Downstream Deregulation Policy and Availability of Petroleum Products in Akwa Ibom State, Nigeria

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Abstract
The adoption of downstream deregulation policy was to enhance availability of petroleum products and eradicate endless queues at filling stations in Nigeria including Akwa Ibom State. Sadly, owing to poor implementation of this policy, the crisis of petroleum products scarcity still persists in the country. Therefore, the objective of this study is to examine the impact of downstream deregulation policy and the availability of petroleum products in Akwa Ibom State. The study used Pearson Moment Correlation Coefficient as the statistical tool for the analysis. Three hypotheses were tested at 0.05 significant levels. This study is anchored on the theory of demand and supply. The findings revealed that endemic corruption, cross-border smuggling by petroleum marketers and downstream oil deregulation policy on removal of petroleum products subsidy are the major challenges to availability of petroleum products in Akwa Ibom State. The study recommended that the various institutions set-up to checkmate corruption in the petroleum sector of the Nigeria economy should be held accountable for all corruption offences recorded in the sector. The federal government should ensure enforcement of the joint task force who monitor the movement of the petroleum products from the refineries to final destination including retail outlet stations, to curb cross-border smuggling. Nigeria government should implement full deregulation policy to end petroleum products scarcity in the country.

Key words: Downstream, deregulation, policy, availability of petroleum products, Nigeria.

Introduction

The Nigerian petroleum sector has been a pot of gold to the nation and the outside world since independence (Okpan & Njoku, 2019), its downstream oil sector powers the Nigerian economy through provision of products for transportation and energy, employment generation and wealth creation (Aminu & Olawore, 2014). The downstream sector's activities involve marketing, distribution, and transportation of refined petroleum products from the refineries or import jetties to retail outlets or points of consumption (NNPC, 2016; Osuala, 2013). However, the Nigerian refineries which have total installed capacity of 445000 bpsd, resorts to importation to meet consumers' demand due to the refineries poor operating performance in the last 20 to 24 years with less than 20 percent average capacity utilization (Ogbuigwe, 2018). This is in tandem with Klynveld Peat Manvick Goerdeler, KPMG (2019) which confirms about 15.6 billion litres of products were apparently not available to the Nigerian market. This situation has caused regular scarcity of fuel since February, 2022, leading to price hikes. Although, the official fuel price, according to the government is N162.50 – N165 per litre, most Nigerians can only purchase fuel at the informal rate (Vanguard Newspapers, February 14, 2022).

Owing to the challenges of unavailability of the petroleum products and huge cost of importation, the Federal Government complained that the cost of subsidizing importation which was estimated to be as high as $1.5 billion annually has become unbearable to sustain and that deregulation of the downstream sector would attract investors into the oil and gas industry and provoke competition which would result in reduction in the prices of petroleum products (Monday, Ekperiware & Muritala, 2016). Unfortunately, under the current deregulated policy, the downstream sector is characterized by endemic corruption, cross border smuggling of crude and refined oil by the marketers and heavy subsidization in the importation of petroleum products due to inefficient local refineries, resulting in petroleum products scarcity, long and unending queues at petrol stations in

Nigeria including Akwa Ibom State.
It is against this background that this study examines Downstream Deregulation Policy and Availability of Petroleum Products in Akwa Ibom State, Nigeria.

Research Objectives
The main objective of this study is to examine the impact of Downstream Deregulation Policy on availability of petroleum products in Akwa Ibom State, Nigeria. The specific objectives of this study are:

1. To examine the extent to which corruption in the downstream oil sector impedes availability of petroleum products in Nigeria, vis-à-vis. Akwa Ibom State.
2. To ascertain the impact of downstream oil deregulation policy on removal of petroleum products subsidy in Nigeria.
3. To investigate whether the cross-border smuggling affects availability of petroleum products.

