REDESIGNING THE EXCISE TAX SYSTEM IN KENYA: TAXATION OF PETROLEUM PRODUCTS

Simon Basescu
Rose Ngugi
Alex Oguso
Nathan Remcho
Zainabu Rono

Working Paper GOK-AERC-UCPH-DERG-009

CONSORTIUM POUR LA RECHERCHE ÉCONOMIQUE EN AFRIQUE

Bringing Rigour and Evidence to Economic Policy Making in Africa

REDESIGNING THE EXCISE TAX SYSTEM IN KENYA: TAXATION OF PETROLEUM PRODUCTS

Simon Basescu
Research Assistant, DERG Copenhagen, Denmark

Rose Ngugi
AERC Fellow Nairobi, Kenya

Alex Oguso
Research Economist, KRA Nairobi, Kenya

Nathan Remcho
Research Assistant, DERG Copenhagen, Denmark

Zainabu Rono
Policy Analyst, KIPPRA Nairobi, Kenya

AERC Working Paper GOK-AERC-UCPH-DERG-009
African Economic Research Consortium, Nairobi
July 2026

Published by: The African Economic Research Consortium

P.O. Box 62882 - City Square

Nairobi 00200, Kenya

Contents

Abstract

This paper examines the structure, implementation, and socioeconomic impact of petroleum pricing in Kenya, with a particular focus on excise taxation. As a major source of government revenue, the petroleum excise tax plays a critical role in financing public expenditure, while also exerting significant influence on inflation, transportation costs, and broader economic activity. The study begins with a review of Kenya's regulatory framework for petroleum pricing and situates it within a regional context. The paper evaluates how changes to the excise tax affects both government revenues and the differential impact to households across income groups, using data from the Kenya Continuous Household Survey (KCHS). It also presents simulated policy scenarios to explore the trade-offs between fiscal revenue and socioeconomic outcomes. The discussion further considers substitution effects, behavioural responses, and long-term economic and environmental implications. Overall, the findings provide evidence to support the development of petroleum tax policies that are both fiscally sustainable and socially equitable.

1 Introduction

The taxation of petroleum products is a complex and vital component of fiscal and environmental policy. Fuel taxes serve as both a major source of government revenue and as a tool to reduce the social and environmental costs of fossil fuel consumption. Furthermore, fuel prices directly influence the cost of living, industrial productivity, and economic stability. As a result, the taxation of petroleum products must strike a balance between revenue generation, economic growth, cost of living, and other externalities.

This study focuses on the taxation of petrol (motor gas) – primarily used for private transportation – and diesel, which is used in commercial and passenger transport as well as for industrial inputs in the agriculture and manufacturing sectors. These products constitute approximately 75% of all domestic petroleum fuel consumption in Kenya and are integral to many levels of the economy (KNBS, 2023b).

While levying taxes on these petroleum products is relatively easy from an administrative perspective and is effective in raising government revenues, it also impacts prices across numerous economic sectors. This leads to varied effects on inflation, the cost of living, and industrial productivity, which should be considered when setting tax policy. It is difficult to glean the exact relationship between fuel prices and various economic activities in Kenya or abroad due to price variation, policy changes, international political trends, and other factors. However, we can, by simulating specific relationships between the price of fuels and the price of goods, see how different policy changes may affect the Kenyan economy in the short run.

We aim to inform decisions surrounding the excise tax policy in Kenya by using a balanced, data-driven approach that considers both short-term economic realities and long-term sustainability and economic goals. Considering the Medium-Term Revenue Strategy (MTRS), Kenya Vision 2030, and socio-economic dynamics, we take a holistic approach to the analysis of petroleum taxation in Kenya. We focus on the effects of price changes, with the acknowledgement that the excise tax is the primary lever through which the government can control domestic prices. Excise tax is identified as the primary lever as the government can justify its modification explicitly for price and externality control measures where other tax types, such as value added tax (VAT) are primarily revenue driven. In this paper, we seek to answer the following questions: *what happens when the excise tax on petrol and diesel is increased?* and *who bears the brunt of the tax burden on these products?*

We begin with a brief literature review, outlining recent developments in research on petroleum taxation and the impacts of petroleum prices on households and the economy. We then focus on the Kenyan context by outlining regulatory frameworks and the current tax policy and price structure of petrol and diesel. Following this, we analyse consumption trends to provide a more detailed welfare and progressivity analysis. We then conduct specific policy simulations regarding changes in excise taxation. We then move to a discussion of our findings as well as other factors that should be considered when it comes to policy changes impacting petroleum prices. Finally, we conclude with a summary, highlighting key considerations for policymakers and laying out key areas for future research.

2 Literature Review

Petroleum prices vary broadly between countries, largely due to contrasting tax structures. When designing tax systems, countries often consider the various impacts of petroleum consumption, including offsetting costs and externalities such as road damage, congestion, and environmental harm caused by fuel consumption. Excise taxes levied on fuel products are aimed explicitly at offsetting these externalities. Taxes on these products also play a role in controlling consumption, generating government revenues, and controlling foreign exchange rates (Gupta & Mahler, 1995). In practice, countries assign different weights and costs to each of these factors, which influence the tax rates they ultimately set.

The economic structure of a country and who bears the burden of fuel taxes also plays a large role in the impact of fuel pricing and taxes. In countries with higher income per capita for example, Dorband et al. (2019) find that the incidence of a carbon tax on CO_2 emissions from fossil fuels tends to be regressive. This is because energy consumption patterns are evenly distributed throughout the population where a large middle class exists. In developing economies, however, partial and general-equilibrium models find that policies that increase fuel prices or remove fuel subsidies are generally progressive (Clements et al., 2003; Coady & Arze del Granado, 2010; Coady et al., 2006; Kpodar & Djiofack, 2010; and Solie & Mu, 2015). In these countries, private car ownership and fuel consumption are concentrated in the high-income segments of the population who then bear more of the burden of fuel taxation. It is important to note, however, that even when fuel taxes are progressive, the impact on the poor may not be negligible as those experiencing acute financial challenges may be less adaptable to changes in the costs of goods.

The progressivity of fuel price increases, then, depends not just on direct consumption but also on broader inflationary effects and impacts on the economy. In South Africa, for example, Meyer (2018) finds that higher fuel prices cause inflation and lowers economic output. Using data spanning 190 countries, Kpodar and Liu (2022) examine the relationship between changes in domestic fuel prices and different categories of the overall consumer price indices (CPI). They find that most of the impact on inflation results from price increases for transport, housing and utilities, and food prices, which account for a combined 70% of household expenditure in developing economies. Additionally, they find that the inflationary impact of fuel price shocks is more persistent in developing economies compared to advanced economies.

The usage of different fuel types and how they impact a country's economy varies greatly. For this reason, it is important to treat petrol and diesel as interrelated but with different consequences for welfare, development, and revenues. In Europe, for example, most countries levy lower taxes on diesel compared to other fuels (Harding, 2014). This reflects the fact that diesel is a more common input in industrial and agricultural activities, making it essential for economic growth. This is further supported by Silva et al. (2022), who, using data from Portugal, find that diesel consumption is closely tied to economic growth. This further encourages separate pricing and taxation structures for diesel and petrol to ensure specific development and emissions goals can be met.

Generally, both petrol and diesel have a low price elasticity of demand in the short- and medium-run (see e.g., Chaiwat & Tangvitoontham, 2014; Díaz & Medlock, 2021; Havranek et al., 2012; Labandeira et al., 2017). Instead, consumption of these fuels is more strongly correlated with income and economic growth (Taghvaee et al., 2023). In Kenya, attempts to calculate the price

elasticity of demand have resulted in varied results. Agwaya and Ochieng (2021) utilize the Almost Ideal Demand System (AIDS) model to calculate the price elasticity of demand for petroleum fuels (Petrol: -0.64; Diesel: -0.67), though their findings are relatively high compared to other literature in countries such as Ghana (see e.g. Adom et al., 2016; Havranek et al., 2012).

The fact that fuels have a low price elasticity of demand renders policies that raise prices relatively ineffective to reduce emissions. When it comes specifically to diesel, Silva et al. (2022) assert that price changes that could stem from tax increases are ineffective on this front. This finding holds true for other fuel types as well (Taghvaee et al., 2023). Bakhat et al. (2017) explore the price elasticity of demand of petrol and diesel in Spain and find that while both are low, they change independently of each other. Specifically, in times of economic crisis, the price elasticity of demand for diesel increased slightly more than for that of petrol, further informing an approach that treats the taxation of these two fuels independently. In a similar vein, Adom et al. (2016) find that diesel and petrol demand are price inelastic in Ghana but that the elasticities between the products do differ. It is essential, then, to consider petrol and diesel consumption and taxation as separate, but related, issues when it comes to tax policy.

3 Regulatory Framework

Kenya's petroleum sector operates under a comprehensive regulatory framework designed to balance consumer protection, economic stability, and national strategic interests. Key institutions such as the Energy and Petroleum Regulatory Authority (EPRA) and Kenya Pipeline Company (KPC), alongside mechanisms like government-to-government supply agreements and a structured tax regime, shape the importation, pricing, and distribution of petrol and diesel. The highly formalized and regulated nature of the sector makes petroleum products relatively easy to tax, providing a reliable revenue stream for the government, though it must be balanced with the need to ensure price stability, protect low-income households, and avoid dampening economic activity through excessive fuel costs. This section outlines the regulatory framework for petrol and diesel in Kenya to contextualize the analysis of taxation and pricing of petrol and diesel in Kenya.

