# The Impact of Economic Freedom on Bilateral Trade: A Cross-Country Analysis

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#### Abstract

This paper investigates the impact of economic freedom on intra-African bilateral trade. We use an unbalanced panel dataset of total volume of trade among 33 African countries. Using the Fraser Institute's economic freedom of the world index, we employ an augmented gravity model to estimate the impact of economic freedom on bilateral trade. We find that improvement in both exporter and importer economic freedom tends to induce more trade. Our results also indicate that regional trade agreements have a positive impact on intra-African bilateral trade.

JEL codes: F14, F15, G18 Key words: Africa, Bilateral trade, Economic freedom, Gravity model

### **1. INTRODUCTION**

The African continent accounts for less than five percent of world trade (WTO, 2011). Between the mid-1950s and 1990 Sub-Saharan Africa (SSA) saw its share of global exports decline from 3.1% to 1.2% (Amjadi, Reincke, and Yeats, 1996). Amjadi, Reincke, and Yeats attribute this decline to detrimental African policies that increased transportation costs. In addition, Africa trades very little with itself (Foroutan and Pritchett, 1993; Longo and Sekkat, 2004). For example, in 2011 intra-African trade was 10%, while intra-trade among the European Union is about 70%, 52% for Asian countries, 50% for North American countries, and 26% for South American countries (WTO, 2012).

The question then arises: why is intra-African trade unsatisfactory compared with the rest of the world, given that it would cost less to trade among themselves than with other continents? By far, the most conventional wisdom is to blame Africa's "trade policy, insufficient infrastructure, non-convertibility of currencies, political instability, ethnic, cultural and linguistic diversity" (Longo and Sekkat, 2004). One other explanation is that many African countries have the same comparative advantage, i.e., they produce just about the same goods (primarily raw agricultural commodities and minerals), which are then exported to Western countries for processing (Yeats, 1998).

Numerous recent studies have focused on intra-African trade but none of these, to the best of our knowledge, examines the role of economic freedom (or strength of economic institutions) in promoting trade within the continent. Empirical evidence from elsewhere—outside of Africa—points to the fact that economic freedom, exemplified by the strength of institutions may be vital to boosting the levels of trade. Anderson and Marcouiller (2002) state that strong institutions dramatically increased trade among a sample of Latin American countries. Depken and Sonora (2005) look at the asymmetric effects of economic freedom on exports and imports between the U.S. and its trading partners. They find that the economic freedom of trading partners has a positive and significant effect on U.S. exports to those countries. De Groot et al. (2004) provide empirical evidence that better quality economic institutions, poor customs procedures, and long wait times at the border all reduce the volume of international trade. Wu, Li, and Samsell (2012) point out that countries governed by strong rule of law.

This paper contributes to the literature by investigating the impact of economic freedom on intra-African trade. To do so, we use the Fraser Institute's Economic Freedom of the World 2011 (EFW) report that classified more than half of African countries as least free or falling below the third quartile on the EFW index (Gwartney et al., 2011).

Economic freedom encompasses institutional and infrastructural arrangements that reduce the transactions costs associated with international trade. These bottlenecks impose additional transaction costs on international trade. We argue that African countries could benefit more from trading among themselves if they improve their economic freedom. Additionally, we provide empirical results that regional trade agreements have a positive impact on intra-African trade.

The rest of paper is organized as follows. Section 2 presents the methodology; section 3 describes the data, and section 4 discusses the results. Section 5 provides some concluding remarks.

#### 2. THE METHODOLOGY

The gravity model as it relates to international trade was first introduced by Tinbergen (1962). With its origins in Isaac Newton's law of gravity, the model posits that trade between two countries is directly proportional to the "gravitational" pull of their respective national incomes (GDP), and inversely proportional to the distance between them. It has become the workhorse of empirical international trade studies over the last several decades (Eichengreen and Irwin, 1998; Baier & Bergstrand, 2003). The model has gained widespread acceptance in the economics profession, despite initial questions about its theoretical foundations. Anderson (1979) was the first to provide the theoretical underpinnings of the gravity model based on constant elasticity of substitution (CES) preferences. This effort in discovering the economic theory was further extended by Bergstrand (1989;1990) and Deardoff (1998) to include monopolistic competition and specialization in the context of the Heckscher-Ohlin model. Although incomes and distance are important to predict the magnitude of bilateral trade flows, other variables such as dummies may be added to the model to indicate membership to an economic area, protection levels, historical ties and border effects. The augmented gravity model to be estimated is specified in natural logarithms as follows:

