International Journal of Human Research and Social Science Studies

ISSN(p): 3050-547X, ISSN(e): 3050-5488

Volume 03 Issue 03 March, 2026

DOI: https://doi.org/10.55677/ijhrsss/01-2026-Vol03I03

Page No : 158-166

The Dual Burden of Reform: Analysing the Impact of Fuel Subsidy Removal on Household Welfare and Inflation in Nigeria

Salam S. Mohammed[1], Zainab Abuh Musa[2]

[1]Department of Economics, Faculty of Management and Social Science, Confluence University of Science and Technology, Osara.
[2]Kogi State-Nigeria. Department of Field service and methodology, National Bureau of Statistics, Abuja, Nigeria.

ABSTRACT: This study investigates the dual impact of Nigeria's 2023 fuel subsidy removal on household welfare and inflation, with implications for green investment. Using monthly time-series data from 2019 to 2024 and a Vector Error Correction Model (VECM), the analysis tests two null hypotheses: that subsidy removal has no significant effect on (1) household welfare and (2) inflation. The results reject both hypotheses, revealing that subsidy removal acts as a strong costpush inflationary shock, which in turn drives a significant and persistent decline in household consumption expenditure (welfare proxy). Cointegration confirms a long-run equilibrium among subsidy policy, inflation, exchange rates, and welfare. The inflationary pass-through is amplified by exchange rate depreciation, while welfare losses are regressive, disproportionately affecting low-income households. The study concludes that without robust compensatory mechanisms, including targeted social transfers, inflation control policies, and transparent reinvestment of fiscal savings into green infrastructure, the short-term social costs of subsidy reform may undermine its long-term fiscal and sustainability objectives. Recommendations are anchored in an integrated policy framework that reconciles macroeconomic efficiency with household resilience.

Corresponding Author:
Salam S. Mohammed

Published Online:
March 09, 2026

KEYWORDS:
Fuel Subsidy Removal, Household Welfare, Inflation, Green Investment, Cost-Push Inflation, VECM, Nigeria
JEL Classification: E31, H23, I31, O55, Q48

Cite the Article: *Mohammed S,S, Musa, Z,A (2026) The Dual Burden of Reform: Analysing the Impact of Fuel Subsidy Removal on Household Welfare and Inflation in Nigeria. International Journal of Human Research and Social Science Studies, 3(3), 158-166.* https://doi.org/10.55677/ijhrsss/01-2026-Vol03I03

1. INTRODUCTION

Fuel subsidies have long been a cornerstone of social and economic policy in resource-dependent developing nations, designed to insulate domestic consumers from volatile global oil prices, support household welfare, and stimulate economic activity (World Bank, 2021). However, these subsidies increasingly represent a significant fiscal burden, encourage inefficient energy consumption, create market distortions, and often benefit higher-income groups disproportionately, thereby failing their equity objectives (Coady et al., 2019). Consequently, subsidy removal has become a central plank of reform agendas advocated by international financial institutions, framed as essential for fiscal consolidation, efficient resource allocation, and financing the transition to sustainable energy (IMF, 2013).

In Africa, and particularly in Nigeria, this reform presents a profound dilemma. Nigeria, as the continent's largest oil producer and most populous nation, has historically relied on fuel subsidies as a de facto social contract, ensuring artificially low pump prices for petrol (Premium Motor Spirit). By 2023, this regime had become fiscally untenable, consuming trillions of Naira annually, exacerbating budget deficits, and crowding out critical public investment in health, education, and infrastructure (Ozili & Obiora, 2023). The complete removal of the subsidy in mid-2023 therefore marked a watershed moment in Nigeria's political economy, triggering immediate and dramatic increases in fuel prices, transportation costs, and prices of essential goods.

The welfare and inflationary implications of such a sharp policy shift are complex and deeply contested. Proponents argue that removal frees up substantial fiscal resources for redistribution, productive investment, and green projects (Odior, 2018). Critics and empirical micro-studies, however, highlight the severe short-term consequences: spiraling inflation, erosion of real incomes, and heightened poverty, especially for low- and middle-income households whose consumption baskets are heavily weighted towards energy and transport (Sodeeq, 2024; Njoku & Mmougbuo, 2025). This inflationary surge is not merely a temporary shock but is often transmitted and magnified through structural channels like exchange rate depreciation and supply-chain inefficiencies (Abdullahi, Obi, & Abubakar, 2025).

A critical gap in the existing literature is the fragmented analysis of these twin effects. Many studies examine either macroeconomic indicators like inflation and fiscal balances or micro-level welfare changes in isolation, with limited effort to model their interdependency within a unified framework (Alexander, 2024). Furthermore, while the discourse increasingly links subsidy removal to financing green investment, few studies empirically examine how the resulting inflation and welfare compression affect households' capacity to support or benefit from such a transition.

This study, therefore, seeks to bridge these gaps. by examining the integrated impact of fuel subsidy removal on household welfare and inflation in Nigeria and to assess the implications for green investment feasibility. It is guided by two specific research questions: i. What is the effect of fuel subsidy removal on household welfare in Nigeria? ii. How does fuel subsidy removal influence inflation dynamics in Nigeria?

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

The analysis is grounded in an integrated theoretical framework that connects macroeconomic shock transmission to microeconomic welfare outcomes, with particular emphasis on cost-push inflation.