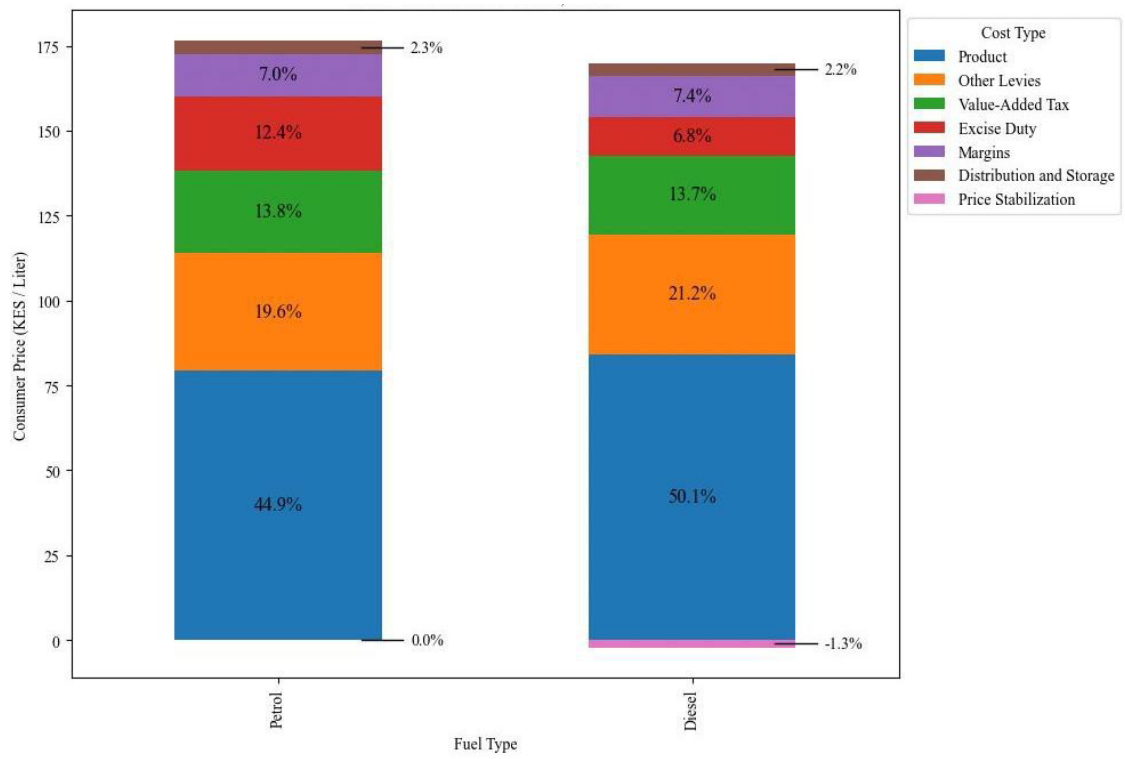
EPRA, established under the Energy Act of 2006 and restructured in 2019, regulates fuel pricing in Kenya to ensure consumer protection and economic stability. The organization determines maximum retail fuel prices monthly using a cost-reflective formula that accounts for global oil prices, freight charges, import fees, transportation costs, and government-imposed levies. Taxes and levies, including excise duty, VAT, and the Petroleum Development Levy, contribute significantly to fuel prices, making up approximately 45% to 50% of retail prices (see Table 3.1 and Figure 3.2). Consumer prices often vary month to month due to changing product costs from fluctuating international oil prices, with any tax or policy changes further affecting the price. As an oil-importing country, Kenya cannot greatly influence international oil prices (reflected in the landing costs), but it can influence domestic prices to the extent that it levies taxes or introduces subsidies on the various products. Some examples of this in recent years include raising the VAT from 8% to 16% in July 2023, as well as increasing the Road Maintenance Levy from 18 KES/L to 25 KES/L in July 2024.

Table 3.1: Petrol and Diesel Taxes and Levies

Tax/Levy	Amount (Per Litre)
Value Added Tax	16%
Excise Duty	KES 21.95 (Petrol); KES 11.37 (Diesel)
Road Maintenance Levy	KES 25 (Petrol); KES 25 (Diesel)
Petroleum Development Levy	KES 5.4 (Petrol); KES 5.4 (Diesel)
Petroleum Regulatory Levy	KES 0.75 (Petrol); KES 0.75 (Diesel)
Railway Development Levy	KES 1.19 (Petrol); KES 1.13 (Diesel)
Merchant Shipping Levy	KES 0.03 (Petrol); KES 0.03 (Diesel)
Import Declaration Fees	3.5%

Source: KRA

Figure 3.2: Petrol and Diesel Price Breakdown (December 2024)



Source: Author's illustration using EPRA (2025) data

EPRA's role extends beyond price-setting to market stabilization, as seen during the 2022 global energy crisis during which they introduced a price stabilization deficit (subsidy) in December 2021 which was halted in April 2023 (see Appendix A.1). These subsidies cushioned consumers from rising international oil prices, though they strained government finances, highlighting the delicate balance between affordability and economic sustainability.

The Kenya Pipeline Company, established in 1973, plays a central role in fuel transportation and storage, ensuring a steady supply of petroleum products across Kenya and neighbouring countries

like Uganda and Rwanda. KPC transports fuel from Mombasa to inland depots in Nairobi, Kisumu, Eldoret, and beyond, reducing reliance on road transport and minimizing costs and environmental risks. It also stores fuel in depots and maintains quality assurance through laboratory testing.

In the recent past, KPC worked closely with Oil Marketing Companies (OMCs) to import petroleum under Kenya's Open Tender System (OTS) to ensure competitive pricing. However, since the beginning of 2024, Kenya has imported fuels via an exclusive government-to-government deal with three Gulf state-owned companies: Saudi Aramco, Abu Dhabi National Oil Company, and Emirates National Oil Company. In this agreement, Kenya imports refined petroleum products on a 180-day credit period. In April 2025, Kenya renewed the contract for two additional years (beginning 2026) and negotiated lower margins. The Government of Kenya cited shortfalls in volumes, instability of international oil prices, and the need to protect foreign reserves of the U.S. dollar as the main reasons for signing the government-to-government trade deal.

4 Regional Analysis

Regulatory Frameworks

Situating Kenya's regulation and taxation of petroleum products amongst other East African countries can provide further evidence to inform future policy. In Tanzania, the Energy and Water Utilities Regulatory Authority (EWURA) sets and publishes cap prices for petroleum products, including petrol, diesel, and kerosene, on both wholesale and retail levels. These prices are determined based on the cost of discharge at Dar es Salaam, Tanga, and Mtwara ports and are published monthly. Tanzania imports all of its petroleum products, using a Bulk Procurement System (BPS) established in 2011 to source petroleum products through a competitive bidding process. The system covers Automotive Gas Oil (AGO), Unleaded Motor Spirit Premium (MSP), Jet A-1, and Illuminating Kerosene (IK). The BPS is regulated under the Petroleum Act 2015, requiring all OMCs to register before participating in the importation process. The Petroleum Bulk Procurement Agency (PBPA) oversees tenders for petroleum imports, ensuring that only pre-qualified suppliers provide products that meet the Standards Act No. 2 of 2009. Under this system, PBPA acts as the importer, purchasing petroleum products from suppliers and selling them to OMCs, preventing direct bulk purchases by individual companies. EWURA plays a critical role in monitoring the security of petroleum supply, ensuring Tanzania maintains a stable supply of essential fuel products for economic growth while enforcing BPS regulations to promote efficiency and market stability.

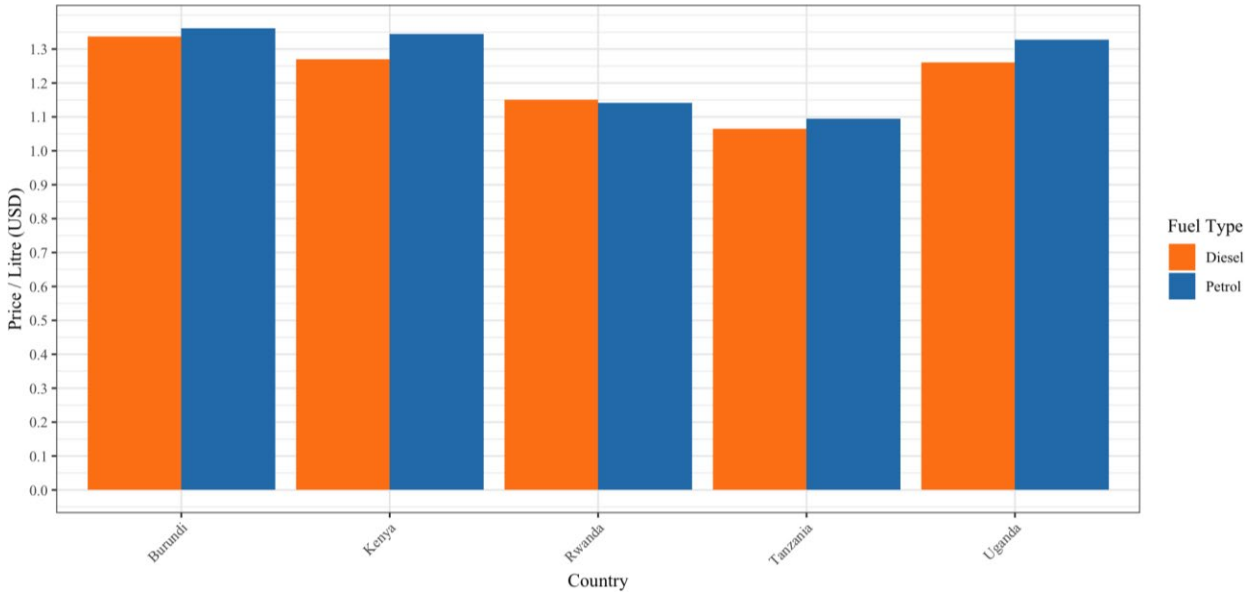
Uganda's petroleum pricing structure operates in a deregulated market, where fuel prices fluctuate based on international oil prices, exchange rates, taxes, and distribution costs. While the government does not directly control prices, it monitors pricing and sets maximum limits to protect consumers from excessive increases. The Ministry of Energy and Mineral Development oversees the sector, including the privatized downstream market, where major oil companies like Shell, Total, CALTEX, and EMPEX dominate. Uganda is highly dependent on imported fuel through Kenya and Tanzania, which can lead to supply disruptions, higher prices, and black markets. Uganda's petroleum regulatory framework is guided by the Petroleum Act of 2013, ensuring efficient resource management, environmental protection, and economic growth. The Petroleum Authority of Uganda (PAU) enforces compliance, promotes cost efficiency, and maximizes government revenue from oil and gas projects.

Rwanda relies mainly on the ports of Mombasa in Kenya and Dar es Salaam in Tanzania to import its fuel needs. The market players are private companies which import products for local distribution and re-export. The regulatory framework is via a Ministerial order, and there are no specific pricing regulations, with pump prices set for Kigali only. In general, when accounting for the import and consumption constraints, the regulation of petroleum products is similar across East Africa.

