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CRUDE OIL EXPORT OF GHANA AND ITS IMPACT ON THE ECONOMY

Key words: crude oil, Dutch disease, agricultural sector, Ghana, one factor variance analysis

ABSTRACT. The aim of the paper is to illustrate the impact of crude oil commercial production and export launch in Ghana on the country's economy. The study is conducted based on one factor variance analysis and Tukey's Honest Significant Difference test. Analysis is related to the Dutch disease paradox. Ghana constitutes an eminent and interesting example of a natural resource-rich country, where oil commercial production started late, in 2011. Monetary policy in Ghana seems to be effective in mitigating the effects of the Dutch disease. Research results imply that the Ghanaian Cedi depreciated rather than appreciated since crude oil export's launch. Moreover, it is shown that the increase in oil export has not had a significant impact on the export of non-fuel goods. Additionally, the study shows that the launch of oil commercial production was associated with a contraction of agricultural value added. The rise in oil export led to a significant decrease of the rural population share in the total population. The agriculture sector, however, provides the main livelihood for many people in Ghana and the revenue generated in the sector plays an important role in the country's development. The Ghanaian government should be especially concerned about issues related to agricultural modernisation and education in rural communities.

INTRODUCTION

Ghana is an English-speaking country located in West Africa and bordered by three French speaking countries: Cote d'Ivoire, Burkina Faso and Togo. In 1957, Ghana became the first sub-Saharan country to gain independence from British Colonial rule. Coup d'états started in 1966, ousted the first president of the first Republic and many others then followed. In 1992, the Fourth Republic began and Ghana's democracy has been stable in the subregion since. A four year-parliamentary system of government is run with a District Assemblies concept. In 2019, the ten regions in Ghana were increased to sixteen by national referendum. Agriculture has been the mainstay of the economy and labour force. Ghana is Africa's second-biggest gold producer and first-largest cocoa producer. Admittedly, the haphazard implementation of mining policies and projects has plunged Ghana into bad environmental conditions [Yeboah 2008, Aboka et al. 2018].

Ghana started to produce crude oil in 2010 and started to export it in 2011 [Obeng-Odoom 2014]. According to the Energy Commission Report for Ghana [EC 2018], oil production comes from the 3 main commercial fields: Jubilee, TEN and Sankofa-Gye

Nyame. The discovery of new natural-resource deposits provides many potential opportunities and benefits. However, there are threats and demanding challenges that arise, too. The Dutch disease is a phenomenon associated with the negative effects resulting from the new discovery of natural resources.

The Dutch disease model was introduced by Max Corden and Peter Neary [1982]. The model assumes that the whole economy consists of tradable and non-tradable sectors. The non-tradable sector is assumed to involve industries and services with prices determined domestically. The tradable sector, on the other hand, consists of all export- and import-competing industries with prices depending highly on the global market and the country's exchange rates [Corden 2012]. Moreover, the Dutch disease model assumes that the tradable sector is divided into booming and lagging sectors. The booming sector is related to the mining industry. The lagging sector comprises part of the manufacturing industry, agricultural industry and services mainly associated with the tourism industry. The Dutch disease occurs when a boom in the natural resource market (e.g. oil) leads to a rise of the export income of natural resources and domestic currency appreciation. As a process, real exchange rate appreciation makes the country's export of other goods in tradable manufacturing and the agricultural sector less competitive. This adverse effect is called "the spending effect" [Corden, Neary 1982]. Another negative effect associated with the Dutch disease is called "the pull effect". This effect describes a situation when the boom in natural resources contributes to an increase of domestic input prices and, consequently, to a rise in the production cost of tradable lagging sectors. It is worth mentioning that "the pull effect" is associated with the Rybczyński theorem. The theorem states that a rise in the endowment of one factor leads to a more than proportional expansion of output in the sector which uses that factor intensively, and an absolute decline of the output of other goods [Rybczyński 1955]. Both Dutch disease effects hamper competitiveness and economic growth of tradable lagging sectors, including the agricultural tradable sector. The Dutch disease only describes some economic problems that hit natural resource-rich countries. All adverse and inhibitory effects of natural resource richness on a country's economic growth are identified in literature as the natural resource curse. The natural resource curse paradox depicts a situation in which natural resource-rich countries experience slower growth in comparison to countries with fewer natural resources [Gelb 1988, Sachs, Warner 1999, Gylfason et al. 1999, among others]. Researchers show that natural resources may additionally bring adverse effects on a country's human capital, economic policies, level of savings and investments, and institutions [Gylfason 2001, 2006].