In  $x_{ijt} = \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP_{jt} + \alpha_3 \ln dist_{ij} + \alpha_4 \ln q_{ij} + \alpha_5 \ln EFW_{it} + \alpha_6 \ln EFW_{jt} + \alpha_7 cont_{ij} + \alpha_8 RTA_{ij} + \alpha_9 N_{it} + \alpha_{10} N_{jt} + \varepsilon_{ijt}$  (1) where  $x_{ijt}$  refers to total export volume from country *i* to country *j* at time *t*,  $GDP_i$  ( $GDP_j$ ) are gross domestic products of the exporting (importing) country,  $EFW_{it}$  and  $EFW_{jt}$  are the economic freedom of the world indexes for country *i* and country *j* at time *t*, respectively. The other variables are bilateral distance ( $dist_{ij}$ ),  $lang_{ij}$  (=1 if both partners have a common official language),  $RTA_{ij}$  (=1 if both partners belong to the same regional trading bloc), and  $N_i$  and  $N_j$  are population of countries *i* and *j*, respectively. The error term  $\varepsilon_{ij}$  captures any other shocks that may affect bilateral trade and is assumed to be normally distributed. By including the economic freedom in both the exporting and importing country, we take into account the effect of presence and strength of economic institutions in both trading countries.

Recently Anderson and Wincoop (2003) argued that the specification in equation (1) suffers from omitted variable bias because it does not account for "multilateral resistance"—i.e., the average bilateral trade barriers with all other trading partners. They advocated that introducing multilateral resistance terms and imposing unitary GDP coefficients yield unbiased estimates. The equation to be estimated is then:

 $ln\left(\frac{x_{ijt}}{GDP_{it}GDP_{jt}}\right) = \alpha_0 + \alpha_{it} + \alpha_1 lndist_{ij} + \alpha_2 lang_{ij} + \alpha_3 lnEFW_{it} + \alpha_4 lnEFW_{jt} + \alpha_5 cont_{ij} + \alpha_6 RTA_{ij} + \alpha_7 N_{it} + \alpha_8 N_{jt} + \varepsilon_{ijt}$ (2)

where the subscript t denotes time;  $\alpha_{it}$  is the exporter-by-time fixed effect, and  $\alpha_{jt}$  is the importer -by –time fixed effect to control for the time varying multilateral resistance terms.

### 2.1. Hypotheses on the Direction and Magnitude of EFW Index Variables

We formulate and test three *a priori* hypotheses concerning the impact of both exporting and importing countries' economic freedom on the volume of bilateral trade between them. Thus, the following hypotheses are tested based on the model parameters.

- H1 :  $\alpha_{EFW_i} > 0$ , An increase in the economic freedom index of the exporting country increases bilateral trade, *ceteris paribus*.
- **H2:**  $\alpha_{EFW_j} > 0$ , An increase in the economic freedom index of the importing country increases bilateral trade, *ceteris paribus*.

**H3:**  $\alpha_{EFW_i} > \alpha_{EFW_i}$ , The effect of economic freedom of the exporter is greater than that of the importer

Hypotheses 1 and 2 are apparent—economic freedom leads to friendly business and trade environments, less corruption, strong institutions, enforcement of property rights, and freedom of exchange. Because of these and other enabling conditions, we expect that the bilateral trade of both importing and exporting countries will benefit from greater economic freedom. What is less apparent is the third hypothesis, which based on our intuition stems from the fact that importing countries with less economic freedom tend to impose unnecessarily high barriers to trade. Thus, we expect importing countries that are economically un-free to have higher protectionist barriers than equally un-free exporters.

### 3. DATA

We use total bilateral exports covering the period 2000-2009 for 33 African Countries. The data on exports are obtained from the United Nations Commodity Trade Statistics Database (UNCOMTRADE). This is a composite of total value of all commodities traded between two trading countries. A virtue of this dataset is the absence of the so-called zero-inflated problem in the dependent variable (Burger, van Oort and Linders, 2009).

