An Empirical Analysis on the Relationship between Trade Openness and Economic Growth in Niger

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Abstract

The purpose of this study is to analyze the relationship between trade openness and economic growth of Niger for the period of 1970-2015. Having found evidence of long-run relationship between variables by using Johansen co-integration approach, Vector Error Correction (VEC) technique has been employed to analyze the direction of causality. The empirical results show that there exists bi-directional causality among variables in Niger economy. This study concludes that like many developing countries, the main aim of economic policies in Niger is to develop business environment and opportunities for supporting trade openness.

Keywords: Trade openness, Economic Growth, Niger

JEL Codes:F13, F14, F43, O55

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1. Introduction

According to standard international trade theories, adopting reforms for liberalizing trade, launching multi-trade agreements and participating free trade by lowering trade barriers are the main trade policies to improve efficiency and increase economic growth.Innovation and adaptation of technology are two basic channels through trade may affect growth. They also boost the economy`s rate of total factor productivity growth (Proudman et al., 1998). Economies of scale and differentiated goods may lead to lower prices and create gain for consumers according to new trade theory developed by Krugman (1979, 80).

However, recently, the protectionist economists have criticized mentioned arguments of standard trade theories. Rodrik (2001) argues that the excessive emphasis on trade liberalization can backfire if it diverts scarce energies and political resources of government leaders from growth fundamentals (Zafar, 2005:3). According to the protectionist views, restrictions on trade may help countries in dealing with trade deficit. Increased export may lead to better growth. In addition, opponents of free trade claim that removing restrictions on trade may cause the decline of domestic production and domestic employment. Free trade also may lead to decrease government revenue by reducing tariffs.

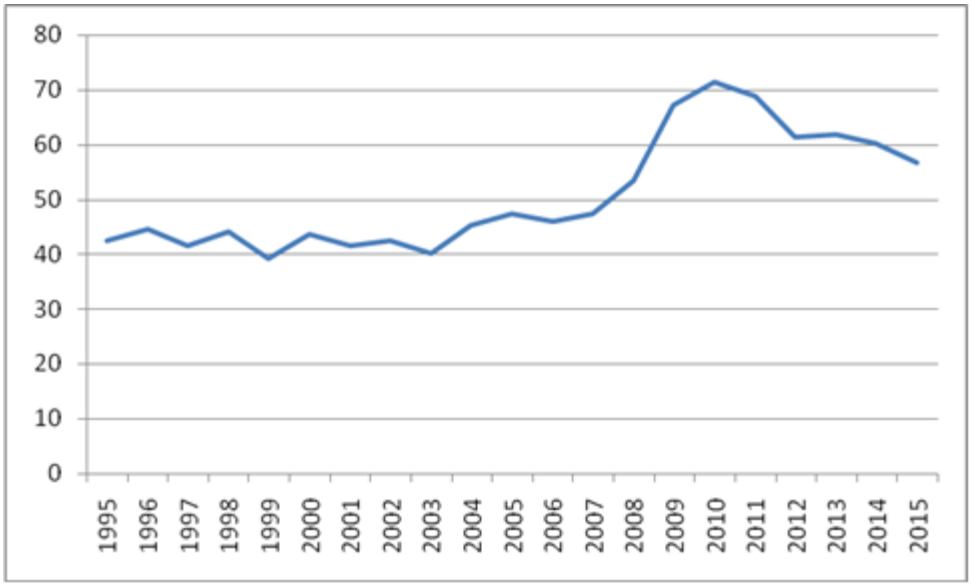
In this world of globalization, each country tries to increase its share on the international market through trade. For this reason, these countries rapidly open their economies to world trade by negotiating trade agreements and lowering trade barriers. Since 1970s economist are investigating whether trade openness is a good thing for an economy. This is due to the growth differences between Latin America and East Asian countries. While East Asian countries have been accepted miracle due to the high economic performance based on trade-led growth, Latin America could not attain high growth with the Import substitution growth.

There is also no consensus about the role of trade on economic growth among economic growth theories and empirical studies. Solow growth theories state that trade liberalization might affect growth in short time without technological progress. On the other hand, trade foster growth in the long run according to the endogenous growth theories (Romer 1986, 1990, Grossman and Helpman, 1990, 1994, Lucas 1988).

