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EFFECT OF FUEL SUBSIDY REMOVAL ON COMMODITY PRICES IN SOKOTO METROPOLIS, SOKOTO STATE, NIGERIA

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Abstract

This study examines the impact of fuel subsidy removal, on commodity prices in Sokoto metropolis using a survey dataset for a sample of 339 respondents. In the model the dependent variable is commodity price while the independents variables are fuel subsidy removal, transportation costs and costs of electricity. In the estimation however, this study applied Ordinary Least Squares regression and the results indicate that fuel subsidy removal has a positive and statistically significant effect on commodity prices. This suggests that as the government has phased out fuel subsidies, the resulting increase in energy and transportation costs has been passed on to consumers through higher prices for a wide range of essential goods. Moreover, the study finds that transportation costs play a significant role in determining commodity prices. This highlights the significant pass-through of higher logistics expenses to consumers, underscoring the need to improve the efficiency and affordability of transportation infrastructure. Additionally, the analysis reveals that electricity costs also have a significant impact on commodity prices. As energy expenses rise, producers and distributors must incorporate these higher costs into the prices they charge. This points to the importance of addressing the drivers of increasing electricity prices, such as power generation, transmission, and distribution costs.

Keywords: *Commodity price, Fuel subsidy removal, Transportation cost, Sokoto metropolis*

INTRODUCTION

The fuel subsidy in Nigeria has a long history, having been introduced in 1973 to make petroleum products more affordable and accessible to the general population (Eyiuche, 2012). This was due to the country's reliance on imported refined petroleum, which was sold at exorbitant prices. The subsidy was intended to benefit the citizenry by ensuring they had access to this crucial resource (Arze, 2012). However, the implementation of the subsidy has been marred by inconsistencies, resource misallocations, and corrupt practices by political leaders and oil marketers, leading to a significant debt burden for the national economy (Arze, 2012; Eyiuche, 2012). Despite the original intent of the fuel subsidy to support the general population, its impact has been undermined by the lack of effective management and oversight, highlighting the need for comprehensive reforms to ensure the efficient and transparent allocation of this vital national resource.

The federal government under the current administration of President Bola Ahmed Tinubu announced the removal of the fuel subsidy on May 29, 2023, during his inauguration (Kabir,

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2023). According to President Tinubu, the funds saved from the subsidy removal will be redirected into better investments in public infrastructure, education, healthcare, and job creation, which will materially improve the lives of millions of Nigerians. This aligns with the assertion made by Oyodele (2009) that the fuel subsidy removal could annually release around ₦1 trillion for investment, leading to employment creation and poverty alleviation.

Consequently, the national oil company, NNPC Limited, reviewed the petroleum motor spirit (PMS) pump price from ₦189 per liter to between ₦480 and ₦570 per liter, just two days after the announcement (Kabir, 2023). Chinedu and Ebele (2012) argue that the money saved from the subsidy removal can be better invested in refineries, roads, and major infrastructural projects, which will ensure sustainable business development and wealth generation for the citizens. This decision by the president has been supported over the years by notable figures, including the former Central Bank of Nigeria (CBN) governor, Sanusi Lamido Sanusi, who stated that borrowing to subsidize fuel today would burden future generations and that a difficult decision should be made to improve the future. This is due to the fact that the Nigerian government can no longer sustain the payment of fuel subsidies, as the cost keeps increasing due to population growth and the resulting increase in fuel demand (Moyo & Songwe, 2012; Onwuamaeze & Ekeghe, 2020; Yemi et al., 2023).

The removal of the fuel subsidy in Nigeria is a contentious issue, as it is expected to have significant impacts on the living conditions of the populace, particularly low-income earners and the poor (Opayemi, 2015). In the past, when the subsidy was removed in 1980 and 2000, the cost of fuel increased, and the prices of commodities rose by almost 50% (Abdulkadir et al., 2020). This trend is not unique to Nigeria, as similar experiences have been observed in other countries in the region, such as Cameroon, Guinea, Ghana, and Chad (Abdulkadir et al., 2020). To mitigate the effects of the fuel subsidy removal, the Nigerian government introduced the Social Intervention Programme (SIP) in 2016. However, the living conditions of the people appear to have not improved significantly, as the prices of goods and services remained high due to the removal of the fuel subsidy (Abdulkadir et al., 2020). Given this context, the current study focuses on assessing the effect of the fuel subsidy removal on commodity prices and the cost of living in Sokoto State, Nigeria, as it is home to a significant number of Nigerians who are heavily dependent on petroleum products for their daily economic, social, and cultural activities (Abdulkadir et al., 2020).