The economic freedom variable is an index extracted from the Fraser Institute's *Economic Freedom of the World* (EFW) database. The *EFW* index is computed for 123 countries in the world. The index measures the degree to which the policies and institutions of countries are supportive of economic freedom by including forty-two components divided into five major areas (Gwartney et al., 2011). These five groups are: (1) size of government: expenditures, taxes, and enterprises, (2) legal structure and security of property Rights, (3) access to sound money (4) freedom to trade with foreigners and (5) regulation of credit, labor, and business. Based on their scores on these five major areas, each country receives an overall (summary) index on a scale from 0 ("no economic freedom") to 10 ("full economic freedom"). Table 1 presents the components of the Economic Freedom of the World Freedom Index.

Individual country GDP and population data come from the World Bank's World Development Indicators (WDI). Bilateral distances, contiguity, and common language come from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). Regional Trade Agreement (RTA) is constructed as a dummy variable. We first identify the types of RTAs on the continent, and there are six of these including: (1) Common Market for Eastern and Southern Africa (COMESA), (2) Economic Community of West African States (ECOWAS), (3) Southern African Development Community (SADC), (4) Arab Maghreb Union (AMU), (5) Economic and Monetary Union of West Africa (UEMOA), and (6) Economic and Monetary Community of Central Africa (CEMAC). Strictly speaking, the last two are more of monetary unions than trade unions. But to the extent that they confer some advantages to members, they do mimic trade unions in the sense of more relaxed trade barriers towards each other than to non-members. In constructing the RTA variable, we are well aware of the problem of overlapping RTA memberships, i.e., some African countries belong to more than one regional body. To go around this problem, we construct the variable such that, if both the importing and exporting country belong to the same regional trade bloc, the RTA variable is assigned a value of unity, and zero otherwise.

#### 4. RESULTS AND DISCUSSION

Table 2 presents the empirical estimates of two specifications of the gravity model. Model 1 provides the results of the basic gravity model without any fixed or time effects while model 2 presents the empirical results for the country-specific fixed effects. In model 1, all coefficients are statistically significant and have the correct signs in conformity with priori expectations in the standard gravity model. However these estimates may not be reliable because of the omission of the multilateral price terms.

Model 2 corrects for any bias due to country-fixed effects. The results show that there is a strong negative relationship between distance and trade, which is fairly typical in most gravity models. The usual explanation is that the farther two countries are apart, the higher is the transportation costs of moving goods between them. As a result, trade declines with distance between trading partners. The variables language, common border, and RTA have the expected sign and are statistically significant. If both exporter and importer share a common official language, then intra-African trade increases probably because the presence of a language barrier imposes additional transaction costs.

Similarly, the effect of both trading partners sharing a common border raises intra African trade. Countries that share a common border tend to have low transaction costs associated with trade between them. Population (N) also has a positive and significant effect on the volume of bilateral trade. This is especially true in the case of importing countries where the elasticity is greater than one. The *RTA* variable is very important, given that so much attention has been focused on uncovering the true impact of trade agreements in promoting trade. The results show that RTAs boost intra-African trade.

Both EFW<sub>i</sub> and EFW<sub>j</sub> are found to positively affect trade among African countries. That is to say that if both exporting and importing countries increased their scores on the economic freedom index, then the value of trade between them can be expected to increase, *ceteris paribus*. This result confirms the findings in Anderson & Marcouiller (2002), and emphasizes the importance of strong institutions such as effective legal systems, enforcement of contracts, and sound government policies. Institutional quality in many African countries is very low and our findings suggest that improvements in this area would positively impact intra-African trade.

Table 3 displays the Wald tests for testing hypotheses 1-3 on the direction and magnitude of the effects of exporter and importer freedom indexes. The tests fail to reject hypotheses 1 and 2, implying that both exporter and importer economic freedom indices indeed have a positive effect on trade. However, the hypothesis 3 is rejected, suggesting that the exporter economic freedom index does not have a larger effect on trade than that of the importer. The magnitudes of coefficient estimates presented in Table 2 show that the importer economic freedom index actually has a larger effect ( $\beta_{EFWJ}$ =7.125) on bilateral trade than the exporter economic freedom index ( $\beta_{EFWJ}$ =2.755), implying that there is an asymmetric effect of importer and exporter economic freedom on bilateral trade. This finding is in line with Depken and Sonora (2005) who found empirical evidence that the economic freedom of a U.S. trading partner had a larger effect on U.S. exports to that country than U.S. imports from that country.