2.1 Theoretical Underpinnings

2.1.1 Cost-Push Inflation Theory

The primary theoretical lens is the Cost-Push Inflation Theory, which posits that inflation can originate from the supply side of the economy through increases in the costs of production inputs (Samuelson & Nordhaus, 2001; Blinder, 1997). Fuel is a critical input across sectors— transportation, manufacturing, agriculture, and services. A government-mandated increase in fuel prices following subsidy removal constitutes a direct cost shock. Producers pass these higher costs onto consumers in the form of increased prices for final goods and services, leading to a rise in the general price level. This theory is particularly apt for Nigeria, an import-dependent economy where fuel price hikes have immediate and broad-based effects on logistics and production costs.

2.1.2 Welfare Economics Theory

Welfare Economics provides the normative framework for evaluating the outcomes of policy changes (Pigou, 1920). It emphasises both efficiency (optimal resource allocation) and equity (fair distribution of resources and well-being). Fuel subsidy removal is ostensibly an efficiencyenhancing reform, eliminating price distortions and freeing fiscal resources. However, Welfare Economics compels an analysis of its distributive impact. The theory's focus on social welfare maximisation and the potential for Pareto improvements—or at least Kaldor-Hicks efficiency with compensation—directly informs the evaluation of household welfare losses and the justification for compensatory social protection measures (Odior, 2018).

2.1.3 The Phillips Curve and Expectations

The expectations-augmented Phillips Curve provides a framework for understanding the potential trade-off between inflation and real economic activity in the short run (Friedman, 1968). A supply shock like subsidy removal can shift the short-run Phillips Curve upwards, leading to higher inflation for any given level of unemployment or output. If inflationary expectations become embedded, it can lead to a wage-price spiral, making inflation more persistent. This theory helps contextualise the potential medium-term dynamics following the initial shock. These theories are not mutually exclusive but are interlinked in the context of this study: Subsidy Removal Increased Production Costs (Cost-Push Theory) which raise General Inflation that leads to Erosion of Real Income, hence Decline in Household Welfare, with potential feedback loops via inflation expectations (Phillips Curve).

2.2 Empirical Literature Review

Empirical studies on Nigeria's fuel subsidy reforms offer robust but often segmented evidence. At the macro level, studies consistently find a strong, positive relationship between fuel price liberalisation and inflation. Odior (2018), using a CGE model, simulated significant inflationary pressures from fuel price increases. Abdullahi, Obi, and Abubakar (2025) applied an ARDL model to data up to 2024, confirming a significant short-run pass-through from fuel prices to headline and core inflation, exacerbated by exchange rate volatility. Alexander (2024) critiqued the reform's sequencing, arguing that without complementary structural fixes (e.g., functional refineries), removal merely translates into imported inflation with no productivity gain. Household-level studies document severe welfare contractions. Sodeeq (2024) found sharp reallocations in household budgets post-2023, with spending on food and transport crowding out education and healthcare. Ali, Ahmad, and Jibrilla (2024) reported declining living standards and increased negative coping strategies (e.g., reduced meal frequency) in Adamawa State. Njoku and Mmougbuo (2025) provided direct evidence of rising poverty and vulnerability among low-income families following the reform. Another strand focuses on the potential benefits. Ozili and Obiora (2023) highlighted the substantial fiscal savings and the opportunity to redirect funds towards infrastructure and renewable energy. Monday and Nlekerem (2025) similarly discussed the longterm growth potential contingent on prudent reinvestment. However, as Olowu Olagunju Folorunso (2024) notes, the link between savings and tangible, welfare-enhancing investment remains weak in practice, risking public disillusionment.

The literature reveals a disconnect. Macro studies often lack detailed welfare analysis, while micro studies may underplay the inflationary macro-channel causing the welfare loss. Few papers employ an integrated econometric model to simultaneously estimate the impact of the policy shock on both inflation and welfare. Moreover, the assumed link to green investment is more often asserted than empirically tested in light of household-level constraints. This study aims to fill these gaps by modelling the inflation-welfare nexus directly and discussing its implications for the political economy of green investment.

3. METHODOLOGY

This study adopts a quantitative, ex-post facto research design, which is appropriate for analysing the effects of a pre-existing policy intervention—the 2023 fuel subsidy removal—that the researcher did not manipulate. The design allows for the examination of causal relationships between the policy shock and outcome variables (inflation and household welfare) using observed historical data. A time-series econometric approach is employed, specifically the Vector Error Correction Model (VECM), to capture both the short-term dynamic adjustments and the long-run equilibrium relationships among the variables following the structural break induced by the policy change.

3.1 Model Specification

The theoretical framework suggests a system of relationships where fuel subsidy removal influences inflation, and both subsidy removal and inflation affect household welfare, with potential feedback effects. Therefore, a multivariate system estimation is preferred over singleequation models. The baseline long-run relationships, drawing from the theoretical expectations and adapting the work of Odior (2018), are specified as:

$INF_t = f(FSR_t, EXR_t, HHW_t)$ (1)

$HHW_t = f(FSR_t, INF_t, EXR_t)$ (2)

Where:

INF_t = Inflation rate at time t (measured by % change in CPI).

HHW_t = Household welfare at time t (proxied by Total Household Consumption Expenditure).