Corruption in Downstream Oil Sector in Nigeria
Baghebo and Atima (2013) stress that since the Royal Dutch Shell discovered oil in the Niger Delta in 1956, precisely in Oloibiri, in Bayelsa State, the oil industry has been marred by political and economic strife largely due to a long history of corrupt military regimes, civil rule and complicity of multinational corporations, notably Royal Dutch Shell. Okpan and Njoku (2019) examined the relationship between corruption and oil sector conflict and sustainable development which was anchored on resource curse theory. The study recommended amongst others, that the award of oil block, contract, and licensing and production right should follow due process and transparent process. Also that the awarding of oil block to individuals should be discouraged, rather they should be awarded to corporate entities with wide spread ownership.

Gillies (2009) as cited in Donwa, Mgbame, Ogbeide (2015) outlined four areas that stand out as possible loci of corruption in Nigerian oil and gas industry. They are: the awarding of licenses; the awarding of contracts; bottlenecks and inefficiencies; the role of bunkering; the exportation of crude and importing refined products.

According to Nigerian Extractive Industry Transparency Initiative, (2014), the 2009 and 2011 (NEITI's) reports, certain oil and gas firms connived with individual tax executives to evade tax overheads of about $8.3 billion; sums that they ought to have credited to the Federal Government's account. However, owing to the weak application of the provisions of the Petroleum Profits Tax Act, all of these have created opportunities for corruption and decline oil revenues deposited on the Federal government.

Transparency International Corruption Perception Index (2004) shows oil-rich Angola, Azerbaijan, Chad, Ecuador, Indonesia, Iran, Iraq, Kazakhstan, Libya, Nigeria, Russia, Sudan, Venezuela and Yemen all have extremely low scores. In these countries, the oil sector is plagued by revenues vanishing into the pockets of western oil executives, middlemen and local officials. According to Adebolu and Vhriterhire (2002), the wrong turn around maintenance of the refineries regularly occasioned the refineries' breakdown and fuel scarcity and the upsurge in fuel, corruption, and fraudulent practices the product scarce.

Leite & Weldmann (1999) use data on exports of fuel, minerals, agriculture, and food products and found that the extent of corruption depends on natural resource abundance. Fuel and ores are consistently related to worse scores of corruption, whereas agriculture and food exports are associated with better scores. Tella, Ades and Di (1999) use the proportion of total exports accounted for by fuels, minerals, and metals as a measure related to rents for domestic firms. They found that this variable is significantly related to more corruption for the period 1980 – 1983. When country and year fixed effects are included, the fuel and mineral export variable becomes

Donwa, Mgbame & Julius (2015) examined corruption in the oil and gas industry as implication for economic growth. Library research method was adopted for this study. The finding of the study revealed that the level of corruption in Nigeria has significant impact on economy growth. The implication of this finding is that economy cannot grow fast without zero tolerance in corruption. The study concluded that despite efforts of ICPC and EFCC, corruption remains a problem to the Nigeria economy. The study recommended that all the public loots should be thoroughly investigated and offenders once found guilt, should be prosecuted and the loots taken back on the value of what has been stolen.

According to CSL Stockbroker (2019), smugglers of Premium Motor Spirit (PMS) divert about 10 million litres of the commodity on a daily basis, to neighbouring countries. NNPC also stated that the smuggling of the product was costing the nation about N2 billion naira daily.

Downstream Oil Deregulation Policy and Removal of Petroleum Products Subsidy in Nigeria

Ebegbulem (2011) asserted that deregulation of the downstream sector and subsidy removal will pose a challenge to monetary policy authority due to its inflationary impact in the short run. He opined that the implementation of this policy had a potential of pushing up prices of goods and services in the country. He therefore recommended that in the interest of the economy and the nation, there is urgent need for greater collaboration and coordination between fiscal and monetary authorities to deliver better policies to move the economy forward. On the other hand, Birol, Aleagha, & Ferroukhi (1995) investigated the impacts of a subsidy phase-out in oil exporting developing countries of Algeria, Iran and Nigeria and reported that the effects of different deregulation policies in these three countries are substantial. The study revealed that a policy geared at more rational use of energy would permit these countries to save enough oil to meet future increases in demand while maintaining stable production.