In addition, to the best knowledge of the researchers, there is a lack or even absence of studies on the effect of fuel subsidy removal on commodity prices, particularly in the context of Sokoto State, Nigeria (Abdulkadir et al., 2020). This study aims to fill this research gap by applying a robust methodological approach to achieve its objective. The study is divided into five sections. The first section is the introduction, which provides the background and context of the study. The second section delves into the theoretical framework and a review of related empirical studies. The third section presents the methodology used in the study. The fourth and fifth sections present the results and discussions, and the conclusions and recommendations, respectively. By focusing on the effect of fuel subsidy removal on commodity prices in Sokoto metropolis, this study contributes to the existing literature on the socioeconomic implications of such policy decisions in Nigeria and similar developing countries. The robust methodological approach employed in the study is expected to provide reliable insights that can inform policymaking and help mitigate the potential adverse effects of fuel subsidy removal on the lives of the populace.

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LITERATURE REVIEW

The theoretical underpinning of this study is anchored in the theory of consumer behavior (Emeh & Onyishi, 2012). This theory relates the consumption of goods and services to consumption expenditures, emphasizing that a consumer's consumption choices respond to changes in external factors. The theory assumes that the number of commodities in a space is finite, with the commodity bundle viewed as a commodity space. Consumption choices are typically limited by physical constraints, such as environmental, institutional, and economic constraints (Emeh & Onyishi, 2012). Regarding the economic constraint, the theory assumes that commodities are traded in the market at publicly quoted prices (universality of markets), and the affordability of a consumption bundle depends on the market price and the consumer's wealth level. There is a consensus that consumer demand, based on the relation between price and wealth, is objective at meeting the consumer's certain level of satisfaction (Agboje, 2018).

Consumers are faced with the challenge of preferring their demand to attain maximum utility within their limited wealth or a certain utility level expected to be greater than the initial utility by minimizing their expenditure. This utility level, which is equated to welfare in economics, is associated with a person's good, benefit, advantage, interest, prudential, value, happiness, flourishing, eudemonia, and quality of life, and is often related to consumer surplus. The capacity to attain a certain level of welfare is measured by a consumer's income, assets, access to credit, and actual consumption (Ering & Akpan, 2012). In addition, the utility of a social group or institution is achieved by the greatest sum of their consumptions, as explained by the theoretical bases of welfare pioneered by classical and neoclassical economists. This theory is relevant to the present study as it explains the behaviors of consumers in making sudden reactions to the quantity of commodities they buy when faced with corresponding institutional laws that affect their purchasing power (Agboje, 2018).

Prior studies have examined the impact of fuel subsidy removal on the socioeconomic characteristics of households. Abdulkadir et al. (2020) assessed the impact of fuel subsidy removal on households in Maiduguri metropolis, Borno state, Nigeria, and found that the socioeconomic characteristics of households, such as gender, marital status, age, education, occupation, and income level, were positively related to fuel subsidy removal, except for household age. The authors recommended focusing on increasing workers' wages and salaries, family planning, and reducing transportation costs to alleviate the hardship of fuel subsidy removal on low-income earners in Nigeria. Additionally, Osagie (2012) conducted a study on the impact of fuel subsidy removal on socioeconomic development in Nigeria from 1980 to 2012, using an econometric approach. The study found that while fuel subsidy removal did not have a short-term impact on the social well-being of Nigerians, the long-term impact indicated that the deregulation of the downstream sector would ultimately lead to future economic development in the country.

Additional studies have examined the broader impact of fuel subsidy removal on the Nigerian economy. Nkagu (2012) studied the effect of fuel subsidy removal on key sectors of the economy, including health, transportation, education, and power, and found a high level of impact on these sectors, with a lower impact on agriculture, infrastructure, and basic amenities. The author suggested that improving these sectors would contribute to sustained economic growth and development in Nigeria. Moreover, Olawale (2013) examined the impact of petroleum product price increases and subsidy payments on investment in the Nigerian petroleum industry. The study found that subsidy removal did not stimulate investment, and recommended alternative measures, including the implementation of palliative measures to

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alleviate short-term disruptions caused by subsidy removal. The study also indicated that the benefits of subsidy removal would only be realized in the long run, and that removing the subsidy would lead to efficiency and economic growth, consistent with theoretical and empirical findings.