Pricing Structures and Revenue Performance

Fuel prices across the East African Community (EAC) region consist of several taxes, levies and fees. As Kenya and Tanzania have the main ports of entry for the region, they are expected to have similar pricing considerations (see Appendix A.2). It is worth noting that Tanzania does not levy VAT on fuel, while Kenya levies it at 16%. In contrast, land-locked EAC countries, such as Uganda, Rwanda, and Burundi, must balance their own taxes, levies, and fees with additional costs associated with importation through a secondary port and transport through other countries (primarily Kenya or Tanzania). The taxes, levies, import structures, and transportation costs contribute to varying pump prices across countries in the region, as shown in Figure 4.1.

Figure 4.1: Regional Petroleum Prices (May 2025)



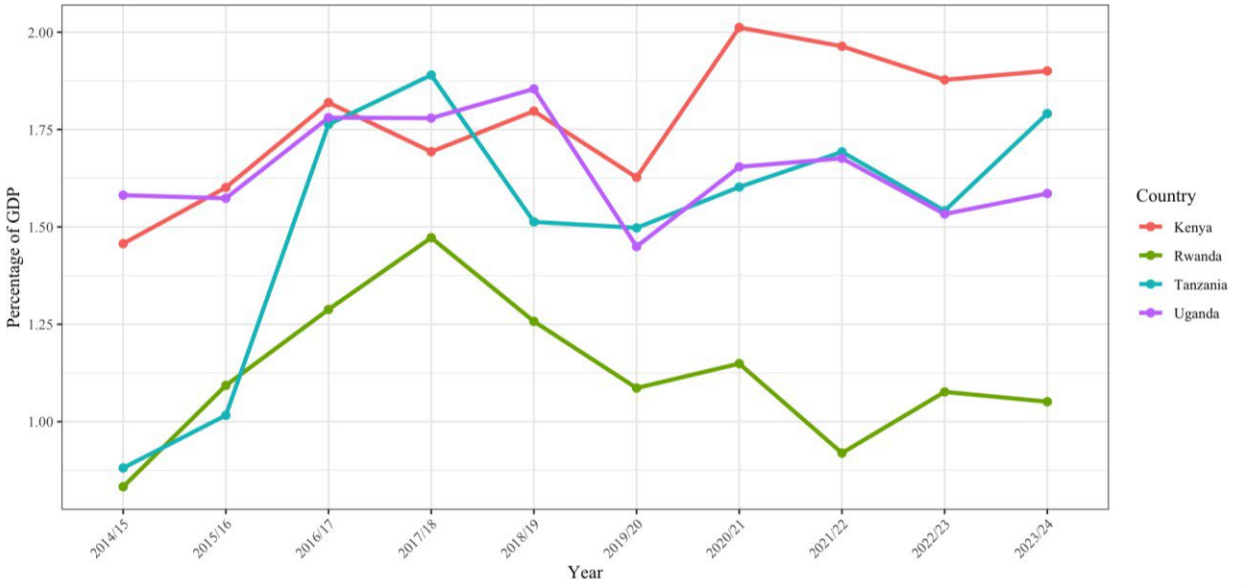
Source: www.globalpetrolprices.com

The regional fuel prices reveal notable differences. Burundi has the highest fuel prices per litre for both petrol ($1.36) and diesel ($1.34), followed closely by Kenya and Uganda. In contrast, Tanzania reports the lowest prices, with petrol at $1.09 and diesel at $1.07. Rwanda's prices fall in the mid-range, though its diesel price slightly exceeds that of petrol—an inversion of the trend seen in most other countries. These variations may reflect differences in fuel taxation, subsidy policies, import logistics, or local supply chain dynamics across the region.

The EAC generally applies specific excise rates on petroleum products.[1] These rates are not subject to international oil price changes and thus help the countries to achieve a consistent revenue based on the consumption volumes of petroleum products. A regional comparison of the excise tax rates as of 2022/23 (see Appendix A.3) shows that the excise rate for petrol in Kenya (KES 21.95) was similar to those of Tanzania and Zanzibar (KES 21.78) and Rwanda (KES 22.32). Meanwhile, Uganda had a higher excise rate at an equivalent of KES 33.60 while Burundi had a lower rate for all fuels, equivalent to KES 11.48. For diesel, the excise rate in Kenya (KES 11.37) is also similar to the rates in Tanzania (KES 12.93) and Zanzibar (KES 11.55). Rwanda had a slightly higher rate of KES 18.30, and Uganda had the highest rate at an equivalent of KES 21.64.

Figure 4.2 compares the performance of taxes on petroleum products between four EAC countries. Revenue from these taxes has constituted a higher average share of Gross Domestic Product (GDP) over the last ten years in Kenya (1.77%) compared to the other countries: Uganda (1.65%), Tanzania (1.52%), and Rwanda (1.12%).

Figure 4.2: Petroleum Taxes as a Percentage of GDP



Source: EARA, 2024

Although the higher petroleum tax to GDP ratio in Kenya may be a sign of strong tax performance in the sector, it could also be explained through broader economic and revenue collection factors. For one, this trend may reflect higher domestic consumption of petroleum products in Kenya compared to other countries which could be tied to infrastructure and development. It may also be indicative of effective enforcement stemming from government regulatory measures or, simply, higher tax rates on certain goods. Regardless, the higher ratio in Kenya indicates that the country is more reliant on taxes collected on these goods than neighbouring countries.

Generally, Kenya is on par in the EAC in terms of revenue collection from petroleum products, collecting over 12% of its total revenue in taxes and levies on petroleum products in FY 2022/23 (EARA, 2024). This is comparable with Tanzania and Uganda and is significantly higher than revenue figures for Rwanda and South Africa. While further analysis of regional trends and

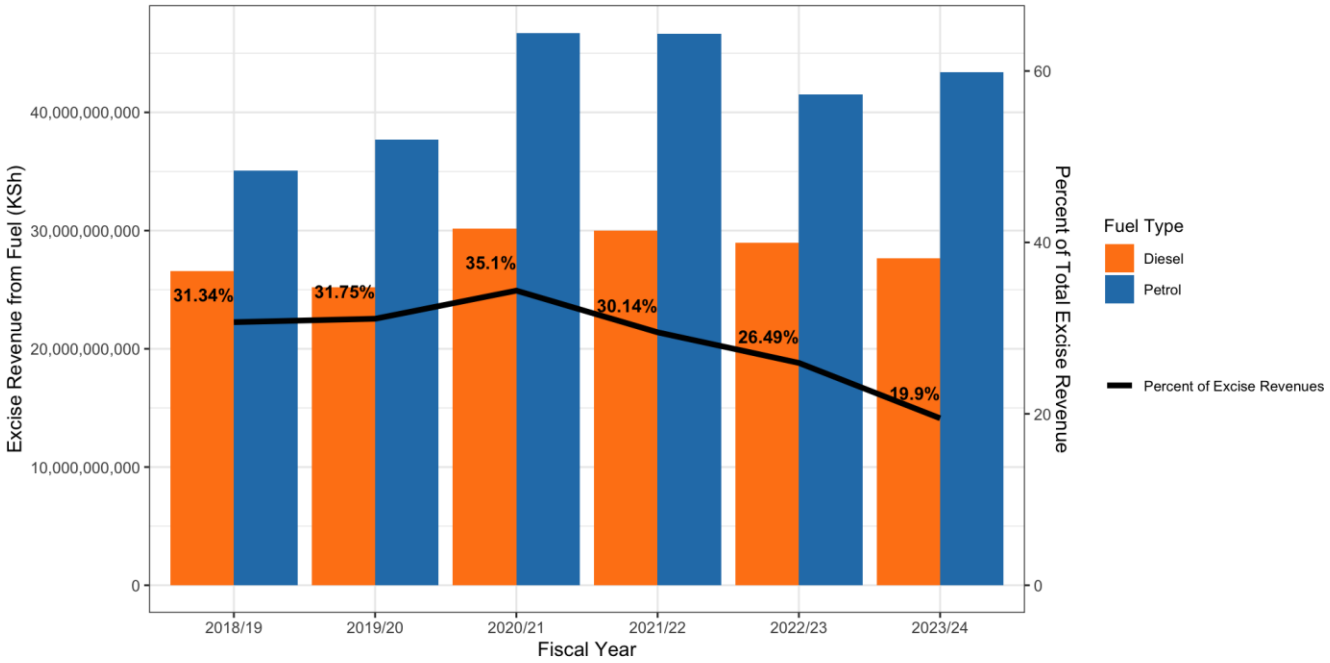
[1] A notable exception is South Sudan, which is a major oil producer in the region and applies an ad valorem rate.

practices in petroleum taxation can provide a more nuanced view of Kenya's current situation, the high-level perception stands that fuel prices in Kenya are generally aligned with or higher than prices in neighbouring countries, and therefore any large policy changes could lead to undue shocks.

5 Revenue Implications of Excise Changes

In FY 2022/2023, total excise tax collection on all products amounted to KES 266 billion, constituting approximately 13% of government revenue in Kenya (KNBS, 2024). Of this, excise on petrol and diesel amounted to KES 70.5 billion (26.5% of total excise collection). Figure 5.1 shows revenue from excise tax on petrol and diesel from FY 2018/19 to 2023/24. While revenues grew from 2018 to 2021, they have since stagnated and declined slightly. Moreover, the percentage of excise revenues made up by petrol and diesel excise is falling. This is partially due to the fact that slightly reduced demand has reduced revenues from these products. Additionally, the excise tax collected on other goods has increased relative to the excise from petroleum products. Both factors contribute to the declining trend in the excise tax collections related to petroleum products as a share of total excise revenue.

