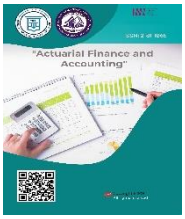

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THE IMPACT OF OIL BUSINESS ON COUNTRIES` AGRICULTURE SECTORS: Dutch Disease Effect

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Abstract. The purpose of this thesis is to inspect Dutch Disease hypothesis by analyzing the impact of oil industry boom on nations` agriculture value added to GDP by using nine real macroeconomic variables. This panel data includes 17 (OPEC and non-OPEC) countries from different continents over the years of 2007-2023. Hausman and Breusch-Pagan Lagrange econometric tests were applied to choose one regression among five different models. Final empirical model is constructed using Random effect estimations. Concluding outcome approves the Dutch Disease hypothesis in the analysis that in order to increase the agriculture value added to GDP by 1%, authorities should devaluate the national currency by 0.66%, ceteris paribus.

Keywords: Dutch disease, Random Effect model, agriculture percentage in GDP, real FX rate.

INTRODUCTION

As something natural, individuals want to get rich faster, and so do the countries as well. While some countries reach it by educational or technological advancement like China, some try to reach that objective by exploiting their natural resources. As a rule, selling natural the resources lead to faster growth. Some countries have taken advantage of this strategy and other are using it still. In short-term, it can benefit a country but in the long-term, unemployment and growth in other sectors rather than booming resource sector will shrink. Economists call it "Dutch disease". This academic paper will identify how some oil producing countries, namely, Russian Federation, Kazakhstan, Norway, China, Brazil, Mexico, Iran, Ecuador, Venezuela, Nigeria, Algeria, Saudi Arabia, United Kingdom, Colombia, Malaysia, Australia and Denmark, and "Dutch disease" respond to each other. This topic is crucial to study because countries that stick to one sector sometimes win the game while others will not be able to handle this problem.

Research question: To what extent oil production influences on the countries` agriculture sector? In order to find the answer to the question above, we have set three objectives, and the content of the paper is concentrated around those two objectives. By combining the preliminary readings and findings, the below objectives were formulated:

1. To evaluate the Oil production effect on countries` agriculture sector
2. To provide an efficient policy implication for governments

Firstly, we introduce the origin of the Dutch disease theory and its appliance. Next, empirical studies and arguments regarding to the topic will be analyzed. As soon as all crucial supplementary data are presented in methodology part, we follow by observing the data and employ econometric tests in the results part. We then finalize the paper by discussing and concluding the results arising from the estimations.

LITERATURE REVIEW

The origin of the Dutch disease theory

The term Dutch disease was coined by "The Economist" journal in 1977 in their article discussing the impact of the discovery of Groningen natural gas reserve in the North Sea by the Netherland in 1959. This discovery eventually led the Dutch Guilder[1] to appreciate against other currencies, which was subsequently considered as a phenomenal paradox.

DD[2] is a casual link where one sector (mostly natural resources) starts advancing in the economy, while the shares of other sectors like manufacturing or agriculture start shirting in the GDP[3]. This happens by national currency appreciating against the other currencies, which will decrease the competitiveness of the other industries exporting goods to world markets by making it more expensive for other nations to buy goods and services from the home country. Resource booms the country leads to an increase in real exchange rate that leads to increasing wages (Krugman, 1987). As a result, unemployment increases and country faces deindustrialization.

Corden and Neary (1982) developed the classical version of modelling the Dutch disease. Their model involved two sectors: Tradable and non-tradable sectors. Tradable sector involves booming and non-booming segments while non-tradable sector included services.

Tradable.1: booming sector (mostly natural resources): gas, oil, gold, diamonds and so on.

Tradable.2: non-booming sector: manufacturing and/or agriculture.