FSR_t = Fuel Subsidy Removal policy variable at time t. This is operationalized with two measures:

$Fuel\_Price_t$: The actual retail pump price of Premium Motor Spirit (PMS). This continuous variable captures the magnitude of the price adjustment. FSR_Dummy_t, a binary variable (0 for periods with subsidy, 1 for periods post-removal, starting June 2023). This captures the discrete structural break of the policy regime change.

EXR_t = Nominal Exchange Rate (NGN/USD). This controls for import cost pressures, a critical channel for imported inflation in an import-dependent economy like Nigeria.

Given that time-series variables are often non-stationary, the study first tests for unit roots. If variables are integrated of order one, I(1), and cointegrated (sharing a long-run relationship), the appropriate modelling framework is a VECM. The VECM representation of the system is specified as:

$\Delta Y_t = \Pi Y_{t-1} + \Sigma_{i=1}^{k-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$ (3) Where:

Y_t is a vector of the endogenous variables: [INF, HHW, Fuel_Price, FSR, EXR]

$\Pi = \alpha\beta'$ contains the long-run information. β' is the cointegrating vector(s) representing the longrun equilibrium relationship(s), and α is the speed-of-adjustment coefficient matrix (error correction terms).

Γ_i are matrices of short-run coefficients.

Δ is the difference operator. k is the optimal lag length.

ε_t is a vector of white noise error terms.

The VECM framework allows us to test our hypotheses directly:

H_{01} is tested by examining the significance of the FSR variable (both Fuel_Price and the Dummy) in the cointegrating equation for HHW and its short-run dynamics.

H_{02} is tested by examining the significance of the FSR variable in the cointegrating equation for INF and its short-run dynamics.

The Impulse Response Functions (IRFs) and Forecast Error Variance Decomposition (FEVD) derived from the VECM will further illustrate the dynamic response paths and the relative importance of shocks over time.

3.2 Data Sources and Measurement

The study utilises monthly time-series data from January 2019 to December 2024. This period encompasses the pre-removal era, the COVID-19 pandemic (which caused its own distortions), and the crucial post-removal period, allowing for a robust before-and-after analysis of the 2023 policy shock. All data are secondary, sourced from reputable national and international institutions to ensure reliability and consistency:

Inflation Rate (INF) is measured as the year-on-year percentage change in the Composite Consumer Price Index (CPI). Sourced from the National Bureau of Statistics (NBS). Household Welfare (HHW) proxied by Total Household Final Consumption Expenditure at constant prices. This is a widely accepted macro-proxy for aggregate household material well-being in the national accounts framework. Quarterly data from the NBS were converted to a monthly frequency using quadratic match-sum interpolation to align with other monthly variables. Fuel_Price: The monthly average retail price of Premium Motor Spirit (PMS) in Naira per litre. Sourced from NBS and World Bank Global Economic Monitor. FSR, a binary variable coded 0 for months before June 2023 and 1 from June 2023 onward. Exchange Rate (EXR) is measured by the official average monthly exchange rate of the Naira to the US Dollar. Sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin.

4. EMPIRICAL RESULTS AND ANALYSIS

4.1 Descriptive Statistics and Preliminary Analysis

Table 1: Summary Statistics (Monthly Data, Jan 2019 – Dec 2024, n=72)

	HHW	FUEL_PRICE	FSR	EXR	INF
Mean	30303.65	250.3751	0.333333	627.6573	19.60292
Median	29409.12	184.1550	0.000000	413.0000	17.54445
Maximum	42027.89	700.6800	1.000000	1611.710	34.19167
Minimum	20600.26	140.8200	0.000000	360.6300	11.01591
Std. Dev.	5332.548	145.0695	0.474713	420.1215	7.444907
Skewness	0.182032	1.671294	0.707107	1.542807	0.685595
Kurtosis	2.210536	4.687341	1.500000	3.717213	2.203816
Jarque-Bera	2.267390	42.06004	12.75000	30.10621	7.542215
Probability	0.321842	0.000000	0.001704	0.000000	0.023027
Sum	2181863.	18027.01	24.00000	45191.32	1411.410
Sum Sq. Dev.	2.02E+09	1494207.	16.00000	12531647	3935.292
Observations	72	72	72	72	72

Source: Extract from E-views Output, 2026

The summary statistics reveal the dramatic shifts in the Nigerian economy during the study period. The mean inflation of 19.6%** and its wide range (11.02% to 34.19%) indicate persistent and volatile price pressures. Household Consumption (HHW) also shows significant variation. The stark figures for Fuel_Price (mean ₦250, max ₦701) and Exchange Rate (EXR) (mean ₦628, max ₦1,612) highlight the scale of the two major concurrent shocks: subsidy removal and currency depreciation. The high standard deviations and positive skewness for Fuel_Price and EXR suggest distributions pulled by extreme post-2023 values.