While some empirical studies suggest that there is positive relationship between trade openness and economic growth, other studies showed that sometime the situation can be the opposite of all this. For this reason, the main purpose of this study is to investigate the relationship between trade openness and economic growth in Niger. She has been a member of the WTO since 1996 and as such is committed to trade liberalization and opening its markets to foreign investments (https://www.state.gov/documents/organization/228800.pdf). Before 1996 the average economic growth was about 2.3% and after 1996, the growth became 4.8%. The total trade / GDP ratio also increased from approximately 40 % in 1996, to 60 % in 2015 (UNCTAD, 2017).

Because of the fact that Niger is a landlocked country, trade openness could hit the economy in long run. Another point is that, despite its natural resources, Niger is one of the poorest country in the world in term of development. And that's why we chose Niger for this study. We will examine the link between trade openness and economic growth in Niger by using time series data of 1970-2015 periods.

Figure 1. Trade (% of GDP) in Niger



Source: *World Bank*

This study examines the cointegration and causality relationship between the variables by employing the Johansen co-integration and VEC Granger causality tests. In this context, our work will be structured as follow. In the second section, we will review the empirical studies about trade openness and economic growth relationship. The third section provides the data, model specification and method. And we concluded in fourth section.

2. Literature Review

Nowadays we can reach a lot of studies related to trade and economic growthin the literature. Most of them give importance to the trade openness for a certain development of a given country. As the main purpose of this study is to investigate the relationship between trade openness and economic growth for Niger, firstly we will look at some studies that did the same investigation using these variables. In this context, we will start with the studies that found a positive relationship between the variables. By employing cointegration and Var Granger causality approach, Constant (2010) found empirical long run link between the foreign direct investment, trade openness and growth; and unidirectional causal relationship. Ramzan & Kiani (2012) performed Error Correction Methods (ECM) in order to find the link between economic growth indicator, FDI, and trade openness by usingthe annual data set ranging from 1975 to 2011. The results suggested that FDI and trade have positive impact on growth of Pakistan. Kakar&Khiji (2011) found also a positive relationship between trade openness and economic growth for Pakistan and Malaysia over the period 1980-2010. Aboubacar et all. (2014) investigated the trade-led growth theory for Niger economy covering the period from 1980 to 2013 and found that the trade liberalization has affected the economic growth positively in Niger over the period of study. Sakyi, Commodore, & Opoku (2015), investigated the long-run impact of FDI and trade openness on economic growth in Ghana (1970–2011) and found that the FDI and exports are fundamentals factors in determining economic growth. Bibi (2014) investigated the role of trade openness in enhancing economic growth in Pakistan by using analysis based on time series data for the period 1980 to 2011. According to his results, negative impact of trade openness could be surmounted by producing import substitutes and creating conditions for trade surplus. The summary of literature review is given in the following table.

