at the annual meeting 2005 of the swiss society of economics and statistics on resource economics, technology, and sustainable development.

Daniel, B. & David, N. D. 2003. *Regional integration: an empirical assessment of Russi.* Pittsburgh: Department of Economics University of Pittsburgh, Pittsburgh, PA 15260 (Berkowitz: Davidson institute; university of Michigan) .

Daniel, B. & Michele, R. 2007. *Economic integration, political integration or both?* Columbia: Columbia University Press.

Dion, D.P. 2004. Regional integration and economic development: an empirical approach. *Governance and efficiency of economic system*, Pp. 1-29.

Draper, P. 2010. *Rethinking the (European) foundations of sub-Saharan African regional economic integration: a political economy essay.* OECD Development Centre Working Paper (African Economic outlook).

Economic Commission for Africa 2004. Assessing regional integration in Africa I (Aria I). United Nations Economic Commission for Africa, Addis Ababa.

Economic commission for Africa 2004b. Economic Report on Africa: Unlocking Africa's trade potential.United Nations Economic Commission for Africa, Addis Ababa.

Economic Commission for Africa 2005. Our common interest: Report of the commission for Africa, London: Commission for Africa.

Economic Commission for Africa 2006. Assessing Regional Integration in Africa II (ARIA II). Rationalizing Regional Economic Communities. United nations economic commission for Africa, Addis Ababa.

Egger, P. and Pfaffermayr, M. 2000. 'The proper econometric specification of the gravity equation: a three way model with bilateral interaction effects', working paper, Austrian Institute of Economic Research, Vienna, Austria.

Evans, D., Michael, G., Ahmed, G., Michanne , H. P., Peter, H., Leo, I., . . . Jim, R. 2006. *Assessing regional trade agreements with developing countries: shallow and deep integration, trade, productivity, and economic performance.* Sussex : University of Sussex .

Evenett, S. J. and Keller, W. 1998. 'On the theories explaining the success of the gravity equation' in nber working paper, no. 6529, Cambridge, MA: National Bureau of Economic Research.

Faezehforoutan and lantpritchett 1993. Intra-sub-Saharan African trade: is it too little? The World Bank, Journal of African Economies, Vol 2(1).

Feenstra, R. C. 2002. "Border effects and the gravity equation: consistent methods for estimation." Scottish Journal of Political Economy 49: 491-506.

Foroutan, F. 1993. Regional integration in sub-Saharan Africa: Past experience and future prospects. In de melo and panagariya. (Eds), new dimensions in regional integration. Cambridge: Cambridge University Press.

Frankel, J. 1997. "Regional trading blocs in the world economic system."Institute for international economics, Washington, DC.

Frankel, J. A. and M. Kahler 1993. Regionalism and rivalry: Japan and the U.S. In pacific Asia (Chicago: University of Chicago Press).

Frankel, J. A. and S. Wei 1995. 'European integration and the regionalization of world trade and currencies: economics and politics,' in monetary and fiscal policy in an integrated Europe, (Eds). B. Eichengreen et al. (New York: Springer).

Hartzenberg, T. 2011. *Regional integration in Africa.* South Africa: trade law centre for southern Africa (tralac) .

Irving fisher committee on central bank statistics. 2009. *Economic and financial convergence en route to regional economic integration: experience, prospects and statistical issues amidst global financial turmoil.* Switzerland : bank for international settlements communications ch-4002 basel.

Jang, H. B. 2011. Financial integration and cooperation in East Asia: Assessment of recent developments and their implications. *Institute for Monetary and Economic Studies (IMES) discussion paper*, Pp. 11-106.

Kawai, M. 2004. *Regional economic integration and cooperation in East Asia.* Tokyo: policy research institute of the Japanese ministry of finance and the OECD secretariat.

Luc, D. W., Maryla, M. (Rym, A., Moez, E. E., Michael, G., Ahmed, F., Mahmut, T. 2009. *Economic Integration in the Euro-Mediterranean region.* Canada: center for social and economic research press.

Luc, D. W., Maryla, M., Rym, A. & Moez, E. E. 2009. *Economic integration in the euro-Mediterranean region.* Canada: Center for Social and Economic Research.