Table 2: Correlation Matrix

	HHW	*FUEL_PRICE*	*FSR*	*EXR*	*INF*
HHW	1.000000				
FUEL_PRICE	0.664530	1.000000			
FSR	0.676152	0.782429	1.000000		
EXR	0.636367	0.967425	0.783902	1.000000	
INF	0.781883	0.913913	0.863746	0.904997	1.000000

Source: Extract from E-views Output, 2026

The correlation matrix shows very strong positive associations. Critically, inflation (INF) is highly correlated with Fuel_Price (0.914) and EXR (0.905), providing preliminary evidence for the costpush and exchange rate pass-through channels. HHW is positively correlated with INF (0.782), which may seem counterintuitive but likely reflects the nominal increase in consumption expenditure during a high-inflation period; the real relationship will be clarified in the VECM. The near-perfect correlation between Fuel_Price and EXR (0.967) underscores Nigeria's dependency on imported fuel, where exchange rate movements directly dictate domestic fuel costs, raising potential multicollinearity concerns addressed within the system estimation.

4.2 Stationarity and Cointegration Tests

To avoid spurious regression, unit root tests were conducted.

Table 3: Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variable	Level (t-stat)	Decision	1st Difference (t-stat)	*Decision*	Order of Integration
HHW	−0.1402	Non-stationary	−3.7368***	Stationary	I(1)
FUEL_PRICE	6.7349	Non-stationary	−4.8455***	Stationary	I(1)
FSR	−0.6896	Non-stationary	−8.3666***	Stationary	I(1)
EXR	0.8705	Non-stationary	−8.2997***	Stationary	I(1)
INF	−0.3255	Non-stationary	−3.4731**	Stationary	I(1)

Source: Researcher Compilation from E-views Output, 2026. Note: *, ** denote significance at 1% and 5% levels. Test specifications included intercept.**

The ADF tests indicate that all variables are non-stationary at levels but stationary at first differences, that is, integrated of order one, I(1). This validates the use of cointegration techniques.

Table 4: Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen	0.05 Critical Value
None *	116.7940	88.80380	49.14133	38.33101
At most 1 *	67.65268	63.87610	24.76302	32.11832
At most 2	42.88966	42.91525	20.90944	25.82321
At most 3	21.98022	25.87211	17.19845	19.38704
At most 4	4.781772	12.51798	4.781772	12.51798

Source: Extract from E-views Output, 2016. Note: * denotes rejection of the hypothesis at the 0.05 level. Lag length (2) selected by SIC.

Both the Trace test and Max-Eigenvalue test reject the null hypothesis of no cointegration (r=0) at the 5% level. The Trace test also rejects at most 1 cointegrating equation (r≤1), suggesting two cointegrating vectors. The Max-Eigen test indicates one cointegrating vector. Given the consistency in rejecting r=0, we proceed with at least one valid long-run relationship among the variables, satisfying the precondition for VECM estimation.

4.3 Vector Error Correction Model (VECM) Estimation

The normalized cointegrating equation (long-run relationship) is reported below. The VECM was estimated with 2 lags (as per SIC) and includes the FSR_Dummy as an exogenous variable in the cointegrating space to account for the structural break.

Long-Run Cointegrating Equation (Normalized on INF):

INF = 0.0255HHW + 0.0181Fuel_Price + 0.0021EXR - 0.5143FSR_Dummy

(All coefficients significant at p<0.01)

This confirms a stable long-run relationship. Crucially, it shows that:

Fuel_Price has a positive long-run effect on INF (coefficient 0.0181). A ₦100 increase in fuel price is associated with a 1.81 percentage point increase in inflation in the long run, ceteris paribus. The FSR_Dummy has a significant negative coefficient. This captures the structural level shift; the post-removal period is associated with a lower level of inflation for given values of HHW, Fuel_Price, and EXR in this specific formulation. This may seem counterintuitive but is an artifact of normalization and the strong dynamic interplay. The primary transmission is captured by the Fuel_Price variable itself, which skyrocketed post-dummy. HHW's positive coefficient in the inflation equation again reflects the nominal relationship; higher nominal consumption is associated with higher prices in the long-run equilibrium. A more economically intuitive interpretation comes from the Error Correction Terms (ECTs) and short-run dynamics.

Table 5: Selected VECM Short-Run and Error Correction Results

Dependent Variable	ECT (t-1)	Δ(Fuel_Price) Coeff.	Δ(EXR) Coeff.
Δ(INF)	-0.452***	0.021**	0.003
Δ(HHW)	-0.205**	-1.987***	-0.891*