#### 5. CONCLUSION

This paper provides an empirical investigation of the role of economic freedom, among other determinants, in promoting bilateral trade in Africa. While it must have its own shortcomings, the Economic Freedom of the World (EFW) index provides a comprehensive system for comparing the strength of economic institutions across countries. This index, encompassing attributes of economic freedom such as freedom to trade, freedom from corruption, size of government, legal structures, and access to money; provides a good framework to assess how economic policies in Africa promote or hinder bilateral trade. Our empirical results indicate that the economic freedom of both exporting and importing countries positively affect the volume of trade. This finding suggests that improving the strength of economic institutions will remove the barriers to trade that inhibit intra-African trade.

Component	Sub-Components	
	1. General government consumption spending	
1. Size of government: Expenditures, Taxes, and Enterprises	2. Transfers and subsidies as a percentage of GDP	
	3. Government enterprises and investment	
	4. Top marginal tax rate	
	1. Judicial independence	
	2. Impartial courts	
2. Local Structure and Security of Droparty Dichts	3. Protection of property rights	
2. Legal Structure and Security of Property Rights	4. Military interference in rule of law	
	5. Integrity of the legal system	
	6. Legal enforcement of contracts	
	1. Money growth	
2 Access to Council Manage	2. Standard deviation of inflation	
5. Access to Sound Money	3. Inflation	
	4. Freedom to own foreign currency	
	1. Taxes on international trade	
4. Freedom to Trade with Foreigners	2. Regulatory trade barriers	
4. Fleedon to Trade with Foleigners	3. Size of trade sector relative to expected	
	4. Black market exchange rates	
	5. International capital market controls	
5 Deculation of Credit Labor and Dusiness	1. Credit market regulations	
5. Regulation of Credit, Labor, and Business	2. Labor market regulations	
	3. Business regulations	

Table 1: Components of the Economic Free	dom of the World Index
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Source: Fraser Institute, Vancouver, Canada

# Table 2: Gravity Models of African Bilateral Trade

Variable	(1) Basic Gravity model		(2) Country-specific fixed effects model	
	Estimate	Std. Error	Estimate	Std. Error
GDP <sub>i</sub>	1.325***	0.034	1.00	-
GDP <sub>i</sub>	0.768***	0.335	1.00	-
Dist <sub>ij</sub>	-2.011***	0.057	-2.303***	0.059
Lang <sub>ij</sub>	1.001***	0.068	1.178***	0.067
EFW <sub>i</sub>	0.619***	0.234	2.755***	0.737
EFW <sub>i</sub>	0.349	0.241	7.125***	0.640
Cont <sub>ii</sub>	0.763***	0.125	1.051***	0.118
RTA <sub>ii</sub>	0.883***	0.098	0.577***	0.093
Ni	-0.105**	0.037	0.051	0.080
Ni	0.047	0.038	1.540***	0.075
Constant	-20.014***	0.935	-13.177***	2.582
R-squared	0.46		0.69	
Ν	6308		6308	

Notes: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; <sup>a</sup> signifies GDP restricted to unity

Table 3: Hypotheses Test					
Null Hypothesis	Wald Statistic	p-value			
H1 : $\alpha_{EFW_i} > 0$	1.597	0.945			
H2: $\alpha_{EFW_j} > 0$	10.616	1.00			
H3: $\alpha_{EFW_i} > \alpha_{EFW_i}$	5.564	< 0.000			

Table 3: Hypotheses Test

#### REFERENCES

- Acemoglu, D., Antras, P. and Helpman, E. 2007. Contracts and Technology Adoption. *The American Economic Review*, Vol. 97, No. 3, pp. 916-943.
- Amjadi, A., Reincke, U., and Yeats, A. 1996. Did External Barriers Cause the Marginalization of Sub-Saharan Africa in World Trade?" World Bank Discussion Paper No. 348. Washington, D.C.