Maruping, M. 2005. Challenges for regional integration in sub-Saharan Africa: macroeconomic convergence and monetary coordination. In a. I. Economy, *challenges for regional integration in sub-Saharan Africa* (pp. 129-155). Fondad.

Mcintyre, M. A. 2005. *Trade integration in the east African community: an assessment for Kenya.* Washington: IMF working paper.

Negasi, M. Y. 2009.*Trade effects of regional economic integration in Africa: the case of sadc (evidence from gravity modeling using disaggregated data).* Ethiopia: trade and industrial policy strategies.

Olayiwola, W. K. 2013. Economic integration, trade facilitation and agricultural. *Eighth African economic conference on 'Regional Johannesburg, South Africa.* pp. 1-30.

Rolf, M. & Nataliya, R. 2013. *Economic integration: free trade areas vs. Customs unions.* Chicago: western centre for economic research press.

Sergey, P., Erwan, M., Jeffery, S., Andrei, S. & John, R. 2013. *Integrated economic and climate projections for impact assessment.* Cambridge: Joint program on the science and policy of global change 77 Massachusetts avenue mite19-411 Cambridge ma 02139-4307 (USA).

APENDICE

1. Summary statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
lngdp	overall	25.94828	3.448556	13.17742	31.00203	N = 585
	between		3.000766	19.74585	29.57007	n = 15
	within		1.863829	19.37985	30.72788	T = 39
lntrade	overall	30.02938	3.451261	16.80929	35.23623	N = 585
	between		2.918276	23.57152	33.50753	n = 15
	within		1.987213	23.26715	35.1372	T = 39
lntp	overall	4.083734	.4149902	1.843773	5.389889	N = 585
	between		.3111899	3.575506	4.621785	n = 15
	within		.2857952	2.079158	4.989393	T = 39

Variable		Mean	Std. Dev.	Min	Max	Observations
co2emi~t	overall	6161.998	17473.47	33.003	104689.2	N = 600
	between		1943.183	3723.961	9826.338	n = 40
	within		17367.63	-3407.65	101842.6	T = 15
energy~p	overall	217.5319	225.3731	1.08	1640.781	N = 600
	between		44.93216	173.424	397.544	n = 40
	within		220.9555	-155.7121	1572.372	T = 15
renewa~a	overall	66.48245	31.62239	.001742	206.6	N = 600
	between		11.62268	43.74249	81.68398	n = 40
	within		29.46262	.5568228	207.0377	T = 15
finalc~f	overall	90.19282	20.57205	34.234	252.5373	N = 600
	between		5.66518	79.75554	102.3496	n = 40
	within		19.79558	44.61838	240.6616	T = 15
finalc~e	overall	8.89e+09	3.49e+10	1.04e+08	4.45e+11	N = 600
	between		9.53e+09	2.92e+09	3.86e+10	n = 40
	within		3.36e+10	-2.89e+10	4.15e+11	T = 15
foreig~r	overall	-2.67e+08	8.22e+08	-8.02e+09	7.39e+08	N = 600
	between		2.86e+08	-1.09e+09	-2.71e+07	n = 40
	within		7.72e+08	-7.20e+09	1.36e+09	T = 15
genera~o	overall	14.14988	5.259494	3.541602	54.51542	N = 600
	between		1.513645	11.91842	17.55363	n = 40
	within		5.042292	2.730942	51.81864	T = 15
grossc~s	overall	1.87e+09	7.22e+09	-2.06e+07	8.98e+10	N = 600
	between		2.12e+09	4.81e+08	8.42e+09	n = 40
	within		6.91e+09	-6.48e+09	8.33e+10	T = 15
grossd~p	overall	7.621566	18.81088	-152.5373	68.78947	N = 600
	between		3.89715	-2.349649	12.3265	n = 40
	within		18.4124	-142.8472	65.43267	T = 15
indust~s	overall	3.10e+09	1.29e+10	3000000	1.40e+11	N = 600
	between		3.10e+09	7.61e+08	1.16e+10	n = 40
	within		1.25e+10	-8.37e+09	1.32e+11	T = 15
manufa~s	overall	8.43e+08	3.67e+09	3429204	5.48e+10	N = 600
	between		9.75e+08	3.01e+08	4.41e+09	n = 40
	within		3.54e+09	-3.55e+09	5.12e+10	T = 15
lendin~e	overall	20.94434	11.07231	6	69.13142	N = 600
	between		5.253349	12.38227	28.09212	n = 40
	within		9.779745	3.488571	61.98363	T = 15
broadm~p	overall	26.53019	14.23663	6.546494	101.8799	N = 600
	between		4.89258	20.39613	39.73224	n = 40
	within		13.39044	6.3425	102.1266	T = 15
offici~i	overall	454.771	884.9818	.0001149	7014.119	N = 600
	between		317.3913	105.8918	1057.578	n = 40
	within		827.5324	-600.0302	6411.312	T = 15
transp~r	overall	54.09215	14.38341	9.998392	90	N = 600
	between		2.339035	48.86229	60.30922	n = 40
	within		14.19645	10.65572	88.15794	T = 15
travel~c	overall	37.37176	24.54299	.138058	100	N = 600
	between		7.102262	24.80849	51.73833	n = 40
	within		23.51798	-13.06845	107.644	T = 15
mercha~p	overall	58.02187	64.86499	12.93786	986.6469	N = 600
	between		13.17334	43.69361	111.0474	n = 40
	within		63.54515	-32.92814	933.6214	T = 15