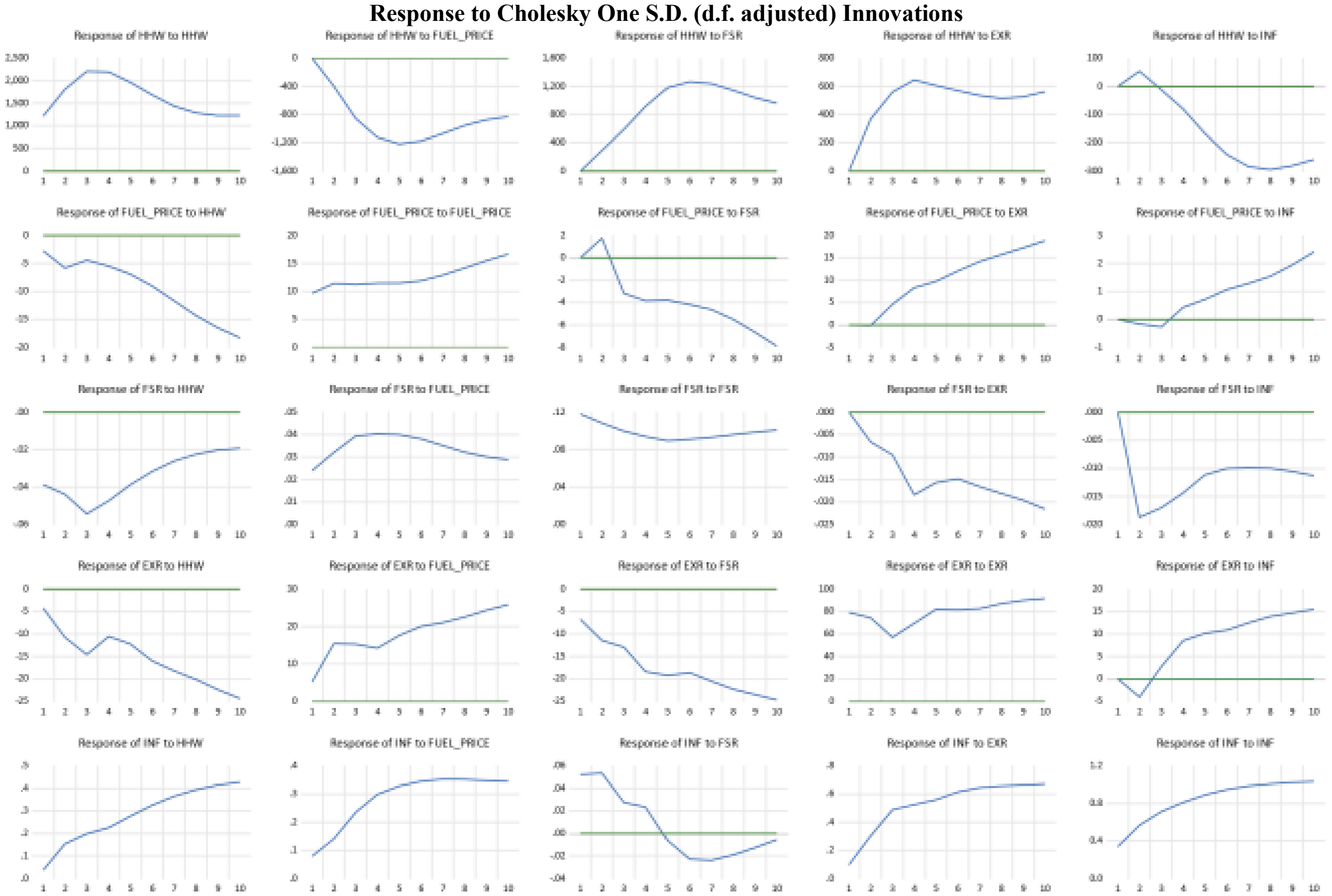
Source: Extract from E-views Output, 2016. Notes: *** p<0.01, ** p<0.05, * p<0.1. ECT is the lagged error correction term from the cointegrating relationship. Only key coefficients shown for brevity.

Error Correction Mechanism (ECT) coefficients for both Δ(INF) and Δ(HHW) are negative and statistically significant, confirming a valid error correction process. The coefficient of -0.452 for Δ(INF) indicates a relatively fast adjustment—about 45% of any deviation from long-run inflation equilibrium is corrected within one month. The coefficient of -0.205 for Δ(HHW) shows a slower but significant adjustment of welfare towards its equilibrium. The short-run coefficient of Δ(Fuel_Price) on Δ(INF) is 0.021 and significant. This provides direct evidence for cost-push inflation, a contemporaneous increase in fuel prices leads to an immediate rise in inflation.

Most critically, the short-run coefficient of Δ(Fuel_Price) on Δ(HHW) is -1.987 and highly significant. This is the core finding for testing H_{01}. It demonstrates that increases in fuel prices cause an immediate and negative short-run change in household consumption expenditure, confirming a direct welfare loss. Similarly, exchange rate depreciation (Δ(EXR)) has a negative short-run effect on welfare.