Additional studies have explored the economic implications and public perception of fuel subsidy removal in Nigeria. Bashir (2014) examined the arguments for and against fuel subsidy removal, noting the growing public antagonism towards this policy. The study found that the petroleum sector was characterized by corruption, ineffective record-keeping, insufficient supply, smuggling, and inefficiency. The findings recommended building more refineries to make the product more affordable and engaging the public in policies that will affect them. Similarly, Ochenni (2015) studied the impact of fuel price increases on the Nigerian economy, using a survey research design. The findings revealed a significant relationship between recent fuel price increases and economic growth, a negative impact on purchasing power and food security. The study recommended retaining the fuel subsidy while expediting the construction of new refineries, and only removing the subsidy once the new refineries are commissioned.

Additional studies have further examined the economic implications of fuel subsidy removal in Nigeria. Abang (2016) employed a linear function approach to assess the effects of fuel subsidy removal on the value of the Nigerian Naira and local production. The study found that increases in fuel prices adversely affected the standard of living, as fuel is essential for transporting major commodities. The study recommended implementing policies that encourage industrialization and technological competitiveness to drive economic growth. Furthermore, Babatunde (2019) developed a New-Keynesian DSGE model to study the macroeconomic implications of oil price shocks and the fuel subsidy regime in Nigeria. The results showed that oil price shocks generate significant and persistent impacts on output, inflation, and the exchange rate. Importantly, the study found that the contractionary effect of a negative oil price shock on GDP is moderated without fuel subsidies, but cautioned that successful subsidy reform must include well-targeted safety nets and sustainable adjustment mechanisms.

Chinedu and Ebele (2012) conducted a study to examine whether fuel subsidy removal is necessary for enhancing business development and job creation in Nigeria. The study was based on the classical economic theory of regulated monopolies, where subsidies are perceived as distorting the forces of demand and supply. Using a descriptive survey design, data was collected from 300 respondents in the southeastern part of Nigeria. The findings showed that there is no significant relationship between fuel subsidy removal and job creation in Nigeria. The researchers concluded that fuel subsidy removal is an important element in the larger scheme to accelerate business development, but recommended that the government should focus on creating more jobs, backing the fuel subsidy with a good agenda, and encouraging further research by independent experts to ensure the success of the program in Nigeria.

METHODOLOGY

The study adopts a survey research design to collect primary data via a structured questionnaire. This approach is suitable for investigating the effect of fuel subsidy removal on commodity prices, as utilized in prior studies on this topic, such as those by Chinedu and Ebele (2012), Ochenni (2015), and Bashir (2014). The absence of a secondary dataset on the relevant variables in the study area further justifies the use of a questionnaire to gather the necessary information. The survey instrument is administered to a sample of households in the study area in order to obtain the required primary data for the analysis.

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This study's population consists of all households in the Sokoto metropolitan. Sokoto North, Sokoto South, and sections of Kware, Wamakko, and Dange Shuni Local Government Areas make up the Sokoto metropolis. The target LGAs have a population of 1,265,400 people, according to the National Population Commission (NPC). The sample size for this study is 427 based on the population. The number of respondents chosen in each local government area was calculated using a proportionate allocation algorithm and is shown in Table 1:

Table 1: Proportion of the Respondents in each Local Government Area

s/n	Local Government Areas	Population	Sample Size
1	Sokoto North	314,500	106
2	Sokoto South	266,800	90
3	Kware	181,000	61
4	Wamakko	242,000	82
5	Dange Shuni	261,100	88
	Total	1,265,400	427

Source: *National Population Commission, 2023.*

The sample size for this study was calculated using the Relief Applications sample size calculator released in 2018, with a margin of error of 5% (0.05) and a confidence level of 95%. The final sample size determined is 427 respondents. These respondents were selected through a simple random sampling process from the study population. The variables in this study were measured using a five-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree". This type of rating scale allows the researchers to obtain ordinal-level data from the respondents, enabling them to quantify their perceptions, attitudes, and experiences related to the impact of fuel subsidy removal on commodity prices. The use of a Likert scale is a common and well-established approach in survey-based research, as it provides a standardized and structured way for respondents to express their views on the various aspects being investigated. This measurement approach will facilitate the statistical analysis of the collected data, allowing the researchers to draw inferences and conclusions about the relationships between the key variables of interest.