The aim of the paper is to illustrate the impact of crude oil commercial production and export launch in Ghana on the country's economy. Analysis is related to the Dutch disease paradox. Ghana constitutes an eminent and interesting example of a natural resource-rich country, where crude oil commercial production started late, in 2011. Most oil-rich countries launched their production in the XX century, so there is a problem with data availability in their analysis. The paper proceeds as follows: Section 2 presents methods and data applied in the study. Section 3 discusses estimation results by showing the impacts of the oil export level on different macroeconomic variables. Section 4 concludes the paper.

MATERIAL AND METHODS

The study investigates the impact of the launch of oil export in Ghana, in 2011, on the country's economic situation. The paper employs the one factor variance analysis (ANOVA) and Tukey's Honest Significant Difference test (HSD Tukey) to verify the hypothesis of whether the levels of oil export values have a significant impact on selected Ghanaian macroeconomic indicators. ANOVA is applied to check if the means of two or more groups are significantly different from each other. When a significant difference exists, Tukey's test determines where the difference exists exactly. Tukey's test is calculated based on the pairwise comparison of all means. ANOVA requires that dependent variables are normally distributed in each group and the variances of distributions in populations are equal. The assumptions are verified by the Shapiro-Wilk normality test and the Berlett test of homogeneity of variances. The study covers the period from 2000 to 2018. Annual data are obtained from the Refinitiv Datastream and the World Bank database.

It is assumed that oil export is a factor with three levels. The first level is the "no" level, whereby oil export values equalled zero. It comprehends the period from 2000 to 2010. In the period from 2011 and 2018, oil export generated annual values in the range of USD 1,345 mln to USD 4,573 mln. The average crude oil export value was USD 3,041 mln. The "medium" level is assigned to all years when annual oil export values were lower than the average value. The "high" level is attributed to all other years with export values higher than USD 3,041 mln. Altogether this translates into 11 observations with a "no" level, 4 observations with a "medium" level (years 2011, 2012, 2015 and 2016) and 4 observations with a "high" level (years 2013, 2014, 2017 and 2018).

Moreover, the paper applies the following dependent variables: real GDP growth rate (GDP (%YOY)), real GDP per capita growth rate (GDP per capita (%YOY)), the real effective exchange rate based on the consumer price index (REER), CPI excluding the energy inflation rate (CPI ex. Energy), non-fuel goods export real percentage change (Non-fuel goods export (%YOY)), government expenditure change expressed in million Ghanaian Cedis (Government Expenditure (YOY)), total reserves minus gold expressed in million US Dollars (Total Reserves minus gold), the service, industry and agriculture sectors' percentage contribution to gross value added (Service sector (% of GVA), Industry sector (% of GVA), Agriculture sector (% of GVA)) and rural population as a percent of the total population (Rural Population).

GHANA'S ECONOMY AND ITS VULNERABILITY TO THE DUTCH DISEASE

The vast majority of existing literature concerning the influence of Ghanaian oil commercial production on its economic situation provides no direct evidence of the Dutch disease. To gain insight into the existing reality, the effect of the launch of oil export in 2011 on the Ghanaian economy is reviewed. According to Balazs Égert [2009], the first indication of a possible Dutch Disease is a change in the structure of the country's economy. Figure 1 depicts the contribution of the service, agriculture and industry sectors to gross value added (GVA) in the period from 2000 to 2018.