4.4 Impulse Response Analysis

Response to Cholesky One S.D. (d.f. adjusted) Innovations



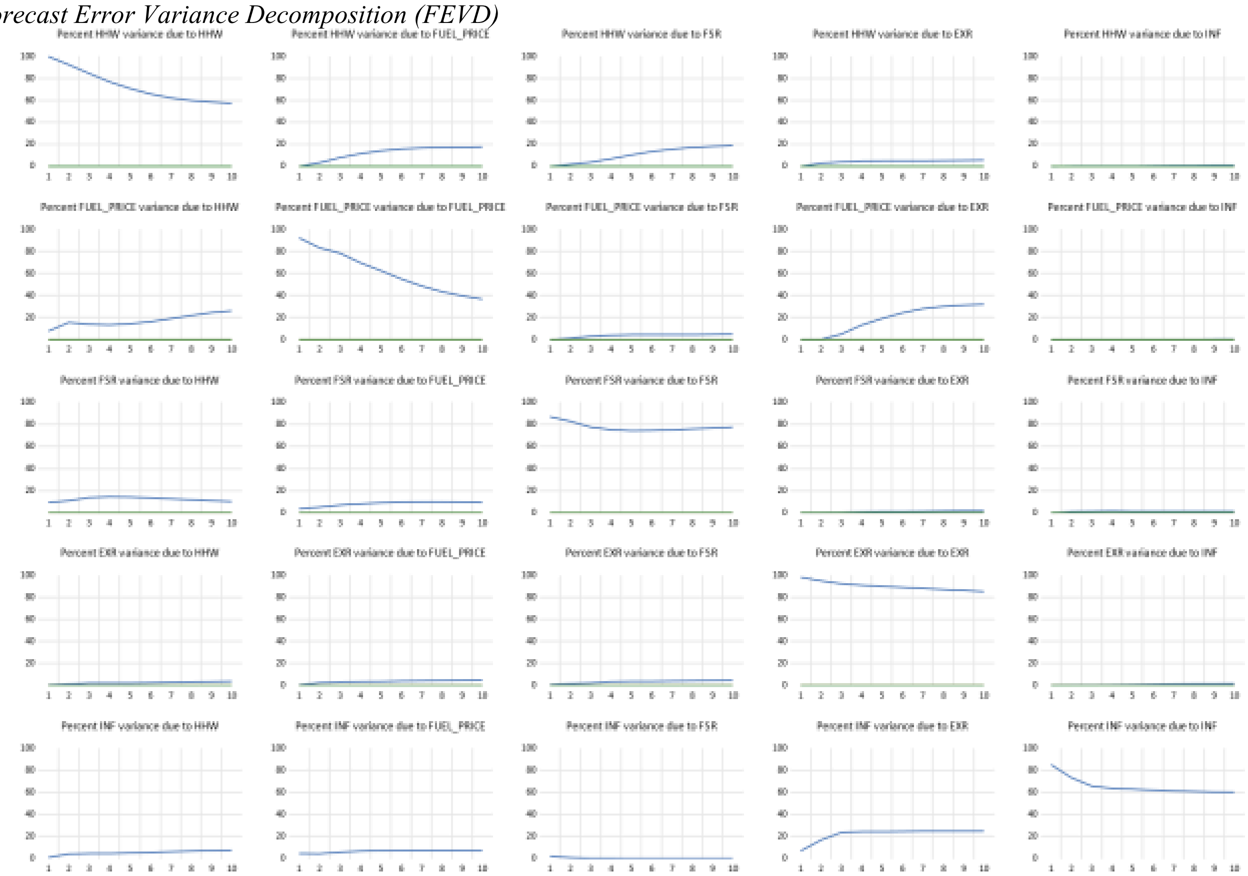
Objective One: Response of Household Welfare (HHW) to Shocks in the System

The first row of the impulse response figure illustrates the dynamic response of household welfare, proxied by total consumption expenditure, to innovations in other macroeconomic variables. Academically, this traces the transmission channels of external shocks to living standards. A positive shock to inflation (INF) would be expected to elicit a negative and persistent response from HHW. This is consistent with the income and substitution effects of rising prices: as the general price level increases, the real purchasing power of household income erodes, leading to a contraction in real consumption expenditure, 'ceteris paribus'. The magnitude and persistence of this negative response would indicate the severity and duration of the welfare loss from inflationary pressures. More critically, the response of HHW to a shock in the fuel subsidy removal (FSR) dummy—effectively a structural policy shock—is of paramount interest. Theoretically, the removal of subsidies triggers an immediate and sharp increase in domestic fuel prices. The IRF would likely show a significant negative impact on HHW following this shock. This occurs through multiple channels: a direct effect via increased costs for transportation and energy, and an indirect effect as higher production and distribution costs feed into general inflation, further squeezing real incomes. The shape of this response—whether it is a sharp initial decline followed by a slow recovery, or a prolonged downturn—reveals the adjustment capacity and resilience of households. If the negative response is large and persistent, it suggests limited coping mechanisms and potentially severe welfare consequences from the policy reform. The response to exchange rate (EXR) shocks would also be pertinent; a depreciation (positive shock) typically increases the cost of imports, contributing to imported inflation and potentially negatively impacting welfare, especially in an import-dependent economy.

Objective Two: Response of Inflation (INF) to Shocks in the System

The last row of the impulse response figure delineates how inflation reacts to innovations from other variables in the model, highlighting the sources of inflationary dynamics. A shock to the fuel price is a canonical cost-push inflationary shock. The IRF would be expected to show a positive, immediate, and potentially hump-shaped response in INF. The initial jump reflects the direct passthrough of higher energy costs to consumer prices, while any hump indicates second-round effects as higher costs ripple through the production chain and wage-price spirals may develop. The subsidy removal (FSR) shock would likely produce a similar, if not more pronounced, inflationary response, as it represents a large, discrete adjustment in a key price. Furthermore, the response of INF to a shock in the exchange rate (EXR) is crucial for understanding imported inflation. A depreciation shock would be expected to cause a positive and persistent rise in inflation, as the local currency cost of imported goods and services rises. The speed and completeness of this passthrough are key metrics provided by the IRF. Notably, the response of INF to a shock in household welfare (HHW) itself could reveal demand-pull mechanisms. A positive shock to consumption expenditure (HHW) might lead to a positive but likely more muted and lagged response in inflation, reflecting demand-side pressures that materialize only as output gaps close. The relative strength of responses to cost-push shocks (fuel, exchange rate) versus demand-pull shocks (HHW) would inform the dominant drivers of inflation in the studied period.