Table 1. Openness and Growth: Literature Survey

Studies	Sample and Periods	Methodology	Findings
Ali & Abdullah (2015)	(Export+Import)/GDP, 1980-2010	The Johansen Cointegration test & VECM	Short-run positive relationship and long-run negative relationship
Kalu, Nwude, & Nnenna (2016)	net export (NEXP), 1991-2013	Classical Linear Regression Model (CLRM) & ordinary Least Square Regression method	Positive
Nduka (2013)	(Export+Import)/GDP, 1970 – 2008	The ordinary Least Squares (OLS) technique	Positive long-run relationship
Olufemi (2004)	(Export+Import)/GDP, 1970-2000	Johansen Cointegration, VECM	Positive long-run relationship and Unidirectional causality
Aboubacar, Xu, & Ousseini, 2014	(Export+Import)/GDP, 1980-2013	The Johansen Cointegration test & VECM	Positive Long-run relationship and unidirectional causality
Nduka, Chukwu, Ugbor, & Nwakaire, 2013	(Export+Import)/GDP , 1970Q1-1985 and 1986-2011	Regression model Granger Cointegration& Causality test	Positive Long-run relationship and unidirectional causality
Mohsen, 2015	(Export+Import)/GDP, 1970-2010	Johansen Cointegration VECM Granger Causality	Positive long-run relationship and bidirectional causality
Ramzan & Kiani, 2012	(Export+Import)/GDP, 1975-2011	Johansen Cointegration& VECM	Positive Long-run relationship
Adhikary, 2015	(Export+Import)/GDP, 1986-2008	Panel Johansen Cointegration& VECM	Positive long-run relationship and unidirectional short-run causal relationship
Kakar & Khılji, 2011)	(Export+Import)/GDP, 1980-2010	Johansen Cointegration and Granger Causality	Positive Long-run relationship and Short-run causal link
Constant, 2010	(Export+Import)/GDP, 1980-2007	The bounds testing cointegration approach (Pesaran et al, 2001) and the VAR Granger causality/Block Exogeneity Wald test	Positive Long-run relationship and unidirectional causality
Umba, 2013	(Export+Import)/GDP , 2015-2029	Dynamic computable general equilibrium model based on the social accounting matrix	Negative.
Adhıkary, 2011	(Export+Import)/GDP, 1985-2012	Johansen Cointegration& VECM	Negative long-run relationship and unidirectional causal link
Olasode, Raji, Adedoyin, & Ademola, 2015	(Export+Import)/GDP, 1981-2012	Vector Error Correction Model (VECM)	Negative short -long-run relationship
Musila & Yiheyis, 2015	(Export+Import)/GDP, 1980-2012	Granger Causality test	Negative long-run relationship & causality link
Bibi, 2014	(Export+Import)/GDP	DOLS (Dynamic Ordinary Least Square)	Negative long run relationship

Eric, 2015	(Export+Import)/GDP, 1980-2011	Johansen co-integration approach, Fully Modified Ordinary Least Square (FMOLS) approach	Negative and significant long run relationship
Yusoff & Nuh, 2015	(Export+Import)/GDP	Granger causality test	Bidirectional causality link between openness and growth.

Source:*Authors*

3. Data, Methodology and Empirical Results

3.1. Data and Methodology

In this study, we investigate the effect of foreign trade on the economic growth of Niger using quarterly time-series data from 1970 to 2015. Trade openness (TO) is defined as Export + Import/ GDP. Economic growth is expressed as logarithmic form of Gross Domestic Product (LGDP) per capita (constant 2010 US$). All data were obtained from World Economic Outlook database of World Bank in constant (base year:2010).
First, we will conduct unit root test to check the stationarity properties of the series. In this study we will use conventional ADF unit root tests (Dickey and Fuller, 1981). The null hypothesis of ADF test suggests that the series include unit root. So, rejection of the null hypothesis means that the series are stationary.
Secondly, we will use the co-integration test to detect the long-term relationship between our variables. Co-integration is a statistical property of time series introduced in economic analysis, to detect the long-term relationship between two, or more time series. Formally, if the available time series are integrated in first order, and in addition, a linear combination of these series is integrated of order zero (stationary), we will then say that the varieties are co-integrated of order I (1). The econometric literature distinguishes different techniques for testing co-integration, among which we can cite: The Granger-Engel algorithm (1987); the approaches of Johansen (1988, 1991); The Stock-Watson test (1988); The Phillips-Ouliaris test (1990). In this study, we will use Johansen approach of co-integration. The co-integration test of Johansen helps us on the number of co-integration relation and its functional form by following the criterion of trace and minimum eigen value and also the information criteria of Akaike and Schwarz. The test hypothesis is formulated as follows:

$$H_0: There\ is\ no\ co-integration\ relation;$$
$$H_1: There\ is\ a\ co-integration\ relationship$$

If the value of the trace and Max-eigenvalue is greater than its tabulated critical value, the hypothesis H0 is rejected, indicating that there is co-integration between the variables. On the other hand, a value of the trace and Max-eigen value lower than its critical value implies that there is no co-integration relation between the variables (Tarı, 2011:416-429).After determining co-integration relation, we want also to investigate the causality link between the variables.In order to understand causality relation among variables, vector error correction (VEC) mode will be performed.
VEC model (VECM) is a restricted VAR designed for use with nonstationary series that are known to be co-integrated (Bagzibagli, et all, 2016). The co-integrating equation is

$$\boldsymbol{y_{2,t} = \beta y_{1,t}} \qquad \textbf{(1)}$$

The corresponding VECM is:

$$\Delta y_{1,t} = \alpha_1(y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{1,t} \quad (2)$$

$$\Delta y_{2,t} = \alpha_2(y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{2,t} \quad (3)$$

The VEC has co-integration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationships while allowing for short-run adjustment dynamics (Goshu, 2014: 29). The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments (Cobham and Dibeh, 2011: 99).