According to Corden and Neary (1982) there are three assumptions. Firstly, all of the goods are final and used for consumption except oil. Oil is a means of intermediate good to make final goods. Secondly, only real variables are deliberated whereas monetary considerations are disregarded. In order to make balance, national output and expenditure are set to be equivalent while relative prices of goods are taken. Last, commodity and factor markets do not involve any distortions and flexibility of real wages along with full employment are kept. The main idea behind these assumptions is potential national prosperity should increase due to booming sector so the concentration takes part on the share of improvements between different factors (Corden and Neary, 1982).

Corden and Neary (1982) claim that resource booming sector can affect the nation`s economy in dual ways.

1. *The resource movement effect.* The labour demand in resource booming sector will increase which leads labour to move to booming sector from other sectors. This

[1] The standard unit of money used in the Netherlands before they started using the euro

[2] The abbreviation form of "Dutch disease"

[3] Gross Domestic Product

process is termed as *direct-deindustrialization.* Tradable sector`s prices are determined in world markets. The *direct-deindustrialization* will increase the price of non-tradable sector and it will be equal to the appreciated *real exchange rate*.

2. *The spending effect.* When world price of resources rise, income at home will also rises which naturally increases demand for *all* goods including non-tradable sector. It results additional appreciation of *real exchange rate.* Again, labour will shift from *manufacturing/agriculture* sector to service sector (*indirect-deindustrialization*), which means *higher* contraction in *non-booming sector*.

The researchers on D.D. have conducted so many investigations. Literatures include the below surroundings.

Review of the literature: empirical studies carried out so far

On this area, numerous scholars worked on the papers about the Dutch disease. However, the results of studies differ critically and each region has a unique characteristic. For instance, Ouattara and Strobl (2004) examined how foreign inflowing aids and real exchange rate correlate with each other in *CFA*[4] *franc zone* and found out that foreign aids neither cause the Dutch disease nor agriculture shrink. The similar case occurred with Owusu-Sekyere *et al.,* (2014) and using panel data, they found that in Sub Saharan countries (34 countries), DD can`t arise because monetary and fiscal expenditure interventions absorb the harm of remittances.

Some scholars discussed one country analysis. Al-mulali and Che Sab (2010) together studied the DD effect in Kuwait caused by oil surprise in a fixed exchange rate system. Examiners intended to check if oil price affected to DD. Results showed that, rise in oil price unexpectedly led to devaluation of Dinar. They suggest that exchange rate will appreciate when their export increases and if oil price increases so that leads GDP to increase along with liquidity. Exchange rate appreciation might occur by an increase in trade balance.

Dutch disease doesn`t exist in Kuwait, because, as oil price rises up, the exchange of Kuwait started to devaluate which does not co with the theory. Al-mulali and Che Sab (2010) state that fixed exchange rate regime helps to decrease the DD influence and at the same time, it leads to a higher inflation if not hyperinflation. However, Akanni (2007) ***develops*** *the* ***claim*** that relationship exists between oil rents and economic growth in African countries, which are stick to oil production and exports. His founding treats that oil rents didn`t contribute to the growth of the economies.

Dutch disease does not describe the negative association of oil rent and economic growth rate. Lotfi and Karim (2016) ***claim*** that Dutch disease exists in Moroccan economy by using time series data for 1980-2012. They found a causality between variables and long-term relationship. Researchers forecasted that, there would be 18% decrease in economic growth of the country and it leads the unemployment to increases by 5.9%. Conclusion was "…if the flow of these incomes in foreign currencies drops, the country can suffer from over-indebtedness" caused by high level of Dutch disease oil dependency

[4] CFA franc zone includes the following countries: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Gabon, Mali, Niger, Senegal, Togo, Equatorial Guinea and Guinea Bissau. The last 2 countries were not included in the analysis due to the lack of data.

(Lotfi and Karim, 2016, p39). Rudd (1996) assessed the Netherland case by following the structure of method done by Corden and Neary (1982). Significant regression analysis showed the presence of Dutch disease in Netherland. (Rudd, 1996, p29).