2. Unit root

2.1 log of GDP

```
Levin-Lin-Chu unit-root test for lngdp
---------------------------------------
Ho: Panels contain unit roots                   Number of panels  =      15
Ha: Panels are stationary                       Number of periods =      39

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:      Bartlett kernel, 10.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic       p-value
------------------------------------------------------------------------------
 Unadjusted t          -4.4426
 Adjusted t*           -3.6823         0.0001
------------------------------------------------------------------------------
```

2.2 log of Trade

```
Levin-Lin-Chu unit-root test for lntrade
-----------------------------------------
Ho: Panels contain unit roots                   Number of panels  =      15
Ha: Panels are stationary                       Number of periods =      39

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:      Bartlett kernel, 10.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic       p-value
------------------------------------------------------------------------------
 Unadjusted t          -4.1875
 Adjusted t*           -2.9294         0.0017
------------------------------------------------------------------------------
```

2.3 log of Trade Openness

```
Levin-Lin-Chu unit-root test for lntp
--------------------------------------
Ho: Panels contain unit roots                   Number of panels  =      15
Ha: Panels are stationary                       Number of periods =      39

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:      Bartlett kernel, 10.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic       p-value
------------------------------------------------------------------------------
 Unadjusted t          -6.7783
 Adjusted t*           -2.9827         0.0014
------------------------------------------------------------------------------
```

2.4 First order interaction term

```
Levin-Lin-Chu unit-root test for lngdplntp
-------------------------------------------
Ho: Panels contain unit roots                   Number of panels  =      15
Ha: Panels are stationary                       Number of periods =      39

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:      Bartlett kernel, 10.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic       p-value
------------------------------------------------------------------------------
 Unadjusted t          -4.7890
 Adjusted t*           -2.1675         0.0151
------------------------------------------------------------------------------
```

2.5 Emission (CO_2)

```
Levin-Lin-Chu unit-root test for co2emissionskt
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -18.9007
 Adjusted t*         -10.7498         0.0000
-------------------------------------------------------------------------------
```

2.6 Energy use

```
Levin-Lin-Chu unit-root test for energyusekgofoilequivalentpercap
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -19.3603
 Adjusted t*          -9.5986         0.0000
-------------------------------------------------------------------------------
```

2.7 Renewable Energy

```
Levin-Lin-Chu unit-root test for renewableenergyconsumptionoftota
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -15.1964
 Adjusted t*          -7.4936         0.0000
-------------------------------------------------------------------------------
```

2.8 Household Consumption Expenditure

```
Levin-Lin-Chu unit-root test for finalconsumptionexpenditurecurre
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -18.7078
 Adjusted t*         -10.7415         0.0000
-------------------------------------------------------------------------------
```

2.9 Foreign Direct Investment

```
Levin-Lin-Chu unit-root test for foreigndirectinvestmentnetbopcur
---------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -19.0727
 Adjusted t*         -11.2316         0.0000
---------------------------------------------------------------------------
```