Figure 5.1: Petroleum Excise Revenues Over Time



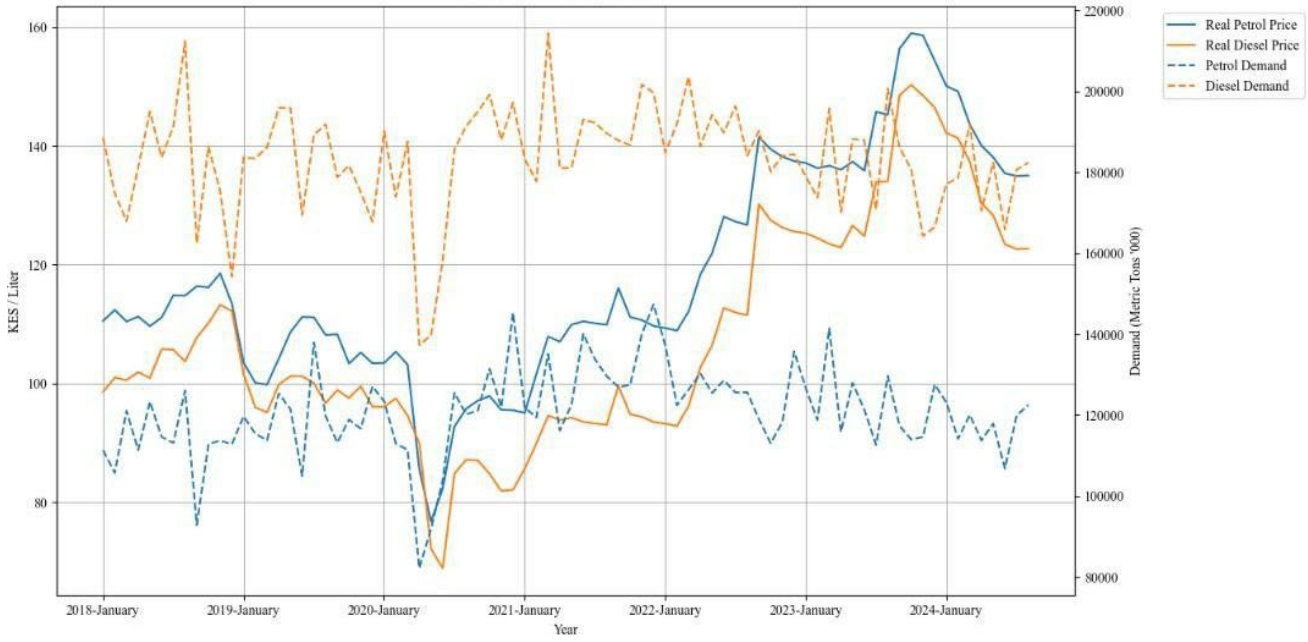
Note: Figures for FY 2023/24 are based on KNBS projections and are subject to error
Source: Author's computations using KRA (2024) and KNBS (2025) data

Price Elasticities of Demand

Figure 5.2 illustrates the trends in inflation-adjusted petroleum prices and consumption in Kenya from 2018 to the present. The data show that, despite a significant increase in real prices—primarily driven by higher landing costs—consumption has remained relatively stable. However, the consumption data also display considerable month-to-month variability. To estimate the price elasticity of demand for petrol and diesel, we applied several methodologies, including Ordinary Least Squares (OLS) and Instrumental Variable (IV) approaches, incorporating explanatory

variables such as GDP, population growth, and vehicle registrations. Even after differencing the data and testing various lag structures, we did not find statistically significant elasticities over the observed period. This suggests that the short-run demand for petroleum products is relatively inelastic—a finding consistent with the literature reviewed in *Section 2*, which reports low price elasticities for petrol and diesel in various contexts (see e.g., Chaiwat & Tangvitoontham, 2014; Díaz & Medlock, 2021; Havranek et al., 2012; Labandeira et al., 2017). Our results imply that moderate increases in excise tax are unlikely to significantly reduce consumption and could therefore be an effective tool for raising government revenue, however with caveats.

Figure 5.2: Petrol and Diesel Real Prices and Consumption Over Time



Note: Prices are inflation-adjusted using published KNBS CPI figures
Source: Author's computations using KNBS (2018-2024) and EPRA (2025) data

Methodology

We aggregate excise revenues for FY 2023/24 and use this figure to predict annual changes associated with various changes to excise rates. We make two predictions: one upper bound with no change in demand which aligns with some studies finding little to no short- or medium-run price elasticities of demand for fuels, and one lower bound, using the price elasticities of demand (-0.64 for petrol and -0.67 for diesel), calculated by Agwaya and Ochieng (2021) for Kenya using the Almost Ideal Demand System model (AIDS). This provides a realistic range of possibilities for consumption changes resulting from price changes. We also factor changes to VAT collection due to lower estimated consumption into the final revenue impact figures displayed.

Specifically, we use a series of formulas, independently for petrol and diesel, to calculate the changes in revenue collections denoted as *Additional Revenue*, where R is the annual revenue collected on petrol or diesel from a given tax denoted in subscript, r is the current excise rate, and r_a is the additional KES amount added to the excise rate.[2] The upper bound equation with zero

[2] **Petrol:** $Rexcise = KES$ 43,380,213,932; $r = 21.95\ KES/L$; $RVAT = KES$ 39,085,015,588
Diesel: $Rexcise = KES$ 27,632,041,266; $r = 11.37\ KES/L$; $RVAT = KES$ 45,017,288,084

price elasticity of demand is given as:

$$Additional\ Revenue = \left(\frac{R_{excise}}{r}\ (r + r_a)\right) - R_{excise}$$

Since the upper bound equation assumes zero price elasticity of demand, no changes to consumption levels need to be factored into the calculation (and thus revenues from VAT collection do not change). To incorporate the elasticities into the lower bound estimates, however, we define the change in consumption due to the price increase as: $\Delta C = (1 + \%\Delta p_i \times \varepsilon_d)$, where p_i is the price of the good in period i, and ε_d is the price elasticity of demand as found by Agwaya and Ochieng (2021).[3] We then calculate the additional revenue at the lower bound estimate with the equation:

$$Additional\ Revenue = \left[\frac{R_{excise}}{r} \times \Delta C \times (r + r_a) - R_{excise}\right] + [R_{VAT} \times \Delta C - R_{VAT}]$$

The first part of the equation calculates the change in excise revenue collection, while the second part of the equation calculates the change in VAT collection, factoring in the decreased demand. It is important to note that these calculations focus on direct excise and VAT revenue collection on petrol and diesel, and the analysis does not incorporate or quantify dynamic equilibrium effects throughout the broader economy.

Results

In Table 5.1, we present our findings on the estimated annual revenue increase that the Kenyan government could expect from raising excise taxes on petrol and diesel. Each increase to the petrol excise rate by 1 KES is projected to generate between 1.67 and 1.98 billion KES annually. Additionally, each 1 KES increase to diesel excise is projected to generate between 2.13 and 2.43 billion KES per year. If both petrol and diesel excise taxes are increased by 1 KES per litre simultaneously, the total estimated annual revenue increase is between 3.80 and 4.41 billion KES. This combined figure is essentially the sum of the individual increases, indicating that the effects on revenue are additive. Further revenue scenarios are provided in *Section 8*.

Table 5.1: Revenue Projections due to Excise Changes

Petrol Excise Increase (KES)	Diesel Excise Increase (KES)	Estimated Annual Revenue Increase (Billions of KES)
1	**0**	1.67 - 1.98
0	**1**	2.13 - 2.43
1	**1**	3.80 - 4.41

Source: Author's computations

The findings demonstrate that even when factoring in behavioural changes to increases in fuel prices, as reflected in the lower-bound of the revenue projections, raising the excise on petrol and diesel offers a significant revenue-raising opportunity. However, since excise tax is levied not only to raise revenues but also offset negative externalities, there are many considerations that influence rate-setting policies. In the rest of this paper, we analyse the progressivity of petroleum taxes and other long-run economic factors of fuel price changes to further inform policy and research.

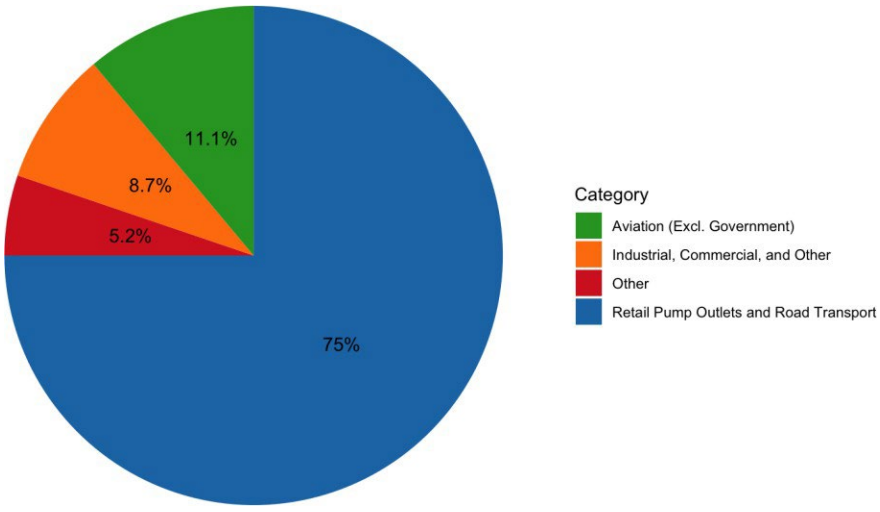
[3] For the values p_i, we utilize EPRA maximum pump prices for petrol (KES 174.63) and diesel (KES 164.86) in Nairobi City County for April 2025.

6 Progressivity Analysis

In this section, we conduct a policy simulation to assess the impact of changes in diesel and petrol prices on households. By analysing the pass-through effects of price changes on various spending categories, we aim to capture how increases or decreases in fuel costs affect transportation costs and food prices. Specifically, we examine how adjustments in fuel prices influence the costs of petrol, various forms of transportation, as well as the effect on food prices. Through this simulation, we analyse the differential impact of these price changes on households with different income levels, to understand how changes in fuel prices affect household budgets and consumption behaviours across demographics.

We find that households with higher overall expenditures use petroleum products at a much higher rate and in greater quantities compared to lower expenditure households. When stratifying by rural and urban households, we find that this trend is more pronounced among rural households, who, on average, allocate a larger share of their budgets to transportation, making rural households more sensitive to price changes (see Appendix A.4). We also find that, because petrol constitutes a larger share of the budget in wealthier households, tax increases on it are progressive. Diesel price increases, conversely, may be regressive when a pass-through to food prices is considered. Our analysis is not limited to price changes due to taxes, as the incidence will be the same regardless of the cause of the price increase. This means that price changes in fuel – regardless of their origin – can have broader implications for equity and welfare, particularly for lower-income households who may be less able to absorb additional costs of essential goods as a result of increasing fuel prices. As such, policymakers should carefully consider both the direct and indirect effects of fuel price adjustments when designing equitable energy and fiscal policies.