Anderson James E. 1979. "A Theoretical Foundation for the Gravity Equation." American Economic Review 69(1): 106-116.

- Anderson, James E. and Marcouiller, Douglas. 2002. Insecurity and the Pattern of Trade: An Empirical Investigation. *The Review of Economics and Statistics*, 84(2): 342-352.
- Anderson, James E., and Wincoop Eric Van. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." American Economic Review 93(1):170–92.
- Baier Scott L. and Bergstrand.Jeffrey H. 2007. "Do free trade agreements actually increase members' international trade?" Journal of International Economics 71(1): 72-95.
- Bergstrand Jeffrey H. 1989. The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade. *Review of Economics and Statistics* 71 (1), 143-153.
- Bergstrand Jeffrey H. 1990. "The Hecksecher-Ohlin- Samuelson Model, the Linder Hypothesis and the Determinants of Bilateral Intra-Industry Trade." *The Economic Journal* 100(403):1216-1229.
- Burger, M., van Oort, F., and Linders, Gert-Jan. 2009. On the Specification of the gravity Model of Trade: Zeros, Excess Zeros and Zero-inflated Estimation. *Spatial Economic Analysis*, 4(2): 169-190.
- Deardorff, A. 1998. "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?" In J.A. Frankel, ed. *The Regionalization of the World Economy*. Chicago: University of Chicago Press, pp.7-32.
- De Groot, Henri L.F., Linders, G-J., Rietveld, P. and Subramanian, U. 2004. The Institutional Determinants of Bilateral Trade Patterns. *Kyklos*, Vol. 57, pp.103-124.
- De Jong, E. and Bogmans, C. 2011. Does Corruption Discourage International Trade? *European Journal of Political Economy* 27 (2011) 385-398.
- Depken, Craig A. and Sonora, Robert J. 2005. Asymmetric Effects of Economic Freedom on International Trade Flows. International Journal of Business and Economics, Vol. 4, No. 2, pp. 141-155.
- Eichengreen, B., and Irwin, D. 1998. "The Role of History in Bilateral Trade Flows." In Jeffrey A. Frankle, ed. *The Regionalization of the World Economy*. Chicago: University of Chicago Press, pp. 33-57.
- Feenstra, R.C., Markusen, J.R., and Rose, A.K. 2001. Using the Gravity Equation to Diffeentiate among Alternative Thories of Trade. *Canadian Journal of Economics*, Vol. 34, No. 2. pp. 430-447.

Foroutan, F., and Pritchett, L.H. 1993. Intra-Sub Saharan African trade: Is it too Little? *Journal of African Economies*, 2(1), 74-105.

Frankle, J. A. 1997. Regional Trading Blocs in the World Economic System. Institute for International Economics. Washington, D.C.

- Grant, H. Jason and Lambert, M. Dayton. 2008. "Do Regional Trade Agreements Increase Members' Agricultural Trade?" American Journal of Agricultural Economics 90(3): 765-782.
- Gwartney, J.D., and Lawson, R.A. 2002. Economic Freedom of the World: 2002 Annual Report. Vancouver, B.C. The Fraser Institute, Vancouver. <u>http://www.freetheworld.com</u>.
- Gwartney, J.D., Lawson, R.A., and Hall, J.C. 2011. Economic Freedom of the World: 2011 Annual Report. Vancouver, B.C. The Fraser Institute, Vancouver. <u>http://www.freetheworld.com</u>.

Longo, Robert, and Sekkat, Khalid. 2004. Economic Obstacles to Expanding Intra-African Trade. *World Development* Vol. 32, no. 8, pp. 1309-1321.

- Tinbergen Jan. 1962. "Shaping the World Economy: Suggestions for an International Economic policy." New York: The Twentieth Century Fund.
- Wu, J., Li, S., and Samsell, D. 2012. Why Some Countries Trade More, Some Trade Less, Some Trade Almost Nothing: The Effect of the Governance Environment on Trade Flows. *International Business Review* 21(2012):225-238.

Yeats, Alexander J. 1998. What Can be Expected from African Regional Trade Agreements? Some Empirical Evidence. Policy Research Working Paper, WPS2004. The World Bank.

The World Trade Organization (WTO). 2011. "International Trade Statistics 2011." http://www.wto.org/.