2.10 Government Expenditure

```
Levin-Lin-Chu unit-root test for generalgovernmentfinalconsumptio
---------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -19.1355
 Adjusted t*         -12.2121         0.0000
---------------------------------------------------------------------------
```

2.11 Gross Capital Formation

```
Levin-Lin-Chu unit-root test for grosscapitalformationcurrentus
---------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -19.1369
 Adjusted t*         -10.8258         0.0000
---------------------------------------------------------------------------
```

2.12 Gross Domestic Savings

```
Levin-Lin-Chu unit-root test for grossdomesticsavingsofgdp
---------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels  =      40
Ha: Panels are stationary                      Number of periods =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -20.6903
 Adjusted t*         -11.8524         0.0000
---------------------------------------------------------------------------
```

2.13 Industry Value Added

```
Levin-Lin-Chu unit-root test for industryvalueaddedcurrentus
---------------------------------------------------------------------------
Ho: Panels contain unit roots                   Number of panels   =      40
Ha: Panels are stationary                       Number of periods  =      15

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -18.8892
 Adjusted t*         -10.7707         0.0000
---------------------------------------------------------------------------
```

2.14 Manufacturing Value Added

```
Levin-Lin-Chu unit-root test for manufacturingvalueaddedcurrentus
---------------------------------------------------------------------------
Ho: Panels contain unit roots                   Number of panels   =      40
Ha: Panels are stationary                       Number of periods  =      15

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -18.6812
 Adjusted t*         -11.3106         0.0000
---------------------------------------------------------------------------
```

2.15 Lending Interest Rate

```
Levin-Lin-Chu unit-root test for lendinginterestrate
---------------------------------------------------------------------------
Ho: Panels contain unit roots                   Number of panels   =      40
Ha: Panels are stationary                       Number of periods  =      15

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -12.3291
 Adjusted t*          -2.9926         0.0014
---------------------------------------------------------------------------
```

2.16 Broad Money (% of GDP)

```
Levin-Lin-Chu unit-root test for broadmoneyofgdp
---------------------------------------------------------------------------
Ho: Panels contain unit roots                   Number of panels   =      40
Ha: Panels are stationary                       Number of periods  =      15

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
---------------------------------------------------------------------------
                     Statistic       p-value
---------------------------------------------------------------------------
 Unadjusted t        -16.8898
 Adjusted t*          -6.1373         0.0000
---------------------------------------------------------------------------
```

2.17 Official Exchange Rate

```
Levin-Lin-Chu unit-root test for officialexchangeratelcuperusperi
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels   =      40
Ha: Panels are stationary                      Number of periods  =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -24.5155
 Adjusted t*         -14.1893          0.0000
-------------------------------------------------------------------------------
```

2.18 Import Transportation Services

```
Levin-Lin-Chu unit-root test for transportservicesofcommercialser
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels   =      40
Ha: Panels are stationary                      Number of periods  =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -18.3536
 Adjusted t*          -8.2255          0.0000
-------------------------------------------------------------------------------
```

2.19 Export Transportation Services

```
Levin-Lin-Chu unit-root test for travelservicesofcommercialservic
-------------------------------------------------------------------------------
Ho: Panels contain unit roots                  Number of panels   =      40
Ha: Panels are stationary                      Number of periods  =      15

AR parameter: Common                           Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
-------------------------------------------------------------------------------
                     Statistic       p-value
-------------------------------------------------------------------------------
 Unadjusted t        -29.7516
 Adjusted t*         -21.5069          0.0000
-------------------------------------------------------------------------------
```

3. Time Effect

```
i.years             _Iyears_1975-2014    (naturally coded; _Iyears_1975 omitted)
note: _Iyears_2011 omitted because of collinearity

Random-effects GLS regression                  Number of obs      =       585
Group variable: countries                      Number of groups   =        15

R-sq:  within  = 0.9990                        Obs per group: min =        39
       between = 1.0000                                      avg =      39.0
       overall = 0.9996                                      max =        39

                                               Wald chi2(40)      = 806160.47
corr(u_i, X)   = 0 (assumed)                   Prob > chi2        =    0.0000
```