Figure 6.1: Fuel Usage by Major Consumer Category (2022)



Source: Author's illustration using data from (KNBS, 2023b)

Figure 6.1 shows how fuel is used in Kenya. As it is used as both a private and commercial input, the impact of changing fuel prices will affect different segments of consumers incongruently. We see that 75% of fuel consumption is for road transport and is distributed at retail pump outlets. This category encompasses both petrol and diesel consumption, which can be used for private rides as well as the commercial transportation of goods, though further disaggregated data within this category is unavailable. Additionally, 8.7% of fuel consumption is used directly as industrial,

commercial, or other inputs, while 11.1% is used for aviation. The remaining 5.2% includes use for power generation (3.5%), agriculture (0.54%), and government (0.45%). In this section, we focus on the 75% of fuel usage that is used from retail pumps and road transport, though we consider the impacts to industry in *Section 7.*

Progressivity Methodology

We use household survey data from the 2022 Kenya Continuous Household Survey (KCHS) to analyse the direct and indirect impact of fuel prices on household budgets and welfare (Kenya National Bureau of Statistics, 2022). The survey contains information pertaining to direct household spending on petrol (for private use), as well as indirect spending on petroleum-related goods such as matatus (buses), taxis/rideshares, tuk tuks, and boda bodas (motorcycles), which also consume either petrol or diesel. We model the relationship between fuel prices and the cost of these goods to households, to understand the impact of fuel price changes on households across income levels.

To do this, we group households into 20 bins based on ascending per-adult equivalent expenditure levels. The first expenditure group constitutes the 5% of households with the lowest per-adult equivalent expenditure, and the 20th expenditure group constitutes the households in the top 5% (see Appendix A.5). The total spending on the various categories (e.g., matatu, private ride, petrol, food) is calculated for each bin, and a "consumption basket" is derived by summing expenditures across these categories. The share of each category in total yearly expenditure is then calculated by dividing the sum of expenditure on each good by the total yearly expenditure within each bin.

Next, we examine the impact of price changes on household spending. The price changes for petrol and diesel, as well as the pass-through effects of these price changes to petrol, private rides, matatu, and food spending, are varied across a defined range of values.[4] We use nested loops to simulate all combinations of these price changes and pass-through scenarios, adjusting the corresponding expenditure categories for each simulation setting. The changes in expenditure are then computed by comparing the new spending values against the original spending values. The results are stored, including the new budget share for each category and the percentage change to the overall budget. Finally, the simulated results are aggregated into a comprehensive dataset, capturing the impact of varying price changes on household expenditure patterns across different income bins.

We make several assumptions when conducting the simulation. First, we assume that the pass-through rate of petrol price increases to petrol spending is one, meaning if the pump price of petrol increases by 5%, a household's spending on petrol also increases by 5%. Second, we assume that the price of private rides will solely be affected by the price of petrol as the majority of these vehicles use petrol rather than diesel, and we model various pass-through rates from petrol price changes to spending on private rides. Third, we assume that diesel prices will affect matatu ride prices, since matatus primarily run on diesel, as well as food prices, as diesel is a common input in agriculture and the transportation of food items. We model various pass-through rates from diesel price changes to these goods. Fourth, we assume that consumer behaviour remains unchanged when fuel prices increase, meaning households will absorb the additional cost rather than reduce or shift

[4] For the purposes of this analysis, we use private rides to denote combined spending on taxis/rideshares, tuk tuks, and motorcycle rides. We do this because they exhibit similar trends in usage across income-levels and primarily consume petrol (see Appendix A.6).

their consumption. This assumption allows us to assess the distributional incidence of fuel price changes across income levels. Our simulation does not, therefore, attempt to build a general-equilibrium model that estimates substitutionary effects and other ways in which households shift their budgets when the prices of certain goods go up.

Pass-through Rates

We consult literature to identify a range of plausible estimates for the pass-through rates of petrol and diesel price changes to the various petroleum-related spending categories identified in the KCHS. The pass-through rate is especially important for food prices, given that food comprises the largest portion of household spending, especially for lower expenditure groups (see Appendix A.7). This means that even a small increase in food prices can have a large impact on household budgets.

Several studies identify linkages between international oil prices and local food prices in developing countries, though there is little consensus on exact relationships as economic structures, price-setting mechanisms, and other factors vary across countries and specific commodities. Ngare and Derek (2021), for instance, study the relationship between diesel prices and maize, beans, potatoes, and cabbage in Kenya, from 2010-2018. Using Granger Causality tests, they find that diesel prices have a significant pass-through effect on perishable food prices, though they did not find a significant relationship between diesel prices and maize and beans prices. They note that this is likely a result of the importance of transportation as a main function in fresh vegetables marketing. Meanwhile, Dillon and Barrett (2015) identify a positive relationship between global oil prices and local maize prices in 17 sub-national markets in East Africa from 2000-2012. They find that on average, a 1% increase in global oil prices led to a maize price increase of 0.26%, controlling for global maize prices and exchange rates. In 15 of the 17 regions, the estimates lie between 0.10% and 0.41% pass-through. They also find evidence that food prices in inland markets may respond more to fuel price variation than global grain price variation, underscoring the positive relationship between transport costs and food prices. They further state that global oil prices transmit much more rapidly to the pump and then to local maize prices than do global maize prices, suggesting that the immediate effects on local food prices are driven more by transport costs than by the prices of the goods themselves. Furthermore, poor households in East Africa, even in agricultural regions, are typically net food buyers (Barrett 2008; Ivanic et al., 2012), meaning that their expenditure on food will be impacted by diesel prices via transport costs.

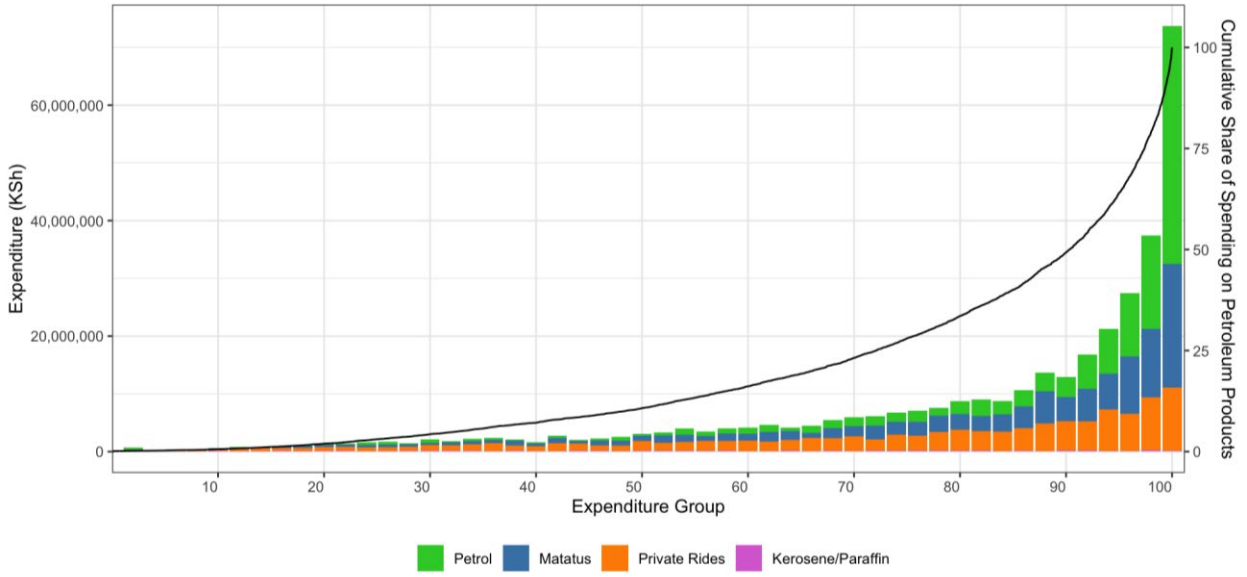
We use Kpodar and Liu's (2022) estimates for the pass-through effect from fuel prices to the Consumer Price Index (CPI) components for food and transportation in developing countries as a broad starting point for the pass-through rates in our model. They estimate that a 1% increase in the price of gasoline translates to an increase of 0 – 0.03% in food prices and 0.1 – 0.25% in transport costs. It is important to note that the estimates for food price increases are a magnitude of ten times lower than Dillon and Barrett's (2015) estimates for maize prices. While Dillon and Barrett's (2015) estimate is limited to maize, the large difference is suggestive of the many factors that influence the pass-throughs of fuel prices to CPI components and the large levels of uncertainty in the estimates.[5] For this reason, we simulate a broad range of pass-throughs for the various goods to show a range of possible impacts on households.

[5] These include the level of informality, subsistence agriculture, food production and consumption by product, import and export controls, and price controls.

Results

To broadly understand spending on petroleum products among the population, we disaggregate the data into 50 expenditure groups to show nominal spending on petrol, matatu rides, private rides, and kerosene/paraffin, and display the results in Figure 6.2. We see that kerosene/paraffin does not constitute a large share of total spending on petroleum products, further informing our focus on petrol and diesel.[6] With matatus, private rides, and petrol consumption, we see that spending increases exponentially as total household expenditure increases. Spending on petrol is distributed most unevenly, where the top 2% of households constitute 33.9% of all expenditure on petrol, and the top 4% constitute 47.1%. This trend remains strong but is relatively less pronounced in spending on matatus and private rides, where the top 4% of households constitute 29.9% and 18.3% of expenditures respectively on those goods.

Figure 6.2: Expenditure on Petroleum Products



Source: Author's computations using KCHS (2022)

The black line in Figure 6.2 shows the Lorenz Curve of expenditure, where the x-axis represents cumulative population by expenditure level, and the y-axis denotes the cumulative share of spending on petroleum products. We see that the lowest spending 50% of households constitute only 10.8% of spending on petroleum products. Moreover, the top 10%, 5%, and 1% of households constitute 50.7%, 26.0%, and 13.9% of spending on those goods, respectively. To quantify these inequalities, we calculate the Gini coefficient for each of the spending distributions, which reflects how evenly or unevenly the goods are consumed across the population. A coefficient of 0 means that the good is consumed equally by all individuals, while a coefficient closer to 1 means that consumption is concentrated among fewer individuals. The Gini coefficients for spending on petrol, matatus, and private rides are displayed in Table 6.2 below.

[6] Though consumed in low quantities, kerosene/paraffin are often consumed by poorer households and warrant an analysis independent of petrol and diesel (see Appendix A.4).