Anyadike (2013) examined the implication of the downstream oil sector on the Nigerian economy by highlighting the main thesis of the proponents and that of the opponents of deregulation and fuel subsidy removal. A likert-type scale was used in designing the questionnaire for data collection administered to the three core Niger Delta States (Delta, Rivers and Bayelsa), where 1177 respondents were randomly selected for opinion sampling. Descriptive and chi-square was used and result revealed that deregulation of the downstream oil sector is a good policy that was wrongly implemented hence the existing four refineries are left in their comatose state with promises of a total turn around maintenance.

Kupoloku (2004) saw deregulation as the dismantling of the natural monopoly of the state owned enterprises by privatizing and deregulating price controls. He argued that this would lead to the creation of competition in the downstream by encouraging more companies to get involved and eventually supplying the market at competitive pricing levels. Thereby reducing the cost government spends on subsidizing the sector. Ugwuanyi (2009) argued that regulation and payment of subsidy discourages competition and encourages corruption and wastage because of lack of plan, which has been responsible for demurrage and other factors that inflate the cost of fuel. To him, this is because importers know that government will certainly pay the extra cost through subsidy.

Okafor (2011) opined that the major reason for deregulation of the downstream sector is to save the economy from total collapse; that the liberalization of the sector is to attract investors because subsidy has been a drain pipe, as the poor masses that are supposed to benefit from fuel subsidy are not feeling the impact, rather, very few individuals are corruptly enriching themselves. He said that the money that will be saved from subsidizing will be used to create jobs and help in infrastructural development and also small and medium enterprise will be better.

Maduka & Ihonre (2015) concluded in their study that deregulating the downstream sector was important in growing the industry rather than the enormous amount used in subsidizing the sector by the government. Furthermore, if the sector was deregulated; it would encourage private investors in the oil industry. They also made a point about deregulation, that it would free the sector for massive infusion of capital and technology to grow it and earn more money for Nigeria and in turn create employment opportunities for Nigerians.

Theoretical Framework

This study is anchored on the theory of demand and supply propounded by Ibn Taymiyyah, cited in Hamid (1995). This theory believes that "if desire for goods increases while its availability decreases, its price rises. On the other hand, if availability of the good increases and the desire for it decreases, the price comes down. This theory explains that petrol scarcity is a function of the demand side activity; that when people do not need a thing, the scarcity of the thing cannot be experienced.

The relevance of the theory of supply and demand to the deregulation policy on availability of petroleum products is that the implementation of the deregulation policy in the downstream sector of the petroleum industry is driven by the federal government commitment to the dismantling and unbundling of the natural monopoly of the state owned enterprise, Nigerian National Petroleum Corporation (NNPC), by privatizing and deregulating price controls in order to create competition in the downstream sector; encouraging more private companies to get fully involved and eventually supplying the market at competitive pricing levels, as the market will self-regulate and prices of refined petroleum products will be sold at the natural market level, as competition forces prices down.

Consequently, deregulation becomes inevitable as government participation in the downstream sector was characterized by some challenges which included large scale smuggling of petroleum products, pipelines vandalism, low capacity utilization and refining activities in the nation's refineries, scarcity of petroleum products, mismanagement of revenue from petroleum, and high level of corruption in the state-owned petroleum companies.

Methodology

The study adopted a survey research design to investigate the magnitude and direction or nature of the effect of downstream deregulation policy on some indices regarding petroleum products availability in Akwa Ibom State, Nigeria. Stratified random and purposive sampling techniques were used because the study focused on a particular characteristic of a population that is of interest. The primary data was collected through field survey using the questionnaire which were carried out with people vested in the operations of oil and gas sector; some downstream authorities, some independent marketers, workers at all levels of the oil and gas sector, the people living in the environment, users of the products derived from crude oil and natural gas: transport agencies, companies, factories and others related users who are well vested in the knowledge needed to help us ascertain the presence and extent of the relationship between the major variables of the study.