Correspondingly, economists, Ruehle and Kulkarni (2011) in their empirical study for the case of Chile, discovered the minimal unfavourable impacts in the industrial yield. However, insignificant "de-agriculturization" urged them to conclude that Chile faced the Dutch disease. Findings of Ruehle and Kulkarni (2011**)** ***maintenance the claim*** that Chile may have encountered the shrinking in the agriculture, mostly because of other major factors and reasons in the country.

Beine *et al*., (2009) studied the Canadian case whether Dutch disease derived from oil production at the beginning of twenties century. They aimed to show to what extent Canadian Dollar linked to the prices of commodity. They utilized the results to find the effect of price fluctuations on the employment trend. Scholars determined that 42 percent of loss arose in manufacturing employment was caused because of Dutch disease presence during 2002-2007 (Beine *et al*., 2009).

Javaid (2009) worked on the six[5] certain South-East Asian countries to find the causality between foreign inflows and real exchange rate appreciation for the timeline of 1981-2007. Further, he determined that increasing FDI[6] and REM[7] cause DD and hurt the region.

Another good study, Edun (2012) investigated the Nigeria whether decrease in agriculture was due to the effect of booming oil export. The assessing duration includes 1960-2010 years. The prioritized objective was to find the negative correlation between oil export and agronomy. Edun (2012) found that quantity of oil export was noteworthy to describe the negative fluctuations in agriculture zone and it constituted for 95% of export of the whole country. In conclusion, scholar recommended Nigerian policymakers to support non-oil sectors by the revenue of earned oil income to stabilize the whole economy and prevent oil dependency. On the other hand, modernism and production techniques should upgrade along with labour trainings on each sphere proportionally.

From above literatures and studies, this work on the hand of the reader helps firstly, to upgrade the current literatures by adding new years in this area. Secondly, it involves the latest supplementary knowledge to the public. Lastly, this paper covers some OPEC and non-OPEC countries from different continents that has not yet done before.

METHODOLOGY

Data specification

This paper intends to investigate the period of 2007-2023 by using panel data. To be more specific, the purpose of the paper is to investigate how top oil producing countries` agriculture sectors are affected by crude oil industry. The construction of the model will follow the academic paper done by Edun (2012) who investigated Nigerian case on the same matter. The research done by Edun (2012) is a time series analysis, however, in this

[5] These countries are Pakistan, Bangladesh, India, Indonesia, Philippines, and Malaysia.
[6] Foreign Direct Investment
[7] Remittances

case it is appropriate to follow her structure since both works have a common purpose. The identified Hypothesis for this research:

H_0: Oil sector boom **did not** result in decrease of agricultural sector's share in GDP

H_1: Oil sector boom **did** result in decrease of agricultural sector's share in GDP

The countries selected for the study are well-known oil producing countries with strong positions in the world oil market. Considering their economies' reliance on oil revenue as important source of national incomes, we will assume that oil production might have weakened their economy's real sector in line with the DD theory.

To make it clear, this is a paper involving Macroeconomic variables. Not to get confused, variables will take the form of percentage rates or logs of nominal data in STATA software.

In the model, *share of agriculture to GDP* is dependent variable in the regressions. *Oil price, oil production (quantity), REER*[8]*, money supply*[9]*, per capita income, government consumptions*, *household consumptions*, *inflation* and *trade openness* are independent variables. In addition, *Global crisis 2008* behaves as a dummy variable. Yearly data for most variables are available on the reliable sources like World Bank and Indexmundi.com. Other variables are accessible on the official web pages of Central banks and OPEC Federation sources. Eleven countries are chosen among non-OPEC and another six countries are from OPEC. They are *Russian Federation, Kazakhstan, Norway, China, Brazil, Mexico, United Kingdom, Colombia, Malaysia. Australia, Denmark* (non-OPEC countries) and *Iran, Ecuador, Venezuela, Nigeria, Algeria, Saudi Arabia* (members of OPEC). The reason of choosing these countries is, they are top oil producing countries and have easily obtainable online data.