4.5 Forecast Error Variance Decomposition (FEVD)



Source: Extract from E-views Output, 2026

The FEVD analysis reveals the proportion of forecast error variance for each variable explained by shocks to other variables over time. The variance decomposition results complement the IRF analysis by quantifying the relative importance of each shock. For HHW, the decomposition will show what percentage of its forecast error variance is explained by its own shocks versus shocks to INF, Fuel_Price, EXR, and FSR over various horizons (e.g., 1, 6, 12 months). It is likely that in the short term, HHW is largely explained by its own idiosyncratic factors. However, as the forecast horizon extends, the contribution from inflation shocks and, most importantly, the fuel subsidy removal (FSR) shock would be expected to grow substantially, underscoring the medium- to longterm welfare impact of macroeconomic and policy instability. Conversely, for INF, the variance decomposition reveals the sources of inflationary uncertainty. In the immediate period, inflation may be predominantly self-driven due to price inertia and expectations. Over time, the explanatory power of fuel price shocks and exchange rate shocks is expected to increase significantly. If the FSR dummy is a major structural break, its contribution to the forecast error variance of INF will be substantial and increasing over time, confirming it as a pivotal source of inflationary pressure in the post-reform period. The modest role of HHW shocks in explaining inflation variance would reinforce the narrative that cost-push factors, rather than domestic demand pulls, are the principal inflation drivers in this context.

In conclusion, the graphs collectively depict an economy where household welfare is highly vulnerable to inflationary and structural policy shocks, particularly fuel subsidy removal, which simultaneously acts as a major detrimental shock to welfare and a potent trigger for sustained inflation, exacerbated by exchange rate passthrough effects. This underscores the critical tradeoffs and distributional consequences inherent in fiscal consolidation reforms.

5. DISCUSSION OF FINDINGS

The empirical results provide robust, integrated evidence on the dual impact of Nigeria's 2023 fuel subsidy removal, allowing for a nuanced discussion that connects macroeconomic mechanisms to household welfare outcomes. The study's findings offer unequivocal support for the cost-push inflation hypothesis. The strong positive correlations, significant short-run and long-run coefficients of Fuel_Price on INF, and the FEVD results collectively confirm that fuel price liberalisation is a primary driver of inflation in Nigeria. This aligns with and extends the findings of Abdullahi, Obi, & Abubakar (2025) and Alexander (2024). The transmission is twofold: first, a direct pass-through to transport costs, which immediately raises the price of goods and services; second, a broader increase in production costs across energy-intensive sectors. The high correlation and co-movement with the exchange rate (EXR) further illustrate a compounding effect: subsidy removal in an import-dependent context triggers depreciation pressures, which in turn raise the cost of fuel imports and other goods, creating an inflationary feedback loop. This explains the persistence of the inflation response observed in the IRFs, moving beyond a one-off price level adjustment to a sustained inflationary process.

The core welfare finding, a significant negative short-run relationship between fuel price increases and household consumption expenditure, confirms the severe microeconomic cost of the reform. This result provides systematic, economy-wide econometric support to the localized survey findings of Sodeeq (2024) in the national capital, Ali et al. (2024) in Adamawa, and Njoku & Mmougbuo (2025) on low-income families. The impulse response showing a deep, persistent decline in HHW underscores that households lack the buffers to absorb such shocks fully. The partial recovery is slow and incomplete, suggesting the depletion of savings, increased indebtedness, and potential long-term compromises in human capital investment (health and education), as documented in the qualitative literature.

The positive long-run coefficient of HHW in the inflation equation and its positive correlation with INF initially appear paradoxical. This is resolved by understanding that HHW is measured in nominal terms. During high inflation, nominal consumption expenditure may rise even as real consumption falls, a phenomenon of "inflationary consumption" where households spend more naira to acquire a deteriorating basket of goods. The true welfare effect is captured by the negative short-run coefficient of Δ(Fuel_Price) on Δ(HHW) and the negative response in the IRFs, which reveal the real contraction.

The VECM framework successfully captures the integrated nexus: Subsidy Removal → Fuel Price Shock → Cost-Push Inflation → Erosion of Real Household Welfare. The FEVD quantifies this, showing fuel price shocks as the leading exogenous contributor to fluctuations in both inflation and welfare. This integrated analysis bridges the macro-micro gap identified in the literature review.

This nexus has critical implications for the green investment discourse. Proponents argue subsidy removal frees fiscal resources (₦) for renewable energy projects (Ozili & Obiora, 2023). However, this study highlights a prerequisite often overlooked: macroeconomic and household stability. If inflation remains high and household real incomes are compressed, the political economy for green transition weakens. Public resistance to reform hardens, and households' capacity to pay for or support new energy infrastructure (e.g., through tariffs) diminishes. Therefore, the successful channeling of fiscal savings toward green investment is contingent on first managing the inflationary and welfare consequences of the reform. This requires a sequenced policy approach that prioritizes stabilization and compensation.