Table 6.2: Gini Coefficients of Consumption

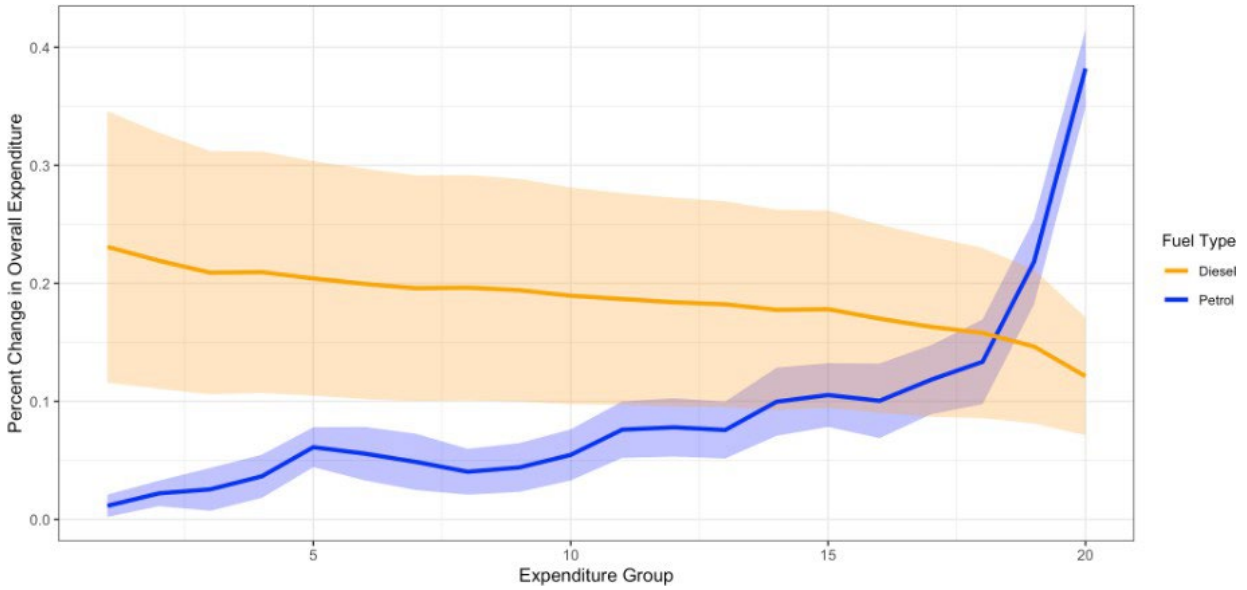
Consumption Type	Gini Coefficient
Petrol	0.956
Matatus	0.921
Private Rides	0.872

Source: Author's computations using KCHS (2022)

For each distribution of spending on petroleum products, the Gini coefficient is very high, indicating that direct and indirect (through matatus and private rides) consumption of petroleum fuels is highly unequal. Acknowledging that petroleum prices have broader economic impacts – particularly on the price of food (Dillon & Barrett, 2016; Baffes & Dennis, 2013) – we then simulate the impact of fuel price changes on household spending on petrol, matatus, and private rides, as well as food prices, to provide a more holistic understanding of petroleum price changes and their implications on progressivity.

Figure 6.3 shows the differential impact of fuel prices on household budgets when diesel and petrol prices are raised by 5%, independently of each other. The horizontal axis shows household groups in ascending order of expenditure levels, while the vertical axis shows the percent change in household budgets due to the fuel price increase. The change is calculated assuming that households simply raise their fuel expenditure in proportion to the price increase. For petrol, in blue, the bottom of the shaded region represents a pass-through rate of 0 to private rides, the solid line represents a pass-through of 0.25, and the top of the shaded region represents a pass-through of 0.5. For diesel, in orange, the bottom of the shaded region represents a food price pass-through rate of 0.03, the solid line represents a pass-through of 0.06, and the top of the shaded region represents a pass-through of 0.09, while the pass-through to matatu prices is held constant at 0.1.

Figure 6.3: Progressivity Impact - 5% Increase in Petrol and Diesel Prices



Note: Shaded area represents upper and lower bound pass-through rate estimates.
Source: Author's computations

From the results, we see that a 5% increase in petrol prices shows a clear trend whereby the wealthiest expenditure groups experience a much higher relative rise in their expenditure levels compared to the poorest expenditure groups, reinforcing the idea that fuel taxes on petrol are

progressive. For instance, households with the highest 5% of expenditures (group 20) experience an average increase of 0.375% to their overall spending when petrol prices are increased by 5%, compared to an average increase of 0.01% for households with the lowest 5% of expenditures (group 1). In nominal terms, this translates to KES 3,783 in additional yearly spending for households in Group 20, and KES 4 in additional spending for households in Group 1. For a median expenditure household (group 10), the impact to their budget translates to approximately an additional KES 100 per year, and for the 75th percentile (group 15) it translates to KES 316.[7]

Conversely, we find that an increase in diesel prices has a more significant impact on lower-income households than wealthier ones: if diesel prices increased by 5%, the expenditures of the highest and lowest 5% of household spending groups would increase by 0.12% (KES 1,210) and 0.23% (KES 95), respectively. For a median expenditure household (group 10), it leads to approximately a spending increase of 0.19% (KES 289) per year, and for the 75th percentile (group 15) it leads to an increase of 0.18% (KES 569). These numbers are contingent on the assumptions and pass-through rates used in the simulation and have high levels of uncertainty, but we expect that the simulation accurately reflects the general trends in incidence across income levels.[8]

The extent to which diesel price increases are regressive is driven primarily by the pass-through rate of diesel to food prices, where a higher pass-through rate leads to more regressivity due to its impact on food prices, which comprises most of the budgets for poorer households. Furthermore, the extent to which fuel prices impact household budgets and inflation depends on where the price increases are absorbed. For example, an increase in petrol prices will lead to a direct impact on consumer spending; however, diesel price increases may not translate to increased prices of goods such as matatu fares, as they could be absorbed by the matatu companies. Additionally, diesel is used as input to some industrial processes, especially in the agriculture and manufacturing sectors, which could increase consumer prices in these and downstream industries. While we capture some of the pass-through effects from fuel prices to the price of other goods, our analysis does not capture other second-order effects, such as shifting consumer behaviour and the cost to businesses, though these impacts are discussed in *Section 7.* These types of relationships add complexity to estimating the full extent of the impact of fuel prices on consumers and the general economy.

To compare the distributional impact of simulated price increases, we draw on the methodology employed by Kpodar and Liu (2022) by calculating the difference in percentage changes in expenditure between the richest and poorest quintiles. A positive value denotes a progressive impact as the wealthier quintile is impacted more than the poorest quintile, and conversely, a negative value denotes a regressive impact. It is important to note that even a progressive coefficient could still impact the poorest quintile significantly, though just at a lesser rate than the highest quintile. In Table 6.3**,** we show estimates of the impact to the bottom and top quintiles of household budgets (columns 3-4) and progressivity measures (column 5) arising from different price changes of petrol and diesel. To understand the relative impacts of petrol vs. diesel price changes, we hold the pass-throughs constant for matatus (0.1 from diesel), food (0.03 from diesel), and private rides (0.25 from petrol).

[7] These calculations include households in those income groups that consume no petrol. In reality, tax increases on petrol will fall solely on users of petrol (5 – 10% of those income groups) who will experience a much higher rise in their spending, while non-users will experience a negligible change. See Appendix A.4 for more information on usage rates.
[8] These numbers are calculated using the pass-through rates and budget increases illustrated by the solid lines in Figure 7.3.

Table 6.3: Differential Impact of Various Excise Increases

Petrol Excise Increase (KES)	Diesel Excise Increase (KES)	Bottom Quintile Expenditure Increase (%)	Top Quintile Expenditure Increase (%)	Progressivity Measure
1	**0**	.003	.029	.026
0	**1**	.013	.010	-.003
1	**1**	.016	.039	.022

Source: Author's computations

While the exact expenditure increases and progressivity measures will change depending on pass-through rates, we find that petrol price increases are progressive while diesel price increases are regressive: a 1 KES increase to petrol prices raises the consumption basket of the top quintile of households by .026% more than the bottom quintile, while an increase of 1 KES to diesel prices raises the consumption basket of the bottom quintile by .003% more that the top quintile.[9]These findings suggest that increasing taxes on petrol may be less burdensome for lower-income households compared to increases in diesel taxes. A corollary of our findings is that petrol subsidies are essentially a subsidy to wealthy households, while a diesel subsidy would more effectively protect poor and middle-income households. Furthermore, it is important to note that a reduction in prices on either of the fuels may not lead to lower prices of consumer goods, as some literature suggests that inflation reacts more to positive oil price shocks than negative price shocks (Choi et al., 2018; Abdallah & Kpodar, 2023).

7 Discussion

Substitution

The progressivity analysis implies that holding diesel prices constant while increasing taxes on petrol would be a progressive policy to raise government revenues. Careful consideration, however, must be given to the price differential between the two fuel types, as a large difference can give users of one fuel type an advantage over users of the other, and risks introducing a fuel-switching effect that encourages, for example, the use of diesel-powered vehicles. This may lead to shifting demand of fuel types, increased air pollution due to higher consumption of diesel (which tends to be a more polluting fuel), and other distortions. Currently, petrol prices are approximately ten shillings higher than diesel prices, so commensurate changes to petrol and diesel excise increases may need to be considered to avoid increased substitution.

Furthermore, the Anti-Adulteration Levy, applied only to kerosene at KES 18 per litre, is aimed at reducing the price differential between kerosene and other fuels (Miscellaneous Fees and Levies Act, 2016). Its main purpose is to discourage individuals from illegally mixing kerosene with other fuels, which reduces fuel quality and can damage vehicles and machinery. In this study, we do not analyse the extent to which price differentials encourage adulteration but assume that small increases to price differentials will have only minor impacts.

Tax Complexity

The tax structure on petrol and diesel in Kenya consists of six separate levies and two taxes. Each

[9] The higher the pass-through rate of petrol to private rides and diesel to matatus, the higher the progressivity. The higher the pass-through rate of diesel to food prices, the more regressivity.

levy is earmarked for different purposes (e.g. road development, railway development, etc.). This structure can provide some advantages but can also be difficult to navigate from both the private and public side. First, by earmarking revenues for development projects directly related to fuel consumption, such as the development of roads through the Road Maintenance Levy, the Government of Kenya can ensure that the price paid by fuel users goes directly into services that benefit them. Whereas excise tax and VAT levied on fuels can be redistributed in any number of ways, the levies, in their design, specifically target issues of importance to users of petroleum. However, the many different levies and taxes contributing to the final pump price, collection, and reporting adds complexity to tax collection. It is therefore worthwhile reviewing the tax and levy structure on fuels to ensure relevance and ease of collection.