Firstly, OLS, Fixed effect method and Random effect method will activate the regression. Hausman test will be carried out to choose between RE and FE.

Variable specification

Edun (2012) states that economists consider the "Per capita income" as a country`s top important indicator of development. Expansion of a country and manufacturing should also intensify the income level of people and it helps to control the demand in the economy, Therefore, this paper sees the per capita income as an independent variable too.

Following methodology of Edun (2012), we have selected the oil price and oil production volume as two important independent variables since oil constitutes an important tradable (export) good in those countries. Edun (2012) has expected the oil price and oil production quantity to be negatively correlated.

One noteworthy point is that oil price is a universal variable for all countries, meaning that we have used average annual oil price in USD for each year of observation, and this average oil price is universal (for each specific year) for all countries. This is done to avoid *multicollinearity* between exchange rate and oil price. Moreover, their fluctuations influence the exchange rate.

Chrystal (1984) included *money supply* as an independent variable too, since collapse in the division of manufacturing and agriculture was due to the reduction in the money

[8] Real Effective Exchange Rate

[9] M2 as money supply

supply, but not due to Dutch disease (cited in Edun, 2012). Hutchison (1994) also investigated the UK and concluded that expansionary monetary strategy would mostly cause an escalation in tradable area rather than non-tradable sector. Lartey et al (2008) state that GC[10] and HC[11] stand to measure the trend in non-tradable goods purchases at home and influence the ER[12] and relative prices level (cited in Porpáczy, 2016). Inflation[13] helps to catch the short run effect varying due to the change in cost of imported intermediate goods whereas trade openness [14]defines the volume percentage of a country`s manufacturing sector (Gasmi and Laourari, 2016). This time, it is presumed that there is a positive association between Money Supply and tradable growth level.

Table 1. Variables` Abbreviations and descriptions:

VARIABLES	CATEGORY	DESCRIPTION	/-
AGRICGDP	Dependent	Percentage share of agriculture to GDP	
LnREER	Relative Price Effect	Log of Real effective FX per USD (2010)	
LnPON	Control: Oil Effect	Logarithm of Oil Price	
LnVOL	Control: Oil Effect	Log of Volume of oil produced (barrels/day)	
MS	Control: Policy Stance	Money supply as % of GDP	
LnPC	Control: Demand Variable	Log of GDP per Capita	
GC	Control: Spending Effect	Government consumption as % of GDP	
HC	Control: Spending Effect	Household consumption as % of GDP	
INF	Control: Price Level	GDP deflator %	
TRD	Commerce Effect	Openness % to world economy	
Global Crisis	Dummy variable	Global Crisis 2008 effect	

Model specification

Below the formula derived as a result of review of the existing literature, followed by the analysis part of this paper:

$$\boldsymbol{AGRICGDP = \beta_0 + \beta_1 LnPON_t + \beta_2 LnVOL_t + \beta_3 REER_t + \beta_4 MS_t + \beta_5 LnPC_t + \beta_6 GC_t + \beta_7 HC_t + \beta_8 INF_t + \beta_9 TRD_t + \mu_i}$$

As mentioned above, this paper includes dummy variable technically to overcome exogenous factors while analyzing in STATA. Thus, our econometric model takes the below form.

$$AGRICGDP = \beta_0 + \beta_1 LnPON_t + \beta_2 LnVOL_t + \beta_3 REER_t + \beta_4 MS_t + \beta_5 LnPC_t + \beta_6 GC_t + \beta_7 HC_t + \beta_8 INF_t + \beta_9 TRD_t + \beta_{10} \boldsymbol{D_t} + \mu_i$$

[10] Government Consumption
[11] Household Consumption
[12] Exchange Rate
[13] Inflation rate matches the yearly growth degree of GDP implicit deflator. (GASMI and LAOURARI, 2016)
[14] Trade openness calculates the percentage of sum of export and import of goods and services divided by GDP. (GASMI and LAOURARI, 2016)