Figure 1. The contribution of the service, agriculture and industry sectors to gross value added

Source: own elaboration based on the Refinitive database

The services sector accounts for around 40% of Ghana's GVA during the whole analysed period (Figure 1). The situation is different as far as the agriculture and industry sectors are concerned. Their contribution to Ghanaian GVA has changed in the period from 2000 to 2018. It resulted largely from launching oil production in 2011. Consequently, in 2018, the agriculture sector came third and contributed around 21% of GVA, in comparison to 2000 when it accounted for around 31%. Year by year, especially after 2011, the agriculture sector's contribution has been declining. It is worth emphasizing that, in 2000, the agriculture sector provided jobs to around 55% of the population of Ghana. In 2018, it decreased to 34%. It is in line with the research results obtained by Nicholas Apergis et al. [2014]. They studied the Dutch Disease effects of expansion in oil production on the agriculture sector in the Middle East and North African countries from 1970 to 2011. Nicholas Apergis et al., [2014] found that an increase in oil rent was associated with a contraction of agricultural value added.

Vulnerability to the Dutch disease and the resource curse phenomenon is highly related with a country's oil dependence [Badeeb et al. 2017]. Vittorio Daniele [2011] estimates country natural resource dependence as a share of their export in total merchandise export. Figure 2 shows the structure of merchandise export in Ghana, in the period from 2000 to 2018.

Figure 2. Structure of merchandise export in Ghana

Source: own elaboration based on the World Bank database

Agricultural raw materials and food export accounted for a large portion of the whole merchandise export in the period from 2000 to 2010 (Figure 2). The structure of merchandise export has changed after launching oil production in 2011. The average 2011-2018 agricultural raw materials and food export as a share to the merchandise export ratio has decreased to around 40%. Average fuel export accounted for around 45% in the same period. The change in merchandise export resulted from an increase in fuel export.

Ghana is a significant exporter of cocoa, crude oil and gold. Ores and metals export constituted, however, only a minor part of merchandise export in Ghana (Figure 2). It stems from the fact that the World Bank does not include gold export in merchandise export. Another export structure is presented on Figure 3. The figure depicts the share of the most important Ghanaian export products in the total value of the export of goods.

Cocoa is the largest agricultural commodity produced and exported in Ghana. Ghana's production of cocoa increased substantially between 2004 and 2018. According to the Bank of Ghana, export of cocoa beans and cocoa products surged from USD 985 mln in 2004 to USD 2,092 mln in 2018. In 2017, the country became the second largest exporter of the product [Vigneri, Kolavalli 2018]. Regardless of the large increase in cocoa production, the average proportion of cocoa export in all exported goods has decreased in the aftermath of the crude oil export launch in 2011 (Figure 3). The rise in oil export has not had a substantial impact on the average contribution of gold in the total export of goods.

Despite the changes observed, after 2011, in the structures of Ghana's economy and export, there is no strong evidence suggesting that Ghana has started to rely too heavily on the oil sector. It is one of the factors that may protect Ghana from the Dutch disease. According to Dominik Kopiński et al. [2013], oil production will accelerate Ghana's economic growth. They claim that the country is likely to avoid the resource curse. In order to illustrate the impact of the discovery of crude oil in Ghana on the country's economic situation, the one factor variance analysis is employed. The result of the test is presented in Table 1. The export level of crude oil is assumed to be the factor and dependent variables are represented by selected macroeconomic indicators. The Shapiro-Wilk normality test and the Berlett test of homogeneity of variances tests confirmed that the investigated variables are normally distributed and are characterized by the homogeneity of variance.

Figure 3. Export structure of trade in goods, in Ghana

Source: own elaboration based on the Refinitiv database and the Bank of Ghana database

The results imply that there is a 1% level of significance relationship between the oil export level and macroeconomic variables such as the real effective exchange rate, government expenditure annual change, central bank total reserves minus gold value, the contribution of industry and agriculture sectors in GVA and the rural population. Moreover, it is shown that the oil export level does not have a significant impact on the real GDP growth rate, CPI excluding energy, non-fuel goods export and the contribution of service sectors in GVA.