Social Responses to Tax Changes

The close relationship between fuel prices and the cost of living makes it a particularly important issue in Kenya, especially in the socio-political realm where public attitudes towards the government can be swayed by fuel price changes. Since fuel prices are easily visible and impact the daily life of millions of Kenyans, they can be a particularly contentious issue that should be considered from a socio-political perspective. As such, past tax hikes on fuels in recent years have received pushback and even led to widespread unrest and protests. It should be expected, then, that any large increase in tax on fuels would be met with discontent from large portions of the public, even if it would technically be a progressive policy. Therefore, any changes to the tax regime should be carefully considered and implemented gradually to avoid any social or economic shocks. Moreover, many members of the public will look for tangible positive impacts stemming from any tax increase, something the Government of Kenya should consider when implementing new taxes or reforming taxes on petroleum products.

Environmental Implications

Any policy related to petroleum products has important environmental implications, and this has been widely researched (see e.g., Hickey & Mohan, 2021; Sun et al., 2022). Generally, we find that price increases on fuels have only a small or negligible impact on consumption levels due to the low price elasticity of demand for these products, meaning that other policies may be more effective at reducing emissions (Havranek et al., 2012). For instance, reducing the number of old diesel engines (i.e. reducing old lorries on the road) by implementing emissions testing for vehicles can be a faster and more effective way to improve air quality and reduce harmful emissions. Additionally, any policy aimed at reducing the consumption of petroleum products should also come with increased access to alternative energy sources. Therefore, for real environmental progress, focusing solely on the tax regime for petrol and diesel alone will not suffice.

Long-Run Effects

Our analysis focuses on the short-term effects of fuel price changes, where price elasticities of demand are small and there are fewer behavioural shifts. In the long run, however, there may be several impacts to transportation habits, manufacturing, and agricultural practices stemming from changes to fuel taxes and prices. It is important to consider how fuel price increases are passed on to consumers and how they impact economic growth. For example, if prices increase, it will directly raise the cost of operating public and private transport, which may be passed onto consumers through fare hikes or absorbed by the service providers. Our analysis incorporates

assumptions about pass-throughs to passenger transportation and food prices, but the long-run effects due to increased fuel prices should be considered. These include:

Passenger Transport: There may be shifts in the type and frequency of passenger transport. For example, an increase in petrol and private ride fees due to petrol price increases could encourage a shift to public transport options.

Transport of Goods: Higher fuel prices, especially diesel, will drive up transportation costs for the movement of goods, affecting both long-haul and local deliveries. This could lead to increased prices for products as businesses pass on the higher logistics costs to consumers, impacting overall supply chains.

Electric Vehicle Substitution: The demand for electric vehicles (EVs) may increase as consumers seek alternatives that offer lower long-term operating costs. The shift toward EVs could accelerate, especially if the cost of electricity remains more stable compared to fuel prices and there is suitable infrastructure. Strategic investment in EV infrastructure—such as charging stations, grid upgrades, and standardized systems—would accelerate this transition. These developments enable a smoother transition from gas-powered vehicles to EVs by ensuring reliability, convenience, and cost-efficiency for users.

Operational Costs for Businesses: Companies may face higher expenses for shipping raw materials and distributing finished products. The cost of operating machinery using diesel or petrol will also rise, which could affect profit margins or lead to price hikes on goods.

Operational Costs in Industrial Agriculture: The industrial agricultural sector relies heavily on fuel for machinery and transport. The cost of operating tractors, irrigation systems, and transporting produce could increase with higher diesel prices, potentially leading to higher food prices and/or reduced profit margins for farmers.

8 Policy Scenarios

In this section, we present various policy scenarios with analysis on revenue, progressivity, and other impacts. We present only those scenarios that are progressive, where the progressivity impact number, as defined in *Section 6,* denotes the relative progressivity of the policy option. This section uses fixed pass-through rates to estimate how changes in petrol and diesel prices affect the prices of various goods in the consumption basket. Specifically, a 1:1 pass-through is assumed for petrol to direct petrol spending, and 0.25 to private ride spending. For diesel, the assumed pass-through is 0.03 to food prices and 0.1 to matatu (public transport) fares. While variations in these pass-through rates may affect the magnitude of the progressivity estimates, the overall trends are expected to remain consistent. Table 8.1 shows what happens to both household expenditures and government tax revenues in various scenarios where the excise rates on petrol and diesel are moderately increased. In Figure 8.1, we pull out specific scenarios to discuss these considerations in greater detail.

Table 8.1 Progressivity and Revenue Impacts

Petrol Excise Increase (KES)	Diesel Excise Increase (KES)	Bottom Quintile Expenditure Increase (%)	Top Quintile Expenditure Increase (%)	Relative Progressivity	Estimated Annual Revenue Increase (Billions of KES)
1	**0**	.003	.029	.026	1.67 - 1.98
1	**1**	.016	.039	.022	3.80 - 4.41
2	**0**	.006	.058	.052	3.33 - 3.95
2	**1**	.019	.067	.048	5.46 - 6.38
2	**2**	.032	.077	.045	7.57 - 8.81
3	**0**	.009	.087	.078	4.97 - 5.93
3	**1**	.022	.096	.074	7.10 - 8.36
3	**2**	.036	.106	.070	9.21 - 10.80
3	**3**	.049	.116	.067	11.30 - 13.22

Source: Author's computations

These scenarios show that raising petrol prices has significant revenue-raising potential in addition to being a progressive policy: each shilling increase in the petrol excise rate would raise approximately KES 1.67-1.98 billion yearly with a minimal impact on the poorest quintile of households. Diesel excise tax rate increases would also raise significant revenues, but the impact on the poorest households is much higher compared to when petrol excise is increased, and is higher than the impact on wealthier households, meaning it is a regressive policy. Diesel tax increases may also have additional distortionary effects than petrol, as diesel is more broadly integrated into industry and the broader economy.

Figure 8.1 Detailed Policy Scenarios

Scenario #1: Petrol Excise: +3 KES, Diesel Excise: N/A

Overall price increase: Petrol: 1.78%, Diesel: N/A

Increase in Excise Rate: Petrol: 13.67%, Diesel: N/A

Annual Tax Revenue Impact:

- Upper bound (0 elasticity): **+5.93B KES**
- Lower bound (petrol elasticity: -.64): **+4.97B KES**

Progressivity Impact: (0.078)

- Raises tax burden on high-expenditure households (top 20%)
- Small change to tax burden on low-expenditure households (bottom 20%)

Other Impacts:

- Increases price difference between petrol and diesel
- Primarily affects direct users of petrol (i.e. for private transportation)
- Car owners and private ride users would carry the tax burden

Scenario #2: Petrol Excise: +2 KES, Diesel Excise: +2 KES

Overall price increase: Petrol: 1.15%, Diesel: 1.21%

Increase in Excise Rate: Petrol: 9.11%, Diesel: 17.59%

Annual Tax Revenue Impact:

- Upper bound (0 elasticity): **+8.81B KES**
- Lower bound (petrol elasticity: -.64, diesel elasticity: -.67): **+7.57B KES**

Progressivity Impact: (0.045)

- Raises tax burden on high-expenditure households (top 20%) more than low-expenditure households (bottom 20%)
- Impact on low-expenditure households' consumption baskets is non-negligible

Other Impacts:

- Keeps price-differential steady between petrol and diesel
- May have macro-economic consequences

Scenario #3: Petrol Excise: +5 KES, Diesel Excise: +2 KES

Overall price increase: Petrol: 2.86%, Diesel: 1.21%

Increase in Excise Rate: Petrol: 22.78%, Diesel: 17.59%

Annual Tax Revenue Impact:

- Upper bound (0 elasticity): **+14.74B KES**
- Lower bound (petrol elasticity: -.64, diesel elasticity: -.67): **+12.45B KES**

Progressivity Impact: (0.12)

- Raises tax burden on high-expenditure households (top 20%) more than low-expenditure households (bottom 20%)
- Impact on low-expenditure households' consumption baskets is non-negligible

Other Impacts:

- Increases price-differential between petrol and diesel
- Raises prices relative to neighbouring countries, particularly for petrol
- May have macro-economic consequences

9 Further Research

This paper focuses on the impact of fuel price increases to individuals and households, and in *Section 7*, we consider some of the broader impacts of fuel price increases beyond the direct impact to end-consumers. Building on ideas presented in that section, there remain several areas where further research could yield important insights, especially in understanding how different actors experience and respond to fuel costs.

Impact to Boda Boda and Uber Drivers

Our analysis assumes that the increased cost of petroleum products is passed directly to end-consumers of transportation services. However, the actual burden of fuel price increases may fall, in some capacity, on the service providers and drivers themselves. This sector employs tens of thousands of workers in urban and peri-urban areas and operates with thin profit margins. Future studies could explore how these drivers adjust their behaviour to fuel price changes — whether by reducing service frequency, raising fares, or absorbing the costs themselves — and what this means for their earnings, employment stability, and the affordability of urban transport. Similar studies could also be carried out for matatu companies to understand how fuel prices affect their business operations, although it is generally accepted that the size and operating capacity of these companies allow them to absorb more costs than those providing private rides.

Industrial and Agricultural Impacts

This study does not investigate the impact of rising fuel costs on the industrial and agricultural sectors, where petroleum products can be key inputs. Fuel, especially diesel, is essential for mechanized farming, irrigation, transportation of goods, and the operation of industrial machinery. Future research could quantify how fuel price increases influence the cost structures of agribusinesses and manufacturing firms and assess the extent to which these increased costs are passed on to consumers or absorbed by producers. Coupled with research on green agriculture efforts and alternatives to fuels, a more holistic roadmap can be produced. A sectoral analysis would also help identify which industries are most sensitive to fuel price volatility and the potential downstream effects on employment, exports, and economic growth.

CPI Components and Inflation

A more nuanced understanding of the inflationary impact of fuel price increases can be gained by analysing the disaggregated components of the Consumer Price Index, particularly food items. Maize, for example, is a staple crop and is consumed in various forms, each of which may be differently affected by rising transport and production costs. Future work could focus on obtaining detailed price data from the Kenya National Bureau of Statistics (KNBS) on food subcategories, as well as fuel and transport indices. By incorporating time series data on these disaggregated CPI components, future simulations could more accurately capture how petroleum price fluctuations ripple through the broader cost of living.