Research Design

In this study, the correlation research design was used, owing to the influence relationship to be derived from the correlation/regression technique. Already existing known facts were gathered from literature on the subject matter. Data were collected through the questionnaire from three hundred and seventy-one (371) respondents. A structured questionnaire was designed in English and used as a relevant instrument for primary data collection. A 5-point Likert scale of Strongly agreed (SA); Agreed (A); Neutral (N); Disagreed (D); Strongly disagreed (SD). The adopted Likert 5-point scales ranged from SA=5; A= 4; N=3; D=2; SD=1

Model Specification

Correlation analysis using Pearson Moment Correlation coefficient was used to find the relationship between factors. The regression equation involve s two types of variables : the dependent variable, Y, and independent variable(s), X or X's as the case may be. The variables of the model are: X and Y , where Y represents the response (dependent) variable and X, the predictor (Independent) variable. The regression model given below is employed in the regression analysis.

$Y_i \quad _0 \quad _1 X_i \quad _i$,

Where, $Y_{i's}$ are Availability of Petroleum Products (APP) and Removal of Petroleum Products Subsidy (RPPS) to be estimated.

$X_{i's}$ are Corruption in the Downstream Oil Sector (CDOS), Downstream oil deregulation policy (DODP) and Coss-bar Smuggling (CBS)

$_0$ is the intercept to be obtained (constant)

$_1$ is the slope (coefficient of the variable X_i to be obtained)

$_i$ represents the error term

Using the model;

$APP \quad _0 \quad _1 CDOS \quad _i \quad -$ (1)

$RPPS \quad _0 \quad _1 DODP \quad _i \quad -$ (2)

$APP \quad _0 \quad _1 CBS \quad -$ (3)

The formulated hypotheses were applied on the model for the purpose of data analyses and the results were obtained.

Data Presentation and Analysis

The total population under study was 5,451,000 as recorded by the National Population Commission (NPC), 2006 for Akwa Ibom State. A Taro Yamane formula was used to determine the reliable sample size from this population. It is given by:

$$n \quad \frac{N}{1 \quad N e^2}$$

Where n is the sample size to be determined, N is the population size (5,451,000), and e is the level of precision. Using a 95% confidence level (that is e = 0.05), the Yamane's formula gives;

$$n \quad \frac{N}{1 \quad N e^2} \quad \frac{5{,}451{,}000}{1 \quad 5{,}451{,}000 \quad 0.05^2} \quad \frac{5{,}451{,}000}{1 \quad 13627.5} \quad \frac{5{,}451{,}000}{13628.5} \quad 399.97 \quad 400$$

Respondents	Questionnaires distributed	Questionnaires retrieved	Percentage retrieved
Downstream petroleum authorities, independent marketers. Etc.	400	371	93