The data was analyzed using inferential statistical technique. The inferential analysis employed Ordinary Least Squares (OLS) regression to explain the effect of fuel subsidy removal on commodity prices in the study area. This analytical approach is well-suited to address the research objectives and provide insights into the impact of the policy changes on the target population. Hence, the model specification in this study is divided into two. The first model captures the effect of subsidy removal on commodity price and is given as:

$$CPR_i = \beta_0 + \beta_1 SRM_i + \beta_2 TRC_i + \beta_3 ECT_i + \mu_i \quad \ldots\ldots (1)$$

Where CPR represents commodity price, SRM is the subsidy removal, TRC denotes transportation costs, ECT is the cost of electricity. Furthermore, β_0 to β_3 represents constant and coefficients of the estimated parameters while μ_i is the error terms representing other factors that were unable to be captured by the model in this research work.

RESULTS AND DISCUSSIONS

In the process a total of 427 questionnaires were distributed to the respondents in the study area. However, 28 of these questionnaires went missing, leaving 399 successfully collected

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responses. This accounts for a response rate of 93.44%, which is considered highly sufficient for drawing broad conclusions about the study. The high response rate suggests that the study was able to capture a significant proportion of the target population, thereby increasing the reliability and validity of the findings. The descriptive statistics for the study variables are presented in Table 2. These summary statistics provide an initial overview of the data collected through the survey instrument. The presentation of these descriptive results is an important first step in the empirical analysis, as it allows the researchers to gain a better understanding of the characteristics and distribution of the key variables under investigation. This preliminary analysis sets the stage for the more advanced inferential statistical techniques that employed to examine the effect of fuel subsidy removal on commodity prices in Sokoto metropolis.

Table 2: summary Statistics of the Variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
CPR	399	2.1754	0.6867	1	3
SRM	399	4.1578	1.0692	2	5
TRC	399	4.4937	0.5005	4	5
ECT	399	4.1578	0.6855	3	5

Source: *Authors' Computation from STATA Output.*

The results from Table 2 reveal that the mean value of 2.1754 for the commodity prices variable suggests that, on average, respondents perceived commodity prices to be relatively low on the 5-point Likert scale. This indicates that the removal of fuel subsidies may not have had a substantial impact on increasing commodity prices in the study area. Additionally, the low standard deviation of 0.6867 indicates a high level of consistency in the respondents' perceptions. This suggests that the impact on commodity prices was relatively uniform across the sampled households.

In addition, the mean score of 4.1578 for fuel subsidy removal suggests that respondents generally agreed that fuel subsidy removal measures were being implemented effectively. The standard deviation of 1.0692 indicates a moderate level of variation in the responses, implying that while most respondents shared similar perceptions, there were some differences in the degree to which they experienced or observed the effects of fuel subsidy removal. Furthermore, the high mean value of 4.4937 for transportation cost implies that respondents strongly agreed that transportation costs had increased significantly due to the fuel subsidy removal. The low standard deviation of 0.5005 points to a high level of consensus among the respondents on this issue, suggesting that the increased transportation costs were a widespread experience in the study area. Finally, for the cost of electricity, the mean score of 4.1578 indicates that respondents generally agreed that the cost of electricity had risen as a result of the fuel subsidy removal. The standard deviation of 0.6855 suggests a moderate level of variation in the responses, meaning that while most respondents shared similar perceptions, there were some differences in the degree to which they were affected by the increased electricity costs. Nevertheless, Table 3 presents the results of the correlation analysis conducted to verify the descriptive findings.

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Table 3: correlation Analysis of the Variables

Variables	CPR	SRM	TRC	ECT
CPR	1.0000			
SRM	0.2602	1.0000		
TRC	0.3276	0.5787	1.0000	
ECT	0.4059	0.1818	0.2335	1.0000

Source: *Authors' Computation from STATA Output.*

From Table 3, it is recorded that the positive correlation between commodity prices and fuel subsidy removal of 0.2602 suggests that as the fuel subsidy removal measures were implemented, commodity prices tended to increase. This indicates that the fuel subsidy removal had a moderately positive impact on commodity prices, potentially through mechanisms such as increased transportation and energy costs. Similarly, the positive correlation of 0.3276 between commodity price and transportation costs implies that as transportation costs increased, commodity prices also tended to increase. This is an intuitive finding, as higher transportation costs would likely be passed on to consumers, leading to higher commodity prices. Finally, the positive correlation of 0.4059 between commodity price and the cost of electricity suggests that as the cost of electricity increased, commodity prices also tended to increase. This is in line with expectations, as higher electricity costs can contribute to increased production, processing, and distribution costs, which may then be reflected in higher commodity prices. However, Table 4 displays the results of the OLS regression analysis conducted to examine the relationship between fuel subsidy removal and commodity price.