Additionally, the paper tests all pairwise comparisons among means applying the HSD Tukey test. The test is only conducted for variables that are significantly affected by the crude oil export factor (Table 2). The Dutch disease occurs when the boom in the natural resource market (e.g. oil) brings about a rise in the natural resource export income and leads to domestic currency appreciation. As a process, the real exchange rate appreciation makes the country's export of other goods in the tradable manufacturing and agricultural sector less competitive. The test shows that there is a significant difference between the real effective exchange rate at both "high" and "medium" oil export levels in comparison to the "no" level. However, the result depicts that the Ghanaian currency has depreciated rather than appreciated since 2011. The real effective exchange rate has decreased from 100 in the "no" oil period to around 75 in the "high" oil period. The vast majority of adverse effects related to the Dutch disease, like hampering non-oil export competitiveness, are associated with domestic currency appreciation (the spending effect). In the Ghanaian case, the currency has depreciated. Moreover, the increase in oil export has not had a significant impact on the export of non-fuel goods (Table 1). It may suggest that there are no symptoms of the Dutch disease in Ghana, at least for now.

The study reveals that foreign central bank reserves increased from USD 1,800 mln in the "no" oil export period to USD 5,760 mln in the "high" oil export period. The test shows that there is a significant difference between foreign reserves at both "high" and "medium" oil export levels in comparison to the "no" level. The government seems to adopt foreign reserves to lower the Ghanaian cedi value and keep export relatively cheaper, boosting trade and economic growth. The issue of the Ghanaian monetary policy will be the subject of further research.

Moreover, the oil export launch has raised government spending. The mean value of change in government expenditure increased from 1,052.41 in the no-oil period to around 6,000 mln Ghanaian Cedis in the oil-period (Table 2). Whether the discovery of oil is a blessing or curse depends highly on how oil-related revenues are managed and reported

Table 1. The crude oil export level and its impact on Ghana's economy (ANOVA)

Indicators	p-value
GDP [%YOY]	0.630
GDP per capita [%YOY]	0.550
REER	< 0.001
CPI ex. energy	0.232
Non-fuel goods export [%YOY]	0.686
Government Expenditure [YOY]	< 0.001
Total Reserves minus gold	< 0.001
Service sector [% of GVA]	0.719
Industry sector [% of GVA]	< 0.001
Agriculture sector [% of GVA]	< 0.001
Rural Population	< 0.001

Source: own elaboration based on the World Bank and Refinitiv databases

Table 2. Tukey's Honest Significant Difference test (HSD Tukey)

Indicators	Oil export level	Indicator's average value	HSD TUCKEY	
			difference	p-value
REER	no	100.1	no-medium	0.002
	medium	80.15	no-high	< 0.001
	high	75.02	medium-high	0.657
Government Expenditure [YOY]	no	1,052.41	no-medium	< 0.001
	medium	6,102.65	no-high	< 0.001
	high	5,606.37	medium-high	0.860
Total reserves minus gold	no	1,799.63	no-medium	< 0.001
	medium	5,460.11	no-high	< 0.001
	high	5,764.92	medium-high	0.919
Industry sector [% of GVA]	no	29.03	no-medium	< 0.001
	medium	36.56	no-high	< 0.001
	high	38.02	medium-high	0.216
Agriculture sector [% of GVA]	no	29.62	no-medium	< 0.001
	medium	22.04	no-high	< 0.001
	high	21.06	medium-high	0.552
Rural population	no	52.69	no-medium	< 0.001
	medium	46.92	no-high	< 0.001
	high	45.59	medium-high	0.630

Source: own elaboration based on the World Bank and Refinitiv databases

[Van Gyampo 2016, Adams et al. 2019]. Although oil windfalls often decrease the quality of public spending in oil-rich countries, the Ghanaian government seems to behave rationally. They implemented the sovereign wealth funds that aims to protect against oil price volatility and save revenue for future generations [Phillips et al. 2016]. They provided legislation against unaccountable government spending of oil revenue that ensures transparency, accountability and sustainability in managing revenue from natural resources.

The HSD Tukey test additionally shows that there is significant difference between industry and agriculture sectors contribution to GVA at both “high” and “medium” oil export levels in comparison to the “no” level (Table 2). The share of the industry sector in GVA increased in the aftermath of the crude oil export's launch. The contribution of the agriculture sector in GVA decreased at the same time. The results are in line with Nicholas Apergis et al. [2014]. Furthermore, it has been shown that there is a significant difference between the rural population at both “high” and “medium” oil export levels in comparison to the “no” level. The rise in oil export led to a significant decrease of rural population share in the total population. Many oil-dependent countries have neglected the rural economy since the discovery of oil [Czech 2018]. However, it is the agriculture

sector that provides the main livelihood for many people in Ghana and revenue generated in the sector plays an important role in the country's development. The Ghanaian government should pay much attention to agricultural modernisation and education in rural communities. Moreover, it should be stressed that the implementation of mining policies and projects was conducted without paying much attention to local communities and environmental protection [Aboka et al. 2018, Siakwah 2017]. It may have, in the long-term perspective, a negative impact on environmental conditions and may hamper agricultural sector development.