3.2.Empirical Results

3.2.1. Unit-Root Tests

The stationary characteristics of trade openness and economic growth series are examined by ADF (1979) test. The ADF test results show that the test statistics for two variables are greater than critical values at 1%, 5%, 10% levels in level form and the two variables are stationary after differenced, suggesting that two variables are integrated of order I(1).

Table 2 Results of the ADF and unit roots tests

	Augmented Dicky-Fuller Test (ADF test)	
	Level Form	**First Difference**
LGDP	-2.34	-6.38
TO	-2.14	-6,45
Significant Level	**Critical Values**	
%1	-3,58	-3,58
%5	-2,92	-2,92
%10	-2,60	-2,60

Source:*Authors' calculations.*

Determining both variables are non-stationary and integrated of first order then we can proceed the test for cointegration.

3.2.2. Co-integration Test

Johansen co-integration results are showed in Table 3.

Table 3: Johansen-Juselius Cointegration Tests

Hypothesized	**Trace**	**Max-Eigen**	**Critical Values (5%)**	
No. of CE(s)	**Statistic**	**Statistic**	**Trace**	**Max-Eigen**
r = 0	17.54**	15.15**	15.49	14.26
r ≤ 1	2.38	2.38	3.84	3.84

Note: ** denotes significant at 5% significance levels.
Source: Authors' calculations

Since calculated trace and max-eigenvalue statistics are bigger than critical value of 15.49 and 14.26 respectively at the 5% significance level, the null hypothesis of r=0 is rejected which means that there is one co-integrating relationship among the variables.

3.2.3. VEC Model and Granger Causality

Having conclude the co-integration relationship, we can estimate VEC model. The error-correction term measures the deviations of the series from the long run equilibrium relation (Anoruo and Ramchander, 2000:10). The VEC approach to granger causality was performed to test the direction of short-run causality existing among the variables.
In this model, we can write error correction term, which is the normalized cointegrating equation, based on the VEC as follows:

$$\Delta GDP = 5.03 + 0.019\,\Delta TP \quad (4)$$

According to normalized equation, trade openness contributes to economic growth in the long-run. In an effort to determine the short run causality between the two variables Granger causality/Block Exogeneity Wald tests based upon VEC model is performed. According to the test results in Table 4, we found the existence of a bidirectional causal relationship between trade openness and growth in the short-run.

Table 4. VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: Δ GDP			
Excluded	**Chi-sq**	**Df**	**Prob.**
ΔTP	3.50	1	0.06***
All	3.50	1	0.06***
Dependent variable: ΔTP			
Excluded	**Chi-sq**	**Df**	**Prob.**
ΔlGDP	4.68	1	0.03**
All	4.68	1	0.03**

Significance levels: 0.01, ** 0.05, *** 0.1.*
Source: Authors' calculations

Our analysis supports the trade-growth hypothesis, which claims that trade openness leads to economic growth.

4. Conclusion

This study examines the causal relationship between trade openness and economic growth of Niger for the period of 1970-2015. After reviewing recent empirical research regarding the link between openness and growth, we use time series methods to discover the causal relationship between these variables. In a first step we check for stationarity using ADF unit root test. Secondly, we tested the co-integration and causality relation. The co-integration test indicates that there is co-integration in our model. According to these results, we can conclude that trade openness in Niger has a long-run equilibrium link with economic growth. The Granger causality test shows that there is short-run bi-directional causal relationship between trade openness and economic growth. When we compare our results with the study on Niger mentioned in literature review, we have obtained similar result with Aboubacar *et all.* (2014). Our model suggests that international openness may play a role in the economic process of Niger, so it should continue to increase the infrastructure in order to reduce the trade costs and to attract and facilitate the foreign investment in the country. The evidence indicates the importance of Niger`s dependence on foreign trade to increase growth, and thus increasing openness is vital.