lntrade	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngdp	.9982328	.0014074	709.26	0.000	.9954743	1.000991
lntp	.9911416	.0088489	112.01	0.000	.973798	1.008485
_Iyears_1976	.0000936	.0244911	0.00	0.997	-.047908	.0480953
_Iyears_1977	.0004782	.0244939	0.02	0.984	-.047529	.0484854
_Iyears_1978	.000807	.0244984	0.03	0.974	-.047209	.0488231
_Iyears_1979	.0014242	.0245066	0.06	0.954	-.0466079	.0494563
_Iyears_1980	.0018466	.0245168	0.08	0.940	-.0462055	.0498987
_Iyears_1981	.0018594	.0245201	0.08	0.940	-.0461991	.049918
_Iyears_1982	.0012876	.0245278	0.05	0.958	-.046786	.0493612
_Iyears_1983	.0012255	.0245426	0.05	0.960	-.0468771	.0493282
_Iyears_1984	.0020102	.0245477	0.08	0.935	-.0461025	.0501229
_Iyears_1985	.0026891	.0245629	0.11	0.913	-.0454534	.0508316
_Iyears_1986	.0020237	.024541	0.08	0.934	-.0460757	.0501231
_Iyears_1987	.0033221	.0245797	0.14	0.892	-.0448533	.0514975
_Iyears_1988	.0032979	.0245885	0.13	0.893	-.0448947	.0514906
_Iyears_1989	.0034971	.0246077	0.14	0.887	-.0447331	.0517273
_Iyears_1990	.0037926	.0246213	0.15	0.878	-.0444642	.0520495
_Iyears_1991	.0038796	.0246396	0.16	0.875	-.0444131	.0521724
_Iyears_1992	.0040809	.0246581	0.17	0.869	-.044248	.0524098
_Iyears_1993	.0041094	.0246696	0.17	0.868	-.0442421	.0524609
_Iyears_1994	.0055941	.0247482	0.23	0.821	-.0429115	.0540998
_Iyears_1995	.0058957	.0247827	0.24	0.812	-.0426774	.0544689
_Iyears_1996	.0059845	.0248063	0.24	0.809	-.0426349	.054604
_Iyears_1997	.0060729	.0248295	0.24	0.807	-.042592	.0547378
_Iyears_1998	.0064298	.0248994	0.26	0.796	-.0423721	.0552318
_Iyears_1999	.00675	.0249292	0.27	0.787	-.0421103	.0556104
_Iyears_2000	.0078036	.0250045	0.31	0.755	-.0412044	.0568115
_Iyears_2001	.0079664	.025031	0.32	0.750	-.0410935	.0570263
_Iyears_2002	.007896	.0250458	0.32	0.753	-.0411928	.0569848
_Iyears_2003	.0084226	.0251014	0.34	0.737	-.0407752	.0576204
_Iyears_2004	.0085617	.0251277	0.34	0.733	-.0406876	.057811
_Iyears_2005	.0091287	.0251915	0.36	0.717	-.0402457	.0585032
_Iyears_2006	.0093669	.0252351	0.37	0.710	-.0400929	.0588267
_Iyears_2007	.0096509	.0252786	0.38	0.703	-.0398942	.059196
_Iyears_2008	.0098375	.02532	0.39	0.698	-.0397888	.0594639
_Iyears_2009	.0093513	.0252987	0.37	0.712	-.0402331	.0589358
_Iyears_2010	.009431	.0253299	0.37	0.710	-.0402147	.0590766
_Iyears_2011	0	(omitted)				
_Iyears_2012	-.0241955	.0252455	-0.96	0.338	-.0736758	.0252847
_Iyears_2013	-.0249302	.0252565	-0.99	0.324	-.074432	.0245716
_Iyears_2014	-.0255918	.0252672	-1.01	0.311	-.0751145	.023931
_cons	.0768002	.0512038	1.50	0.134	-.0235575	.1771578
sigma_u	.01702786					
sigma_e	.06703762					
rho	.060608	(fraction of variance due to u_i)				

(1) _Iyears_1976 = 0
(2) _Iyears_1977 = 0
(3) _Iyears_1978 = 0
(4) _Iyears_1979 = 0
(5) _Iyears_1980 = 0
(6) _Iyears_1981 = 0
(7) _Iyears_1982 = 0
(8) _Iyears_1983 = 0
(9) _Iyears_1984 = 0
(10) _Iyears_1985 = 0
(11) _Iyears_1986 = 0