SUMMARY

The Dutch disease phenomenon is largely associated with the appreciation of local currency. The monetary policy in Ghana seems to be effective in mitigating negative effects related to the Dutch disease. The research results imply that the Ghanaian Cedi depreciated rather than appreciated since oil export's launch in 2011. Moreover, it is shown that the increase in oil export has not had a significant impact on the export of non-fuel goods. It may imply that there is no obvious evidence of the Dutch disease in Ghana.

However, taking the change in the structure of the country's economy into account, there are some signals that represent a looming threat of the Dutch disease. The commercial production launch has made a significant change in the agriculture and industry sectors' contribution to Ghanaian gross value added. Year by year, especially after 2011, the agriculture sector's input has been declining. The structure of merchandise export has changed, too. The average 2011-2018 agricultural raw materials and food export as a share to the merchandise export ratio substantially decreased. Moreover, regardless of the large increase in cocoa production, the average share of cocoa export in all exported goods has shrunk after the oil production launch. The rise in oil export has not however had a significant impact on the contribution of gold export in the Ghanaian total export of goods. It should be stressed that the ANOVA and HSD Tukey test are the first stage of quantitative analysis of the undertaken research issue. Further studies will apply a more advanced method to analyse the impact of the oil sector on Ghana's economy.

Although oil windfalls often decrease the quality of public spending in oil-rich countries, the Ghanaian government seems to behave rationally. They have implemented the sovereign wealth fund that aims to protect against oil price volatility and save revenue for future generations. On the other hand, the implementation of mining policies and projects has not fully been prepared with local communities and environmental protection in mind. It creates a problem related to environmental conditions and the development of the agricultural sector. The government should pay much attention to issues related to agriculture, the environment and regional development.