References

Aboubacar, Badamassi, Xu, Deyi, OusseiniAmadouMaiga (2014), `Does Trade Openness Matter for Economic Growth in Niger? `, Theoretical Economics Letters, 4, 916-927

Ada, O. E., Oyeronke, A., Odunayo, A. J., Okoruwa, V. O., & Obi-Egbedi, O. (2014). Trade Openness and Inflation in Nigerian Economy: A Vector Error Correction Model (VECM) Approach. *Research Journal of Finance and Accounting, 5*(21), 74-85.

Adhikary, B. K. (2011). FDI, Trade Openness, Capital Formation, and Economic Growth in Bangladesh: A Linkage Analysis. *International Journal of Business and Management, 6*(1), 16-28.

Adhikary, B. K. (2015). Dynamic Effects of FDI, Trade Openness, Capital Formation and Human Capital on the Economic Growth Rate in the Least Developed Economies: Evidence from Nepal. *International Journal of Trade, Economics and Finance, 6*(1), 1-7.

Agrawal, P. (2005). Foreign Direct Investment in South Asia: Impact on Economic Growth and Local Investment. In E. M. Graham, *Multinationals and Foreign Investment in Economic Development* (pp. 94-118). London: Palgrave Macmillan UK.

Ali, W., & Abdullah, A. (2015). The Impact of Trade Openness on the Economic Growth of Pakistan: 1980-2010. *Global Business and Management Research: An International Journal*, 120-129.

Asiedu, E. (2002). On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different? *World Development, 30*(1), 107–119.

Anoruo, E. and Ramchander, S. (2000) `Exports and economic growth: an error correction model`https://pdfs.semanticscholar.org/c0f5/4d058442e1287f3f19da24684809046a1c3d.pdf, (23.12.2016)

Badio, M. S. (2016). *Impact Des Investissements Directs Étrangers Et De L'ouverture Commerciale Sur La Croissance Économique.*Montréal: Université du Québec.

Bagzibagli, K., Bahramian,P., Uzuner, G. (2016), Workshop on Advanced Time Series Econometrics with EViews, Eastern Mediterian University

Basu, P., Chakraborty, C., & Reagle, D. (2003). Liberalization, FDI, and Growth in Developing Countries: A Panel Cointegration Approach. *Economic Inquiry, 41*(3), 510-516.

Bibi, S. (2014). Impact of Trade Openness, FDI, Exchange Rate and Inflation on Economic Growth: A Case Study of Pakistan. *International Journal of Accounting and Financial Reporting, 4*(2), 236-257.

Cobham, David and DibehGhassan (2011), Money in the Middle East and North Africa: Monetary Policy Frameworks, Routlage,First Edition, London and New York

Constant, N. B. (2010). The Relationship between Foreign Direct Investment, Trade Openness and Growth in Cote d'Ivoire. *International Journal of Business and Management, 5*(7), 99-107.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association, 74*(366), 427–431. doi:10.2307/2286348

Goshu, P.(2014), Sectoral Analysis of the Impact of Foreign Aid on Economic Growth in Ethiopia. The Case of Agriculture, Education and Health Sectors**,** Master Thesis, Wollega University, Ethiopia

Granger, C. W. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica, 37*(3), 424–438. doi:10.2307/1912791

Gujarati, D. N. (2009). *Basic Econometrics* (5 ed.). Singapore: McGraw-Hill.

Hsiao, F. S., & Hsiao, M.-C. W. (2006). FDI, Exports, and GDP in East and Southeast Asia - Panel Data versus Time-Series Causality Analyses. *Journal of Asian Economics, 6*(17), 1082-1106.

Hussain, M. E., & Haque, M. (2016). Foreign Direct Investment, Trade, and Economic Growth: An Empirical Analysis of Bangladesh. *Economies, 4*(2), 1-12.

Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica, 59*(6), 1551–1580.

Kakar, Z. K., & Khilji, B. A. (2011). Impact of FDI and Trade Openness on Economic Growth: A Comparative Study of Pakistan and Malaysia. *Theoretical and Applied Economics*(11), 53-58.

Kalu, E. U., Nwude, C. E., & Nnenna, N. (2016). 2013), Does Trade Openness Engineer Economic Growth in Nigeria? (Empirical Evidence Covering 1991 to. *Global Journal of Management and Business Research, 16*(4).