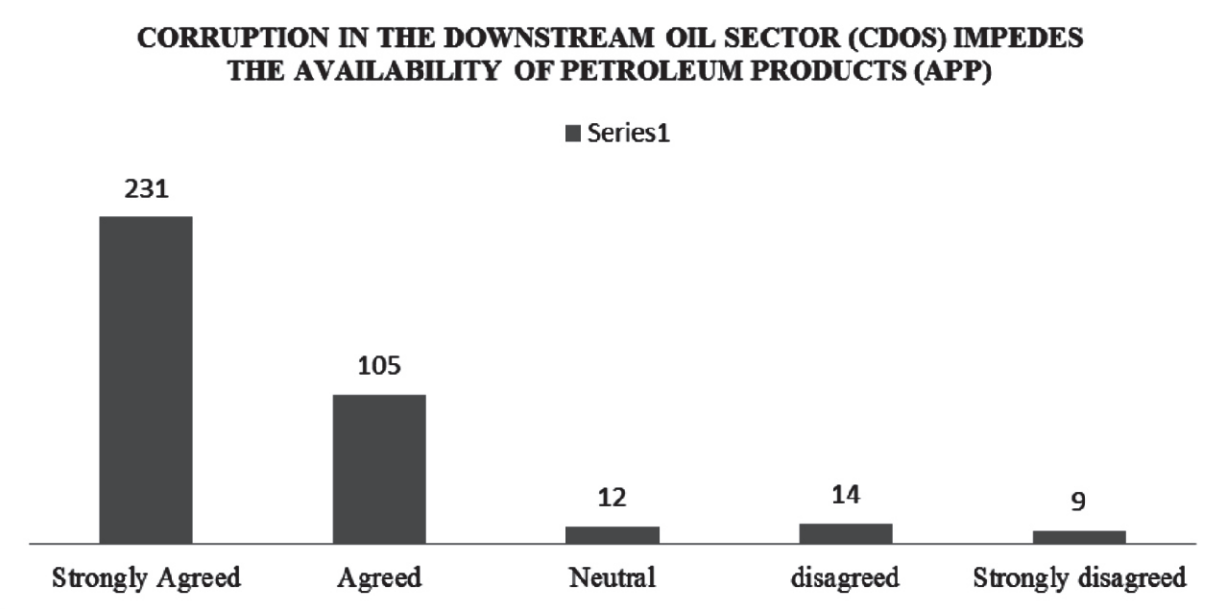
Data Analysis

Survey Question One: Corruption in the Downstream Oil Sector (CDOS) impedes Availability of Petroleum Products (APP) in Akwa Ibom State

Strongly Agreed	Agreed	Neutral	disagreed	Strongly disagreed

CDOS IMPEDES ON THE *APP*	FREQUENCY	%
Strongly Agreed	231	62
Agreed	105	28
Neutral	12	3.2
disagreed	14	3.8
Strongly disagreed	9	2.4
Total	***371***	***100***

Figure 1: A Bar-chart of **CDOS** impediment on APP and their frequencies



Hypothesis One:

Null Hypothesis (H_0): Corruption in the downstream oil sector has no significant impediment on the availability of petroleum products.

Alternative Hypothesis (H_1): Corruption in the downstream oil sector has a significant impediment on the availability of petroleum products.

Table 1: Pearson Product Moment Correlation analysis of relationship between Corruption in the Downstream Oil Sector (CDOS) and the Availability of Petroleum Products (APP)

Variables	N	Df	R	r^2		Sig	Result
APP	371						Significant
		369	0.785	0.62	0.05	0.002	(Reject H_0)
CODS	371						

Source: SPSS Analysis, 2022

Statistical Analysis of Result

Data was analyzed using IBM SPSS version 25. From the analysis in Table 1. The sample size (N) for both Corruption in the Downstream Oil Sector (CDOS) and availability of petroleum products (APP) is 371. The relationship coefficient calculated, is 0.79 and its square value is 0.62 as stated in the result in the table. These values show that there is an indication that corruption in the downstream oil sector has a strong relationship with the availability of petroleum products. The r^2 value indicates that corruption in the downstream oil sector has a relationship of about 62% with availability of petroleum products.

Decision

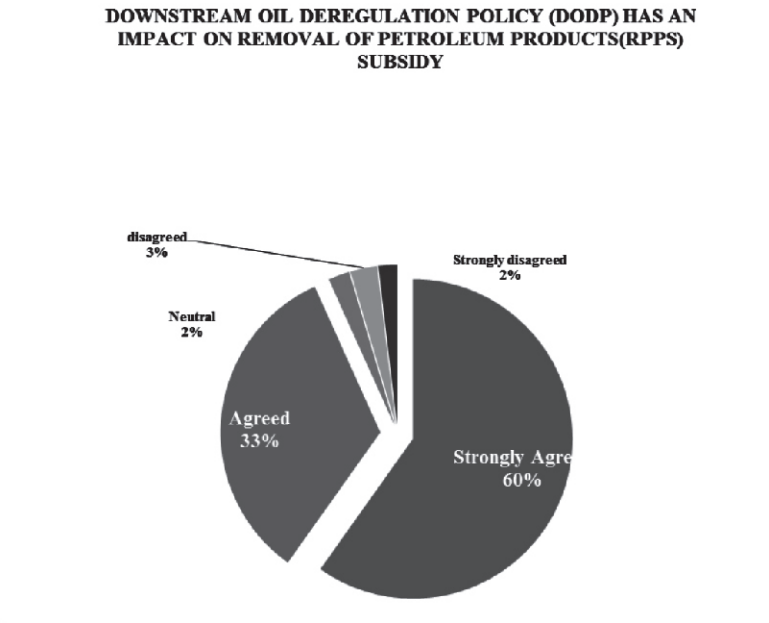
The p-value (Sig) is 0.002 < 0.05 at 369 degrees of freedom. Hence, the Null hypothesis is rejected, indicating that actually, there is a significant relationship between Corruption in the Downstream Oil Sector (CDOS) and Availability of Petroleum Products (APP). Hence, it is concluded that corruption in the downstream oil sector has a significant impediment on the availability of petroleum products.