BIBLIOGRAPHY

- Aboka Emmanuel, Samuel Cobbina, Adzo Doke. 2018. Review of Environmental and Health Impacts of Mining in Ghana. *Journal of Health & Pollution* 8 (17): 43-52.
- Adams Dawda, Ullah Subhan, Akhtar Pervaiz, Kweku Adams, Saidi Samir. 2019. The role of country-level institutional factors in escaping the natural resource curse: Insights from Ghana. *Resources Policy* 61: 433-440.
- Apergis Nicholas, Ghassen El-Montasser, Emmanuel Sekyere, Ahdi Ajmi, Rangan Gupta. 2014. Dutch disease effect of oil rents on agriculture value added in Middle East and North African (MENA) countries. *Energy Economics* 45: 485-490.
- Badeeb Ramez A., Hooi Lean, Jeremy Clark. 2017. The evolution of the natural resource curse thesis: A critical literature survey. *Resources Policy* 51: 123-134.
- Corden Max, Peter Neary. 1982. Booming sector and de-industrialisation in a small open economy. *The Economic Journal* 92 (368): 825-848.
- Corden Max. 2012. Dutch disease in Australia: policy options for a three-speed economy. *Australian Economic Review* 45(3): 290-304.
- Czech Katarzyna. 2018. Agricultural performance of oil-dependent economies. *Roczniki Naukowe SERiA XX* (6): 35-40.
- Daniele Vittorio. 2011. Natural resources and the quality of economic development. *The Journal of Development Studies* 47 (4): 545-573.
- EC (Energy Commission). 2018. *Energy (Supply and demand). Outlook for Ghana*. Ghana: Energy Commission.
- Égert Balazs. 2009. Dutch disease in former Soviet Union: Witch-hunting? *CASE Network Studies & Analyses* 380: 131.
- Gelb Alan H. 1988. *Oil windfalls: Blessing or curse?* Washington: Oxford University Press.
- Gylfason Thorvaldur, Tryggvi Herbertsson, Gylfi Zoega. 1999. A mixed blessing: natural resources and economic growth. *Macroeconomic Dynamics* 3 (2): 204-225.
- Gylfason Thorvaldur. 2001. Natural resources, education, and economic development. *European Economic Review* 5 (4-6): 847-859.
- Gylfason Thorvaldur. 2006. Natural resources and economic growth: From dependence to diversification. [In] *Economic liberalization and integration policy*, 201-231. Heidelberg, Berlin: Springer.
- Kopiński Dominik, Andrzej Polus, Wojciech Tycholiz. 2013. Resource curse or resource disease? Oil in Ghana. *African Affairs* 112 (449): 583-601.
- Obeng-Odoom Franklin. 2014. Measuring what? “success” and “failure” in Ghana’s oil industry. *Society & Natural Resources* 27 (6): 656-670.
- Phillips Jon, Elena Hailwood, Andrew Brooks. 2016. Sovereignty, the ‘resource curse’ and the limits of good governance: a political economy of oil in Ghana. *Review of African Political Economy* 43 (147): 26-42.
- Rybczyński Tadeusz. 1955. Factor endowments and relative commodity prices. *Econometrica* 22: 336-41.
- Sachs Jeffrey, Andrew Warner. 1999. The big push, natural resource booms and growth. *Journal of Development Economics* 59 (1): 43-76.
- Siakwah Pius. 2017. Actor Network Theory, globalised assemblages and the impact of oil on agriculture and industry in Ghana. *The Extractive Industries and Society* 4 (3): 462-472.
- Van Gyampo Ransford E. 2016. Transparency and accountability in the management of oil revenues in Ghana. *Africa Spectrum* 51 (2): 79-91.
- Vigneri Marcella, Shashi Kolavalli. 2018. Growth through pricing policy: The case of cocoa in Ghana. *Background paper to the UNCTAD-FAO Commodities and Development Report 2017. Commodity market, economic growth and development*. Rome: FAO.
- Yeboah Joseph. 2008. *Environmental and health impact of mining on surrounding communities: a case study of AngloGold Ashanti in Obuasi*. Kumasi, Ghana: Kwame Nkrumah University of Science and Technology.

WPŁYW EKSPORTU ROPY NAFTOWEJ NA GOSPODARKE GHANY

Słowa kluczowe: ropa naftowa, choroba holenderska, sektor rolny, Ghana,
jednoczynnikowa analiza wariancji

ABSTRAKT

Celem artykułu jest ocena wpływu uruchomienia komercyjnej produkcji i eksportu ropy naftowej w Ghanie na sytuację gospodarczą tego kraju. Badanie przeprowadzono na podstawie jednoczynnikowej analizy wariancji oraz testu HSD Tukeya. Analizę przeprowadzono w odniesieniu do zjawiska tzw. choroby holenderskiej. Ghana jest interesującym przykładem kraju bogatego w zasoby naturalne, w którym produkcja ropy naftowej rozpoczęła się późno – w 2011 roku. Polityka pieniężna Ghany wydaje się być skuteczna w łagodzeniu skutków tzw. choroby holenderskiej. Zjawisko to powiązane jest z umocnieniem się waluty krajowej, podczas gdy wyniki badań w analizowanym okresie wskazują na osłabienie waluty Ghany, a nie jej umocnienie. Wykazano także, że wzrost eksportu ropy naftowej nie miał istotnego statystycznie wpływu na eksport pozapaliwowych surowców. Wskazano, że uruchomienie komercyjnej produkcji ropy naftowej wiązało się z istotnym statystycznie spadkiem wartości dodanej rolnictwa. Wzrost eksportu ropy doprowadził także do znacznego zmniejszenia się udziału ludności wiejskiej w ogólnej liczbie ludności Ghany. Należy podkreślić, że sektor rolniczy stanowi podstawowe źródło utrzymania wielu obywateli w Ghanie, a przychody w nim generowane odgrywają ważną rolę w rozwoju kraju. Rząd Ghany powinien zwrócić szczególną uwagę na kwestie związane z modernizacją rolnictwa i edukacją społeczności wiejskich.

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