Currently, we have two scenarios:

1. First scenario: $D_i = 0$

$$AGRICGDP = \beta_0 + \beta_1 LnPON_t + \beta_2 LnVOL_t + \beta_3 REER_t + \beta_4 MS_t + \beta_5 LnPC_t + \beta_6 GC_t + \beta_7 HC_t + \beta_8 INF_t + \beta_9 TRD_t + \boldsymbol{\beta_{10}}(\mathbf{0}) + \mu_i$$

Then

$$AGRICGDP = \beta_0 + \beta_1 LnPON_t + \beta_2 LnVOL_t + \beta_3 REER_t + \beta_4 MS_t + \beta_5 LnPC_t + \beta_6 GC_t + \beta_7 HC_t + \beta_8 INF_t + \beta_9 TRD_t + \mu_i$$

2. Second scenario: $D_i = 1$

$$AGRICGDP = \beta_0 + \beta_1 LnPON_t + \beta_2 LnVOL_t + \beta_3 REER_t + \beta_4 MS_t + \beta_5 LnPC_t + \beta_6 GC_t + \beta_7 HC_t + \beta_8 INF_t + \beta_9 TRD_t + \boldsymbol{\beta_{10}}(\mathbf{1}) + \mu_i$$

Then

$$AGRICGDP = (\beta_0 + \boldsymbol{\beta_{10}}) + \beta_1 LnPON_t + \beta_2 LnVOL_t + \beta_3 REER_t + \beta_4 MS_t + \beta_5 LnPC_t + \beta_6 GC_t + \beta_7 HC_t + \beta_8 INF_t + \beta_9 TRD_t + \mu_i$$

At the end of the study, finalized econometric model takes place.

EMPIRICAL RESULTS

Before carrying out econometric regressions over the variables of the model, several tests on the consistency and validity of the gathered data were implemented. First of all, variables were checked for stationarity and correlation. Secondly, Breusch-Pagan Lagrange multiplier test (LM test) for heteroscedasticity was performed. Then the variables were checked for normality using simple graphical illustration.

In the next step, we need to identify the most suitable model for our research. Thus, Greene (2008) suggests using Hausman test to pick between Fixed and Random estimations.

Table 2. Hausman test results:

	Coefficients		**(b-B) Difference**	**sqrt(diag(V_b -V_B)) S.E.**
	(b) Fixed	**(B) Random**		
Log of REER	-0.7997	-0.6625794	-0.1371342	0.2000272
Log of GDP per Capita	-4.0222	-3.893728	-0.1284999	0.3984682
Log of OIL Produced	1.77726	1.426928	0.3503353	0.4061511
Log of OIL Price	1.7368	1.697726	0.0390724	0.2634652
Trade openness of GDP	0.01395	0.0171762	-0.0032251	0.0067588
Inflation rate	0.00915	0.0079213	0.0012255	0.0022825
Household consumption %	0.20313	0.2025558	0.0005757	0.0134859
Government consumption %	0.05754	0.0569532	0.0005846	0.0265731
Broad Money %	0.04018	0.0342319	0.0059475	0.0066744
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(9) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 2.36				
chi2 = 0.9843				

Test resulted is straightforward to interpret. P-value (chi2) is 0.9843 and higher than 0.05 that prefers to choose Random effect model rather than Fixed effect because test failed to reject the null hypothesis.

Analysis of results

Revising the results estimated by econometric tests and regressions, Random effect model is constructed as an ultimate model. Table 7 informs data measurements precisely.