Survey Question two: Downstream Oil Deregulation Policy (DODP) has an impact on Removal of Petroleum Products Subsidy (RPPS)

Strongly Agreed	Agreed	Neutral	disagreed	Strongly disagreed

DODP has an impact on RPPS	**FREQUENCY**	**%**
Strongly Agreed	222	60
Agreed	124	33
Neutral	8	2.2
disagreed	10	2.7
Strongly disagreed	7	1.9
Total	***371***	***100***

Figure 2: Pie-chart of DODP impact on RPPS and their percentages



Hypothesis Two:

Null Hypothesis (H_0): Downstream oil deregulation policy has no significant impact on removal of petroleum products subsidy.

Alternative Hypothesis (H_1): Downstream oil deregulation policy has a significant impact on removal of petroleum products subsidy in Akwa Ibom State.

Table 2: Pearson Product Moment Correlation analysis of relationship between Downstream Oil Deregulation Policy (DODP) and Removal of Petroleum Products Subsidy

Variables	N	Df	R	r^2		Sig	Result
DODP	371						Significant
		369	0.859	0.74	0.05	0.004	(Reject H_0)
RPPS	371						

Source: SPSS Analysis, 2022

Statistical Analysis of Result

From the analysis in table 2, the sample size (N) for both Downstream Oil Deregulation Policy (DODP) and Removal of Petroleum Products Subsidy (RPPS) is 371. The relationship coefficient calculated, is 0.86 and its square value is 0.74 as stated in the result in the table above. These values show that there is an indication that downstream oil deregulation policy has a strong relationship with the local refining of petroleum products. The r^2 value indicates that downstream oil deregulation policy has a relationship of about 74% with local refining of petroleum products. From the figure above, it can be deduced that there is a strong evidence of impact of DODP on RPPS.