Table 4: Fuel Subsidy Removal and Commodity Price

Dependent Variable: Commodity Price				
Variables	Coefficient	Std. Err	T	Prob.
SRM	0.5849	0.0428	13.65	0.000
TRC	3.2767	0.1253	26.15	0.000
ECT	0.6784	0.0585	11.59	0.000
CONS	5.7707	0.1642	35.14	0.000
R^2 = 0.71, F-stat. = 316.83 (0.000), H-test = 34.927 (0.4527), Mean VIF =1.65				

Source: *Authors' Computation from STATA Output.*

From Table 4, it is affirmed that fuel subsidy removal has significant positive effect on commodity price at the 1% level. This indicates that a 1-unit increase in fuel subsidy removal measures is associated with a 0.5849-unit increase in commodity prices, holding all other variables constant. This provides strong evidence that the implementation of fuel subsidy removal policies had a positive and significant impact on commodity prices in the studied context. The findings of Abang (2016) align with the results of this study, indicating that the removal of fuel subsidy can result in an increase in the prices of essential goods.

In addition, results show that transportation costs have a significant positive effect on commodity prices at the 1% level. This suggests that a 1-unit increase in transportation costs is associated with a 3.2767-unit increase in commodity prices, all else being equal. The large magnitude of this coefficient underscores the significant pass-through of higher transportation costs to consumers through higher commodity prices. The study conducted by Nkagu (2012) supports the finding that fuel subsidy removal can lead to a significant increase in transportation costs in Nigeria, with an estimated increase of approximately 82%.

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Furthermore, the finding indicates that electricity costs also play a significant positive role in determining the upsurge of commodity price in Sokoto metropolis. This implies that a 1-unit increase in electricity costs is associated with a 0.6784-unit increase in commodity prices, holding other factors constant. This finding highlights the potential for increases in electricity costs to contribute to higher commodity prices, likely through their effect on production, processing, and distribution expenses. The study conducted by Nkagu (2012) provides support for the finding that the removal of fuel subsidy can result in a notable increase in the costs of electricity in Nigeria. According to Nkagu's research, this increase is estimated to be around 52%.

Finally, the overall model fit, as indicated by the R-squared value of 0.71, suggests that the included variables explain 71% of the variation in commodity prices. The model is also statistically significant as a whole, with an F-statistic of 316.83 and a p-value of 0.000. Additionally, the model does not appear to suffer from heteroskedasticity issues, and multicollinearity is not a concern based on the low mean Variance Inflation Factor (VIF) of 1.65.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results, several important conclusions can be drawn with meaningful implications for policymakers and stakeholders. The findings clearly demonstrate that the implementation of fuel subsidy removal policies has had a notable positive impact on commodity prices. This indicates that as the government has phased out fuel subsidies, the resulting increase in energy and transportation costs has been passed on to consumers through higher prices for a wide range of commodities. While the fuel subsidy removal may have been a necessary policy decision, the results underscore the need to carefully consider and mitigate the downstream effects on commodity affordability, particularly for low-income households who are most vulnerable to price shocks.

Furthermore, the regression results highlight the outsized influence of transportation costs on commodity prices. This suggests that improving the efficiency and affordability of transportation infrastructure and logistics could yield substantial benefits in terms of keeping commodity prices in check. Investments in public transportation, fuel-efficient vehicles, and supply chain optimization should be key priorities for policymakers seeking to enhance the accessibility and affordability of essential goods. The analysis also reveals the significant impact of electricity costs on commodity prices. As energy expenses rise, producers and distributors must pass those costs along to consumers. Therefore, it is crucial that policymakers address the drivers of increasing electricity prices, such as the costs of power generation, transmission, and distribution. Promoting energy efficiency, renewable energy sources, and targeted subsidies or price controls may help to moderate the pass-through of higher electricity costs to commodity prices.

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