Table 7. Random Effect model regression results:

Agriculture percentage in GDP	**Coeficient**	**STD. ERR.**	**z**	**P>|z|**
Log of REER	-0.6625794	0.85766	-0.77	0.44
Log of GDP per CAPITA	-3.893728	0.562371	-6.92	0
Log of OIL Produced	1.426928	0.650343	2.19	0.028
Log of OIL Price	1.697726	0.459381	3.7	0
Trade Openness % of GDP	0.0171762	0.013849	1.24	0.215
Inflation rate	0.0079213	0.013576	0.58	0.56
Household Consumption % of GDP	0.2025558	0.038416	5.27	0
Government Consumption % of GDP	0.0569532	0.078914	0.72	0.47
Broad Money % of GDP	0.0342319	0.013708	2.5	0.013
Constant	12.9228	7.140147	1.81	0.07
sigma_u	5.5077977			
sigma_e	1.7632936			
rho	0.90703542			
Number of observations 258	**Probability > chi2 = 0.0000**			
Number of groups 17	**R-square: within = 0.4478**			
Wald chi2(9) = 205.23				

Reviewing the econometric model that was created at the beginning and insert the coefficients in the table into the formula gives the closing effect.

$$AGRICGDP = 12.9228 + 1.697726LnPON_t + 1.426928LnVOL_t - 0.6625794REER_t + 0.0342319MS_t - 3.893728LnPC_t + 0.0569532GC_t + 0.2025558HC_t + 0.0079213INF_t + 0.0171762TRD_t + \mu_i$$

To sum up, it is evident that Agriculture shares in GDP decrease happened due to the oil boom in the economies. Most of the variables in the equation showed a significant effect on the agriculture, however, their changes do not affect directly but through other channels. For example, in fact, real effective exchange rate is negatively correlated and fully fit the theory of Dutch disease. Government and household consumption are also vital factors since these consumptions are spent on the non-tradable goods, they gave a big pressure onto the relative price level following by appreciation of real exchange rate. GDP per capita indirectly effected towards the agronomy decline. The reason is that increase in GDP per capita rose the demand for non-tradable goods, which in turn led to resource movement effect in the sectors.

Hence, if a country encounters a Dutch disease, then it is hard to avoid the long-term effect of the syndrome. The main concern of Dutch disease comes from the exchange

rate appreciation. On that way, governments can devaluate their currencies by using their expansionary monetary policies. There are mainly two types of instruments to take advantage. Firstly, government and central banks work together and lower the interest rate. As a result, people get encouraged to borrow loans to make investments. The second one is inflation targeting economy; increasing money supply is an extremely effective way of making artificial depreciation over currency. However, authorities should be very careful before using the above tools since they sometimes may not end up with the expected results.

Subsidy motivation is an elementary way of curing Dutch disease. Policymakers should subsidize the lagging sectors in competition. This strategy can handle the economic problems and the main purpose behind is that this tactic gives a financial support to lagging exporters by compensating the salaries of workers. Through this approach, unemployment level can keep stability in the short run.

Advancing the labor mobility is another solution to the Dutch disease as well. Officials can practice this method to ease the increasing domestic income level as oil wages are consumed. During the Dutch disease, home country faces fluctuations in the labor migration. Therefore, the following approach can be helpful but expensive at the same time. A decrease in oil salary spending could be roused by prompt monetary issues in the contending division or through the increase of home income level. It is very easy to use this policy as soon as natural resource boom occurs in the economy and consequently it may last for long run. In general, to overcome this obstacle resulting from resource curse, governments should implement variety of reforms including tax, economic, welfare, agrarian and social ones. In practice, to realize the above objectives, training of workers and education must be upgraded regularly by feeling responsibility.

CONCLUSION

The paper in the hand of the reader has examined the consequences of oil booming on agriculture sector. Firstly, Dutch disease theory and current empirical studies have been carried out. This paper included and analysed the two main hypothesis in the area. Starting from the measurement of oil production effect and providing some applicable policy recommendations for users. Results revealed the significance of chosen variables to conduct the study. The role of real effective exchange rate and GDP per capita was huge whereas the effect of global crisis 2008 was insignificant and not correlated with agriculture percentage in GDP.