Conclusion

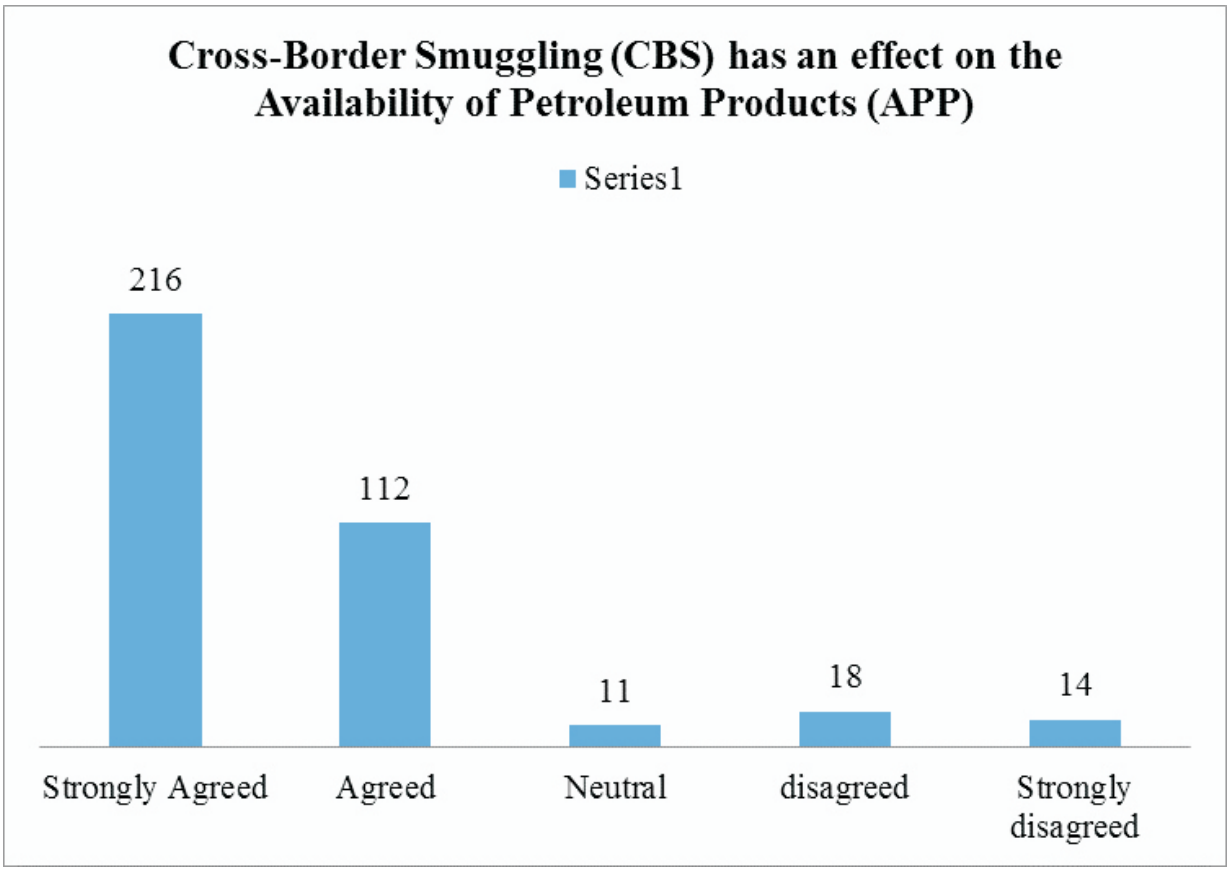
The p-value (Sig) is 0.000 < 0.05 at 369 degrees of freedom, hence, the Null hypothesis is rejected, indicating that actually there is a statistically significant impact of Downstream Oil Deregulation Policy (DODP) on Removal of Petroleum Products Subsidy (RPPS). Hence, we conclude that there is an impact of Downstream Oil Deregulation Policy (DODP) impact on the Removal of Petroleum Products Subsidy (RPPS).

Survey Question Three: Cross-Border Smuggling (CBS) has an effect on the Availability of Petroleum Products (APP) in Akwa Ibom State?

Strongly Agreed	Agreed	Neutral	disagreed	Strongly disagreed

DODP has impact on RPPS	**FREQUENCY**	**%**
Strongly Agreed	216	58
Agreed	112	30
Neutral	11	3
disagreed	18	5
Strongly disagreed	14	4
Total	***371***	***100***

Figure 3: Bar chart of ***DODP*** impact on RPPS and their frequencies



Hypothesis Three:

Null Hypothesis (H_0): Cross-Border Smuggling (CBS) has no significant effect on the Availability of Petroleum Products (APP)

Alternative Hypothesis (H_1): Cross-Border Smuggling (CBS) has a significant effect on the Availability of Petroleum Products (APP)

Table 3: Pearson Product Moment Correlation analysis of relationship between Cross-Border Smuggling (CBS) on the Availability of Petroleum Products (APP)

Table 3: Pearson Product Moment Correlation analysis of relationship between Cross-Border Smuggling (CBS) on the Availability of Petroleum Products (APP)

Variables	N	Df	R	r^2		Sig	Result
APP	371						Significant
		369	0.72	0.52	0.05	0.010	(Reject H_0)
CBS	371						

Source: SPSS Analysis, 2022

Statistical Analysis of Result

Data was analyzed using IBM SPSS version 25. From the analysis in table 3, the sample size (N) for both Cross-Border Smuggling (CBS) and Availability of Petroleum Products (APP) is 371. The relationship coefficient calculated, is 0.72 and its square value is 0.52 as stated in the result in the table above. These values show that there is an indication that Cross-Border Smuggling has a strong relationship with the Availability of Petroleum Products. The r^2 value indicates that Cross-Border Smuggling has a relationship of about 52% with Availability of Petroleum Products.