4. Individual Effects

```
i.countries       _Icountries_1-15    (naturally coded; _Icountries_1 omitted)

Random-effects GLS regression                   Number of obs      =       585
Group variable: countries                       Number of groups   =        15

R-sq:  within  = 0.9989                         Obs per group: min =        39
       between = 1.0000                                        avg =      39.0
       overall = 0.9997                                        max =        39

                                                Wald chi2(16)      =  1.63e+06
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

lntrade	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngdp	.9978015	.0015739	633.95	0.000	.9947166	1.000886
lntp	.9866137	.0102646	96.12	0.000	.9664955	1.006732
_Icountri~_2	-.0090408	.0150362	-0.60	0.548	-.0385112	.0204296
_Icountri~_3	.0141447	.0162967	0.87	0.385	-.0177962	.0460855
_Icountri~_4	-.0086027	.015531	-0.55	0.580	-.039043	.0218375
_Icountri~_5	-.0152511	.0206464	-0.74	0.460	-.0557174	.0252152
_Icountrie~6	-.0369619	.0192459	-1.92	0.055	-.0746832	.0007593
_Icountrie~7	.0220504	.0151073	1.46	0.144	-.0075594	.0516602
_Icountrie~8	.0052144	.0168137	0.31	0.756	-.0277398	.0381687
_Icountrie~9	.0338531	.0203824	1.66	0.097	-.0060957	.0738019
_Icountri~10	.0059943	.014935	0.40	0.688	-.0232777	.0352663
_Icountri~11	.0134337	.0148235	0.91	0.365	-.0156199	.0424873
_Icountri~12	-.0188469	.0150901	-1.25	0.212	-.0484229	.0107291
_Icountri~13	-.0179839	.0151907	-1.18	0.236	-.0477571	.0117892
_Icountri~14	-.021443	.0150785	-1.42	0.155	-.0509963	.0081102
_Icountri~15	.0314805	.016308	1.93	0.054	-.0004826	.0634437
_cons	.1092061	.0468927	2.33	0.020	.0172981	.2011141
sigma_u	0					
sigma_e	.06534405					
rho	0	(fraction of variance due to u_i)				

```
( 1)  _Icountries_2 = 0
( 2)  _Icountries_3 = 0
( 3)  _Icountries_4 = 0
( 4)  _Icountries_5 = 0
( 5)  _Icountries_6 = 0
( 6)  _Icountries_7 = 0
( 7)  _Icountries_8 = 0
( 8)  _Icountries_9 = 0
( 9)  _Icountries_10 = 0
(10)  _Icountries_11 = 0
(11)  _Icountries_12 = 0
(12)  _Icountries_13 = 0
(13)  _Icountries_14 = 0
(14)  _Icountries_15 = 0
(16)  _Iyears_1991 = 0
(17)  _Iyears_1992 = 0
(18)  _Iyears_1993 = 0
(19)  _Iyears_1994 = 0
(20)  _Iyears_1995 = 0
(21)  _Iyears_1996 = 0
(22)  _Iyears_1997 = 0
(23)  _Iyears_1998 = 0
(24)  _Iyears_1999 = 0
(25)  _Iyears_2000 = 0
(26)  _Iyears_2001 = 0
(27)  _Iyears_2002 = 0
(28)  _Iyears_2003 = 0
(29)  _Iyears_2004 = 0
(30)  _Iyears_2005 = 0
(31)  _Iyears_2006 = 0
(32)  _Iyears_2007 = 0
(33)  _Iyears_2008 = 0
(34)  _Iyears_2009 = 0
(35)  _Iyears_2010 = 0
(36)  _Iyears_2012 = 0
(37)  _Iyears_2013 = 0
(38)  _Iyears_2014 = 0

          chi2( 38) =
        Prob > chi2 =
```

5. Fixed Effect Result

```
Fixed-effects (within) regression               Number of obs      =       585
Group variable: countries                       Number of groups   =        15

R-sq:  within  = 0.9990                         Obs per group: min =        39
       between = 0.9999                                        avg =      39.0
       overall = 0.9996                                        max =        39