Krugman, P.R. 1979. Increasing returns, monopolistic competition and international trade. Journal of International Economics 9 (4): 469-479.

Krugman, P.R. 1980. Scale economies, product differentiation, and the pattern of trade. American EconomicReview 70 (5): 950-959

Lemzoudi, N. (2005). *L'impact du degré d'ouverture sur la croissance économique : Cas de six pays d'Afrique de l'Ouest.* Economics. Montreal: Université de Montréal.

Liargovas, P. G., & Skandalis, K. S. (2012). Foreign Direct Investment and Trade Openness: The Case of Developing Economies. *Social Indicators Research, 106*(2), 323–331.

Mohsen, A. S. (2015). Linkages between Trade Openness, Capital, Oil Price and Industrial Outputs in Syria. *Economic Insights – Trends and Challenges, IV*(3), 11-19.

Nair-Reichert, U., & Weinhold, D. (2001). Causality Tests for Cross-Country Panels: a New Look at FDI and Economic Growth in Developing Countries. *Oxford Bulletin of Economics and Statistics, 63*(2), 153–171.

Nduka, E. K. (2013). Openness and Economic Growth in Nigeria. *Journal of Education and Practice*, 68-73.

Nduka, E. K., Chukwu, J. O., Ugbor, K. I., & Nwakaire, O. N. (2013). Trade Openness And Economic Growth: A Comparative Analysis Of The Pre And Post Structural Adjustment Programme (Sap) Periods In Nigeria. *Asian Journal of Business and Economics*, 1-12.

Olufemi, S. M. (2004). Trade Openness and Economic Growth in Nigeria: Further Evidence on the Causality Issue. *SAJEMS NS, 7*(2), 299-315.

Proudman, J., Redding, S., Bianchi, M. (1998), Openness and growth, "Proceedings of the Bank of England Academic Conference on the Relationship between Openness and Growth in the United Kingdom", September 15th, 1997, Bank of England, Martins Printing Group, U.K.,

Ramzan, D., & Kiani, A. K. (2012). Analyzing the Relationship Between FDI, Trade Openness and Real Output Growth: An ECM Application for Pakistan. *International Journal of Basic and Applied Science, 1*(2), 440-447.

Sakyi, D., Commodore, R., & Opoku, E. E. (2015). Foreign Direct Investment, Trade Openness and Economic Growth in Ghana: An Empirical Investigation. *Journal of African Business, 16*(1-2), 1-15.

Sevüktekin, M., & Nargeleçekenler, M. (2010). *Ekonometrik Zaman Serileri Analizi.* Ankara: Nobel Yayın Dağıtım.

Tarı, R. (2011). *Ekonometri* (7 ed.). Kocaeli: Umuttepe Yayınları.

Thompson, A. B. (2011). Trade Openness, Infrastructure, FDI and Growth in Sub-Saharan African Countries. *Journal of Management Policy and Practice, 7*(12), 27-36.

Topallı, N. (2016). Doğrudan Sermaye Yatırımları, Ticari Dışa Açıklık Ve Ekonomik Büyüme Arasındaki İlişki: Türkiye Ve BRICS Ülkeleri Örneği. *Doğuş Üniversitesi Dergisi, 17*(1), 83-95.

Topallı, N. (2016). Doğrudan Sermaye Yatirimları, Ticari Dışa Açıklık Ve Ekonomik Büyüme Arasındaki İlişki: Türkiye Ve BRICS Ülkeleri Örneği. *Doğuş Üniversitesi Dergisi, 17*(1), 83-95.

Umba, G. B. (2013). *Ouverture commerciale et croissance économique en RD Congo : une analyse en équilibre général calculable.*HAL.

UNCTAD. (2017, May 26). *UNCTADstat Data Center*. Retrieved from UNCTADstat: http://unctadstat.unctad.org/

Zafar, A. (2005), Revenue and the Fiscal Impact of Trade Liberalization: The Case of Niger, http://documents.worldbank.org/curated/en/204031468761111641/text/wps3500.txt**,**

Zekarias, S. M. (2016). The Impact of Foreign Direct Investment (FDI) on Economic Growth in Eastern Africa: Evidence from Panel Data Analysis. *Applied Economics and Finance, 3*(1), 145-160.