Conclusion

The p-value (Sig) is 0.000 < 0.05 at 369 degrees of freedom. Hence, the Null hypothesis is rejected, indicating that actually there is a statistically significant effect of Cross-Border Smuggling (CBS) on Availability of Petroleum Products (APP). Hence, we conclude that there is an effect of Border Smuggling (CBS) on Availability of Petroleum Products (APP).

Results and Discussions

Hypotheses one, two and three were used to test the relationship between the proxies of the independent and dependent variables in the study. The relationship between corruption, cross-border smuggling, and downstream oil deregulation policy on removal of petroleum products subsidy in Nigeria and availability of petroleum products in Nigeria vis-à-vis Akwa Ibom State were seen to be positive. Findings from hypothesis one analysis show that the sample size (N) for both Corruption in the Downstream Oil Sector (CDOS) and availability of petroleum products (APP) is 371. The relationship coefficient calculated, is 0.79 and its square value is 0.62 as stated in the result in the table above. These values show that there is an indication that Corruption in the Downstream Oil Sector has a strong relationship with the non-availability of petroleum products. The r^2 value indicates that Corruption in the Downstream Oil Sector has a relationship of about 62% with non-availability of petroleum products. This is in tandem with Adebolu & Vhriterhire (2002), that the wrong turn around maintenance of the refineries regularly occasioned the refineries' breakdown, and fuel scarcity and the upsurge in fuel, corruption, and fraudulent practices the product scarce.

Findings from hypothesis two indicate that there is a significant relationship between downstream oil deregulation policy and removal of petroleum products subsidy. As shown in Table 2, the sample size (N) for both Downstream Oil Deregulation Policy (DODP) and Removal of Petroleum Products Subsidy (RPPS) is 371. The relationship coefficient calculated, is 0.86 and its square value is 0.74 as stated in the result in the table above. These values show that there is an indication that downstream oil deregulation policy has a strong relationship with the local refining of petroleum products. The r^2 value indicates that downstream oil deregulation policy has a relationship of about 74% with local refining of petroleum products. From the figure above, it can be deduced that there is a strong evidence of impact of DODP on RPPS. This is in support of a study conducted by Birol, Aleagha, & Ferroukhi (1995) investigating the impacts of a subsidy phase-out in oil exporting developing countries of Algeria, Iran and Nigeria, which reported that the effects of different deregulation policies in these three countries are substantial. The study revealed that a policy geared at more rational use of energy would permit these countries to save enough oil to meet future increases in demand while maintaining stable production.

The findings from hypothesis three showed that cross-border smuggling and availability of petroleum products are significantly related. This is demonstrated in the Table 3, from the sample size (N) for both Cross-Border Smuggling (CBS) and Availability of Petroleum Products (APP) is 371. The relationship coefficient calculated, is 0.72 and its square value is 0.52 as stated in the result in the table above. These values show that there is an indication that Cross-Border Smuggling has a strong relationship with the Availability of Petroleum Products. The r^2 value indicates that Cross-Border Smuggling has a relationship of about 52% with Availability of

Petroleum Products. This is in line with Nigerian National Petroleum Corporation reports (NNPC, 2019), smugglers of Premium Motor Spirit (PMS) divert about 10 million litres of the commodity on a daily basis and sell to neighbouring countries. NNPC also stated that the smuggling of the product was costing the nation about N2 billion naira daily.

Conclusion and Recommendations

The literature reviewed on empirical studies and the results obtained from the analysis of data in this study indicate that a significant relationship exists between corruption and cross-border smuggling as well as downstream oil deregulation policy on removal of petroleum products subsidy in Nigeria. The proxies of the main variables in this study all had a positive significant relationship with each other.

Based on the findings, the study recommends the following:

1. The Nigeria government should ensure that the various institutions set-up to checkmate corruption in the Petroleum Sector of the Nigeria economy should be held accountable for all corruption offences recorded in the sector.
2. The federal government should ensure enforcement of the joint task force who monitor the movement of the Petroleum products from the refineries to final destination including retail outlet stations, to curb cross-border smuggling.
3. Nigeria government should implement full deregulation policy to end Petroleum products scarcity in the country.

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