                                                F(5,565)           = 112526.69
corr(u_i, Xb)  = 0.0078                         Prob > F           =    0.0000
```

lntrade	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngdp	.9914985	.0075071	132.08	0.000	.9767533	1.006244
lntp	.9456999	.0439858	21.50	0.000	.8593042	1.032096
lngdplntp	.002103	.0018986	1.11	0.268	-.0016262	.0058322
fdii	-.0218775	.0047165	-4.64	0.000	-.0311415	-.0126135
nrr	-1.347757	.6967065	-1.93	0.054	-2.716208	.0206942
_cons	.2315624	.1700681	1.36	0.174	-.1024805	.5656053
sigma_u	.02826228					
sigma_e	.06399117					
rho	.16322385	(fraction of variance due to u_i)				

F test that all u_i=0: F(14, 565) = 3.19 Prob > F = 0.0001

6. Random Effect Result

```
Random-effects GLS regression                   Number of obs      =       585
Group variable: countries                       Number of groups   =        15

R-sq:  within  = 0.9990                         Obs per group: min =        39
       between = 1.0000                                        avg =      39.0
       overall = 0.9996                                        max =        39

                                                Wald chi2(5)       = 946863.03
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

lntrade	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngdp	.9927728	.0066488	149.32	0.000	.9797413	1.005804
lntp	.956495	.0394849	24.22	0.000	.879106	1.033884
lngdplntp	.0017892	.00169	1.06	0.290	-.0015231	.0051016
fdii	-.0216643	.004417	-4.90	0.000	-.0303215	-.0130071
nrr	.1868072	.4152707	0.45	0.653	-.6271083	1.000723
_cons	.1758871	.1545029	1.14	0.255	-.1269329	.4787072
sigma_u	.01403399					
sigma_e	.06399117					
rho	.04589027	(fraction of variance due to u_i)				

7. Hausman's Test

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lngdp	.9914985	.9927728	-.0012743	.0034856
lntp	.9456999	.956495	-.0107951	.0193828
lngdplntp	.002103	.0017892	.0003138	.0008652
fdii	-.0218775	-.0216643	-.0002132	.0016539
nrr	-1.347757	.1868072	-1.534564	.5594195

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 11.96
Prob>chi2 = 0.0354

8. Estimation Result

Linear regression, absorbing indicators

Number of obs	= 585
F(5, 565)	= 112526.69
Prob > F	= 0.0000
R-squared	= 0.9997
Adj R-squared	= 0.9997
Root MSE	= 0.0640

lntrade	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngdp	.9914985	.0075071	132.08	0.000	.9767533	1.006244
lntp	.9456999	.0439858	21.50	0.000	.8593042	1.032096
lngdplntp	.002103	.0018986	1.11	0.268	-.0016262	.0058322
fdii	-.0218775	.0047165	-4.64	0.000	-.0311415	-.0126135
nrr	-1.347757	.6967065	-1.93	0.054	-2.716208	.0206942
_cons	.2315624	.1700681	1.36	0.174	-.1024805	.5656053
countries	F(14, 565) =	3.189	0.000	(15 categories)		

8.2. Panel Instrumental Variable Estimation

```
> tfinalconsumptio manufacturingvalueaddedcurrentus), fe vce(bootstrap)
(running xtivreg on estimation sample)

Bootstrap replications (50)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................     50

Fixed-effects (within) IV regression          Number of obs      =       600
Group variable: years                         Number of groups   =        40

R-sq:  within  = 0.9996                       Obs per group: min =        15
       between = 1.0000                                      avg =      15.0
       overall = 0.9997                                      max =        15

                                              Wald chi2(13)      =         .
corr(u_i, Xb)  = -0.2544                      Prob > chi2        =         .
                                    (Replications based on 40 clusters in years)
```