To execute the empirical investigations, number of regressions and tests were applied. In fact, five different regressions were computed and it followed by checking for Endogeneity using Hausman test to choose between Fixed and Random. As the test confirmed to choose Random effect, then Heteroskedasticity check applied utilizing the Breusch-Pagan test to make sure once more. Since the used panel data was normally distributed, expected results came up without any difficulties. For instance, appreciation of real exchange rate by 1 percent computed for 0.66 percent decrease in agriculture value added to GDP while money supple resulted for 0.03 percent increase in dependent variable.

For the second objective of thesis, three main different types of recommendations were delivered. They are expansionary monetary policies and inflation targeting economic systems, which work through money supply and interest rates mechanisms. The second recommendation evaluated the prominence of subsidies that cares about lagging exporters in the economy. Moreover, the last one focused on the issues related to the advancement of labour mobility. If the nation feels intrinsic about the upcoming danger of Dutch disease, then this option is the most appropriate and suitable in comparison with others. The term Dutch disease is not an abstract or newly defined for economic and econometric researchers. This phenomenon was in existence even 1000 years before, but only the academics of the twenty's century were able to make researches on this area professionally. Commonly, many empirical papers can be found regarding the topic or other aspects of this topic. Another purpose of this study is to add something valuable and measurable to current existing researches in the field. One last thing to mention, if nation finds or discovers the new means of natural abundance, then it should continue hardworking in parallel with other sectors as if it did not make any discovery. Only then, there won`t be a room for worrying about any kind of disease at all.

REFERENCES:

Akanni, O. P., (2007). "*Oil Wealth and Economic Growth in Oil Exporting African Countries*." African Economic Research Consortium. Nairobi.

Al-mulali, U. and Che Sab, N., (2010). Oil Shocks and Kuwait`s Dinar Exchange Rate: The Dutch Disease Effect. School of Social Sciences.

Beine, M., Bos, C. S., and Coulombe, S. (2012). Does the Canadian economy suffer from Dutch disease? *Resource and Energy Economics*, *34*(4), 469-492.

Corden, W. and Neary, J. (1982). *Booming Sector and De Industrialization in a Small Open Economy*. Laxenburg, Austria: International Institute For Applied Systems Analysis.

Edun, Adebisi. T., (2012). "A Vector Autoregressive Analysis of oil and Exchange Rate in Nigeria: A Case of Dutch Disease." *British Journal of Arts and Social Sciences.* ***11*** (1).

Javaid, S. (2009). *Dutch Disease Investigated: Empirical Evidence from Selected South-East Asian Economies*. 1st ed. Sri Lanka, pp.60-69.

Lotfi, B. and Karim, M., (2016). "Dutch Disease and Changes of the Productive Structure in Moroccan Economy. An Analysis Using VECM." *Advances in Management & Applied Economics.* ***6***(4): 25-44.

Ouattara, B. & Strobl, E. (2004). *Foreign Aid Inflows and the Real Exchange Rate in the CFA Franc Zone.* Centre for Research in Economic Development and International Trade, University of Nottingham.

Owusu-Sekyere, E., van Eyden, R. and Kemegue, F. (2014). Remittances and the Dutch Disease in Sub-Saharan Africa: A Dynamic Panel Approach. Vizja Press&IT, 8(3), p.297.

Porpáczy, S. (2016). *A case of the Dutch disease: made in China?* 1st ed. Rotterdam: Erasmus.

Rudd, D. (1996). An empirical analysis of Dutch disease: Developing and Developed countries. Illinois Wesleyan University.

Ruehle, A. A., and Kulkarni, K. G. (2011). "Dutch disease and the Chilean copper boom–an empirical analysis." *International Journal of Education Economics and Development*, **2**(1).

Greene, W. (2017). *ECONOMETRIC ANALYSIS*. 6th ed. New Jersey: Pearson, p.209.

Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica*, 46, p.1251-1271.