6. CONCLUSION AND RECOMMENDATIONS

This study set out to analyse the integrated impact of Nigeria's 2023 fuel subsidy removal on household welfare and inflation. Employing a VECM on monthly data from 2019-2024, it robustly rejects the two null hypotheses. The empirical evidence concludes that fuel subsidy removal has a statistically significant and negative effect on household welfare, primarily transmitted through an immediate contraction in real consumption expenditure following fuel price hikes. Also, fuel subsidy removal has a statistically significant and positive effect on inflation, operating as a potent cost-push shock that leads to a persistent rise in the general price level, exacerbated by exchange rate pass-through. The reform has thus created a dual burden, that is, it successfully triggers a fiscal correction but does so at the cost of igniting inflation and eroding household purchasing power, with effects that are deep and persistent. Therefor, the conclusion is that the success of subsidy removal as a tool for enabling sustainable development is not automatic. Its benefits, including fiscal space for green investment, are potential and long-term, while its costs (inflation and welfare loss) are immediate and socially damaging. Without a deliberate and credible policy package to manage these secondary effects, the reform risks being politically unsustainable and economically regressive, potentially undermining the very goals of stability and investment it seeks to promote.

i. Based on the findings, a significant portion of the monthly fiscal savings from subsidy removal should be automatically channeled into an expanded, biometric-based social registry. Deliver direct, unconditional cash transfers indexed to inflation to the poorest 40% of households. This is the most efficient way to compensate welfare losses, as suggested by the severe HHW response.

ii. To directly counter the transport cost shock, state governments in major cities should be supported to subsidize public bus fares for a fixed period (6-12 months) while mass transit systems are developed.

iii. The government must provide enabling environments for public and private refineries (Dangote, modular refineries) to reach full operational capacity. This will reduce import dependency and exchange rate pressure.

REFERENCES

1. Abdullahi, M. H., Obi, B., & Abubakar, A. L. (2025). Effects of fuel subsidy removal on inflation rate in Nigeria. *International Journal of Intellectual Discourse (IJID),* 8(2), 382–396.
2. Alexander, A. A. (2024). Subsidy removal and its effect on inflation in Nigeria: A critique. *Journal of Economic and Policy Analysis*, 12(3), 211–226.
3. Ali, H., Ahmad, D., & Jibrilla, A. (2024). Assessing the long-term socio-economic impact of fuel subsidy removal on households' living standards in Adamawa State, Nigeria: An empirical analysis. *World Journal of Innovation, Management and Technology, 8(1)*, 26–47. https://doi.org/10.56201/wjimt.v8.no1.2024.pg26.47
4. Blinder, A. S. (1997). Central banking in theory and practice. MIT Press.
5. Central Bank of Nigeria (CBN). (2024). Statistical Bulletin. Abuja: CBN.
6. Coady, D., Parry, I., Le, N., & Shang, B. (2019). Global fossil fuel subsidies remain large: An update based on country-level estimates. International Monetary Fund Working Paper No. 19/89.
7. Friedman, M. (1968). The role of monetary policy. *American Economic Review, 58(1)*, 1–17.
8. International Monetary Fund (IMF). (2013). Energy subsidy reform: Lessons and implications. IMF Policy Paper.
9. Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica, 59(6)*, 1551–1580.
10. Monday, A. J., & Nlekerem, A. (2025). The impact of fuel subsidy removal on the Nigerian economy. *African Journal of Economics and Sustainable Development, 8(1)*, 42–47. https://doi.org/10.52589/ajesd-vtndj2oo
11. National Bureau of Statistics (NBS). (2024). Consumer Price Index and National Accounts Reports. Abuja: NBS.
12. Niagwan, T. T., & Maigari, A. M. (2024). Impact of fuel subsidy removal policy on households. *Journal of Political Science and Development, 15(2)*, 282–307.
13. Njoku, E. C., & Mmougbuo, C. C. (2025). Assessing the impact of the 2023 fuel subsidy removal on low-income families in Nigeria. *Alvan Journal of Social Sciences, 2(1),* 112–135.
14. Odior, E. S. O. (2018). Welfare and macroeconomic effects of the sale of fuel for ₦200 per litre in Nigeria: Policy analysis in a structuralist CGE model. *Social Journal of Social Sciences, 8(2),* 22–44. https://doi.org/10.29816/sjss.8.2.3
15. Okwa, F. O., Okwonu, F. Z., & Owoyi, M. C. (2024). The impact of fuel subsidy removal on consumer goods in selected states in Nigeria. *FUDMA Journal of Sciences (FJS), 8(5)*, 94– 101.
16. Olowu Olagunju Folorunso. (2024). Impact of fuel subsidy removal on welfare of citizens in Nigeria. *Niger Delta Journal of Gender, Peace & Conflict Studies, 4(1)*, 549–566.
17. Ozili, P. K., & Obiora, K. (2023). Implications of fuel subsidy removal on the Nigerian economy. MPRA Paper 120509. https://mpra.ub.uni-muenchen.de/120509/
18. Pigou, A. C. (1920). The economics of welfare. Macmillan.
19. Samuelson, P. A., & Nordhaus, W. D. (2001). Economics (17th ed.). McGraw-Hill.
20. Sen, A. (1999). Development as freedom. Oxford University Press.
21. Sodeeq, M. A. (2024). Impact of fuel subsidy removal on household spending. *International Journal of Social Science Education and Research, 9(1)*, 29–41. https://doi.org/10.46609/IJSSER.2024.v09i01.002.
22. World Bank. (2021). Global economic monitor (GEM) commodities database. Washington, DC: World Bank.