lntrade	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
lngdp	.9870883	.0382356	25.82	0.000	.9121479	1.062029
lntp	.9284488	.2347895	3.95	0.000	.4682698	1.388628
Interaction	.0030656	.0099229	0.31	0.757	-.016383	.0225142
co2emissionskt	-4.74e-07	4.56e-07	-1.04	0.299	-1.37e-06	4.21e-07
energyusekgof~p	.0000579	.0000464	1.25	0.212	-.000033	.0001488
renewableener~a	.0002978	.0001632	1.82	0.068	-.0000222	.0006177
foreigndirect~r	2.41e-11	1.98e-11	1.22	0.224	-1.47e-11	6.30e-11
grosscapitalf~s	1.12e-12	3.77e-12	0.30	0.766	-6.27e-12	8.52e-12
grossdomestic~p	-.0002469	.0003151	-0.78	0.433	-.0008645	.0003706
industryvalue~s	3.29e-12	3.17e-12	1.04	0.299	-2.92e-12	9.51e-12
manufacturing~s	-1.54e-11	5.61e-12	-2.75	0.006	-2.64e-11	-4.43e-12
lendingintere~e	-.0003811	.0002593	-1.47	0.142	-.0008892	.0001271
broadmoneyofgdp	.0003216	.0003131	1.03	0.304	-.0002921	.0009353
officialexcha~i	4.22e-06	3.05e-06	1.39	0.166	-1.75e-06	.0000102
transportserv~r	-.0001911	.0001869	-1.02	0.307	-.0005574	.0001752
travelservice~c	.0002297	.0003111	0.74	0.460	-.0003801	.0008396
merchandisetr~p	5.01e-06	.0000703	0.07	0.943	-.0001327	.0001428
_cons	.2785267	.8889882	0.31	0.754	-1.463858	2.020912
sigma_u	.00672409					
sigma_e	.06266185					
rho	.01138384	(fraction of variance due to u_i)				

```
F  test that all u_i=0:      F(39,543) =      0.13           Prob > F     = 1.0000

Instrumented:    lngdp
Instruments:     lntp Interaction co2emissionskt energyusekgofoilequivalentpercap
                 renewableenergyconsumptionoftota foreigndirectinvestmentnetbopcur
                 grosscapitalformationcurrentus grossdomesticsavingsofgdp
                 industryvalueaddedcurrentus manufacturingvalueaddedcurrentus
                 lendinginterestrate broadmoneyofgdp
                 officialexchangeratelcuperusperi transportservicesofcommercialser
                 travelservicesofcommercialservic merchandisetradeofgdp
                 finalconsumptionexpenditurecurre generalgovernmentfinalconsumptio
```

9. Hausman and Over Identification Test

```
Note: the rank of the differenced variance matrix (2) does not equal the number of
      coefficients being tested (17); be sure this is what you expect, or there
      may be problems computing the test.  Examine the output of your estimators
      for anything unexpected and possibly consider scaling your variables so
      that the coefficients are on a similar scale.
```

	Coefficients (b) iv	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lngdp	.9870883	1.002287	-.0151992	.040565
lntp	.9284488	1.020009	-.0915603	.2443665
Interaction	.0030656	-.000829	.0038945	.0103941
co2emissio~t	-4.74e-07	-5.37e-07	6.29e-08	1.71e-07
energyusek~p	.0000579	.0000687	-.0000108	.0000289
renewablee~a	.0002978	.0002706	.0000272	.0000731
foreigndir~r	2.41e-11	2.49e-11	-7.42e-13	2.12e-12
grosscapit~s	1.12e-12	5.32e-13	5.92e-13	1.59e-12
grossdomes~p	-.0002469	-.0003116	.0000647	.0001733
industryva~s	3.29e-12	3.56e-12	-2.65e-13	7.15e-13
manufactur~s	-1.54e-11	-1.48e-11	-6.36e-13	1.73e-12
lendingint~e	-.0003811	-.0002749	-.0001062	.000285
broadmoney~p	.0003216	.0003544	-.0000328	.0000913
officialex~i	4.22e-06	4.54e-06	-3.17e-07	9.23e-07
transports~r	-.0001911	-.0002087	.0000176	.0000518
travelserv~c	.0002297	.0001229	.0001068	.0002854
merchandis~p	5.01e-06	-.0000148	.0000198	.0000531

b = consistent under Ho and Ha; obtained from xtivreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.14
Prob>chi2 = 0.9322
(V_b-V_B is not positive definite)

10. Heteroscedasticity test

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (15)   =     1.5e+05
Prob>chi2 =       0.0000
```

11. Autocorrelation

```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
     F(  1,       14) =  34732.877
           Prob > F =       0.0000
```

****