Demand Elasticities

We were unable to derive proprietary reliable estimates for the price- and cross-price elasticities of demand for petrol and diesel (and kerosene/paraffin as well as GAS/LPG), despite factoring in

elements such as GDP, population, and automobile registrations, in addition to price. Using novel datasets, future research could investigate, on a more granular level, how households across income levels and location shift their consumption patterns when fuel prices increase (e.g., reducing driving, increasing spending, increasing use of public transport or alternative transport methods, or changing spending and consumption habits in other ways). Furthermore, it is important to understand how *reducing* fuel prices affects consumer behaviour. For example, if reduced diesel prices translate to reduced food prices, it may follow that reducing taxes on diesel could improve progressivity and function as a subsidy to poorer households. This, of course, is dependent on the production of more robust datasets on the consumption of petroleum and other consumer goods.

Policy Interventions and Social Safety Nets

Another important area for future research is the role of policy in weathering the impact of fuel price increases. This includes evaluating the effectiveness of existing taxes, subsidies, social protection measures, and pricing regulations. Understanding which interventions most effectively shield vulnerable populations without distorting markets could help policymakers design -targeted responses during fuel price shocks. Understanding how levies have performed, both in terms of real projects and public perceptions, can provide the government with valuable insight into how to best balance different types of revenue-generating policies on goods such as petrol and diesel.

10 Conclusion

Multiple factors need to be carefully considered when reforming the tax structure, and specifically the excise tax, on petroleum products. We identify progressivity and revenue generation as the chief considerations in our analysis, alongside other factors such as the regional context, development goals, broader economic impacts, and environmental damage. In general, we find that small increases to the excise tax to petrol could yield significant government revenues with minimal distortions to both poorer households and the broader economy. Diesel, however, is more linked to industrial operations and the transport costs of consumer goods. Changes to diesel prices would therefore have a higher impact on poorer households and more of ripple-effect through other sectors. Furthermore, the political economy framework in Kenya must be acknowledged, given the highly politicized nature of petroleum pricing and its social implications. In this context, it is important that the Government of Kenya carefully consider public attitudes and the existing complex pricing structure before introducing any additional taxes on petroleum products, to ensure such measures align with national development goals as well as public interests.

It is critical to note that the integrated nature of petrol and diesel into many aspects of the Kenyan economy and society mean that reforming the excise tax should be considered alongside Kenya's broader goals. Kenya Vision 2030 lays out a blueprint for a sustainable future and emphasizes the need to industrialize, improve infrastructure, and increase oil exploration, while also transitioning away from fossil fuels (Government of Kenya, 2007). To address these sustainability goals, the Government of Kenya can consider introducing other environmental regulations and policies. For example, introducing emissions testing policies can reduce vehicle pollution and traffic, and create new revenue streams through fees on high-emission vehicles. It may also be in the interest of the Government of Kenya to consider a carbon tax to earmark revenues specifically to offset the negative environmental impacts of petroleum product consumption. These policies merit further analysis, as they may incur costs to businesses and individuals reliant on older vehicles and would require capacity development to implement.

References

Abdallah, C., & Kpodar, K. (2023). How large and persistent is the response of inflation to changes in retail energy prices? *Journal of International Money and Finance, 132*, 102806. https://doi.org/10.1016/j.jimonfin.2023.102806

Adom, P. K., Amakye, K., Barnor, C., Quartey, G., & Bekoe, W. (2016). Shift in demand elasticities, road energy forecast and the persistence profile of shocks. *Economic Modelling*, *55*, 189–206. https://doi.org/10.1016/j.econmod.2016.02.004

Agwaya, R., & Ochieng, J. (2021). *Demand Elasticities of Excisable Goods in Kenya: Estimation Using Almost Ideal Demand System*. http://erepository.uonbi.ac.ke/handle/11295/161225

Baffes, J., & Dennis, A. (2013). Long-term drivers of food prices (World Bank Policy Research Working Paper No. 6455). The World Bank. https://ssrn.com/abstract=2268316

Bakhat, M., Labandeira, X., Labeaga, J. M., & López-Otero, X. (2017). Elasticities of transport fuels at times of economic crisis: An empirical analysis for Spain. *Energy Economics*, *68*, 66–80. https://doi.org/10.1016/j.eneco.2017.10.019

Barrett, C. B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. Food Policy, 33(4), 299–317. https://doi.org/10.1016/j.foodpol.2007.10.005

Chaiwat, P., & Tangvitoontham, N. (2014). Petroleum's Price Transmission and Imported Demand for Crude Oil in Thailand. *International Journal of Energy Economics and Policy*, *4*(3), 476–483.

Choi, S., Furceri, D., Loungani, P., Mishra, S., & Poplawski-Ribeiro, M. (2018). Oil prices and inflation dynamics: Evidence from advanced and developing economies. *Journal of International Money and Finance, 82*, 71–96.

Clements, B., Hong-Sang, J., & Gupta, S. (2003). Real and Distributive Effects of Petroleum Price Liberalization: The Case of Indonesia. *IMF Working Papers,* 2003/204.

Coady, D., & Arze del Granado, J. (2010). The Unequal Benefits of Fuel Subsidies: A Review of Evidence for Developing Countries. *IMF Working Paper*, *2010*(202). https://doi.org/10.5089/9781455205325.001

Coady, D., El-Said, M., Gillingham, R., Kpodar, K., Medas, P., & Newhouse, D. (2006). The Magnitude and Distribution of Fuel Subsidies: Evidence from Bolivia, Ghana, Jordan, Mali, and Sri Lanka. *IMF Working Paper,* 2006/247.

Díaz, A. O., & Medlock, K. B. (2021). Price elasticity of demand for fuels by income level in Mexican households. *Energy Policy*, *151*, 112132. https://doi.org/10.1016/j.enpol.2021.112132

Dillon, B. M., & Barrett, C. B. (2016). Global Oil Prices and Local Food Prices: Evidence from East Africa. *American Journal of Agricultural Economics*, 98(1), 154–171. http://www.jstor.org/stable/24739916

Dorband, I. I., Jacob, M., Kalkuhl, M., & Steckel, J. C. (2019). Poverty and distributional effects of carbon pricing in low- and middle-income countries: A global comparative analysis. *World Development*, 115, 246–257. https://doi.org/10.1016/j.worlddev.2018.11.015

East African Revenue Authorities: EARA. (2024) East African Revenue Authorities Regional Comparative Report: Financial Year 2023/24. *Tanzania Revenue Authority.*

Government of Kenya. (2007). Kenya Vision 2030: A globally competitive and prosperous Kenya. Ministry of Planning and National Development and the National Economic and Social Council (NESC), Office of the President.

Gupta, S., & Mahler, W. (1995). Taxation of petroleum products: Theory and empirical evidence. *Energy Economics, 17*(2), 101–116. https://doi.org/10.1016/0140-9883(95)00013-K

Harding, M. (2014). The diesel differential: Differences in the tax treatment of gasoline and diesel for road use (OECD Taxation Working Papers No. 21). OECD Publishing. https://doi.org/10.1787/5jz14cd7hk6b-en

Havranek, T., Irsova, Z., & Janda, K. (2012). Demand for gasoline is more price-inelastic than commonly thought. *Energy Economics*, *34*(1), 201–207. https://doi.org/10.1016/j.eneco.2011.09.003

Hickey, S. & Mohan, G. (2021). Assessing the Impact of the Oil Governance Agenda on Africa's New Producers, *OECD Development Perspectives*, No. 12. https://doi.org/10.1787/ec6161b3-en

Ivanic, M., Martin, W., & Zaman, H. (2012). Estimating the Short-Run Poverty Impacts of the 2010–11 Surge in Food Prices. *World Development*, *40*(11), 2302–2317. https://doi.org/10.1016/j.worlddev.2012.03.024

Kenya Revenue Authority (KRA). (2024). *Excise tax collections report.* Kenya Revenue Authority.

Kenya National Bureau of Statistics (KNBS). (2018, February). *Economic indicators report February 2018*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2019, February). *Economic indicators report February 2019*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2020, February). *Economic indicators report February 2020*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2021, February). *Economic indicators report February 2021*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2022, February). *Economic indicators report February 2022*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2023a, February). *Economic indicators report February 2023*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2024, February). *Economic indicators report February 2024*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2025, February). *Economic indicators report February 2025*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2023b). *Economic Survey 2023*. Nairobi: Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2024). *Economic Survey 2024*. Nairobi: Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics. (2022). *Kenya Continuous Household Survey (KCHS) - 2022*. Nairobi: Kenya National Bureau of Statistics.

Kpodar, K., & Djiofack, C. (2010). The Distributional Effects of Oil Price Changes on Household Income: Evidence from Mali. Journal of African Economies, 19(2), 205–236. https://doi.org/10.1093/jae/ejp023

Kpodar, K., & Liu, B. (2022). The distributional implications of the impact of fuel price increases on inflation. *Energy Economics, 108*, 105909. https://doi.org/10.1016/j.eneco.2022.105909

Labandeira, X., Labeaga, J. M., & López-Otero, X. (2017). A meta-analysis on the price elasticity of energy demand. *Energy Policy*, *102*, 549–568. https://doi.org/10.1016/j.enpol.2017.01.002

Meyer, D. F. (2018). The Impact of Changes in Fuel Prices on Inflation and Economic Growth in South Africa. In *Proceedings of the 11th International RAIS Conference on Social Sciences* (pp. 65–73). Scientia Moralitas Research Institute.

Miscellaneous Fees and Levies Act, Cap. 469C, § 8A (Kenya). https://new.kenyalaw.org/akn/ke/act/2016/29/eng@2024-12-27

National Treasury and Economic Planning. (2023). The medium-term revenue strategy (An approach for enhancing domestic revenue) FY 2024/25 – 2026/27. Republic of Kenya. https://www.treasury.go.ke/sites/default/files/Strategies/Medium-Term-Revenue-Strategy-2023.pdf

Ngare, L. W., & Derek, O. W. (2021). The Effect of Fuel Prices on Food Prices in Kenya. International Journal of Energy Economics and Policy, 11(4), 127–131. https://econjournals.com/index.php/ijeep/article/view/10600

Silva, S., Soares, I., & Pinho, C. (2022). Different taxation between diesel and gasoline: Is it justifiable for Portugal? *Energy Reports*, *8*, 203–206. https://doi.org/10.1016/j.egyr.2022.01.107

Solie, I., & Mu, X. (2015). Who Benefit Most from Fuel Subsidies? Evidence from Nigeria. *Energy Policy* 87, 314–324.

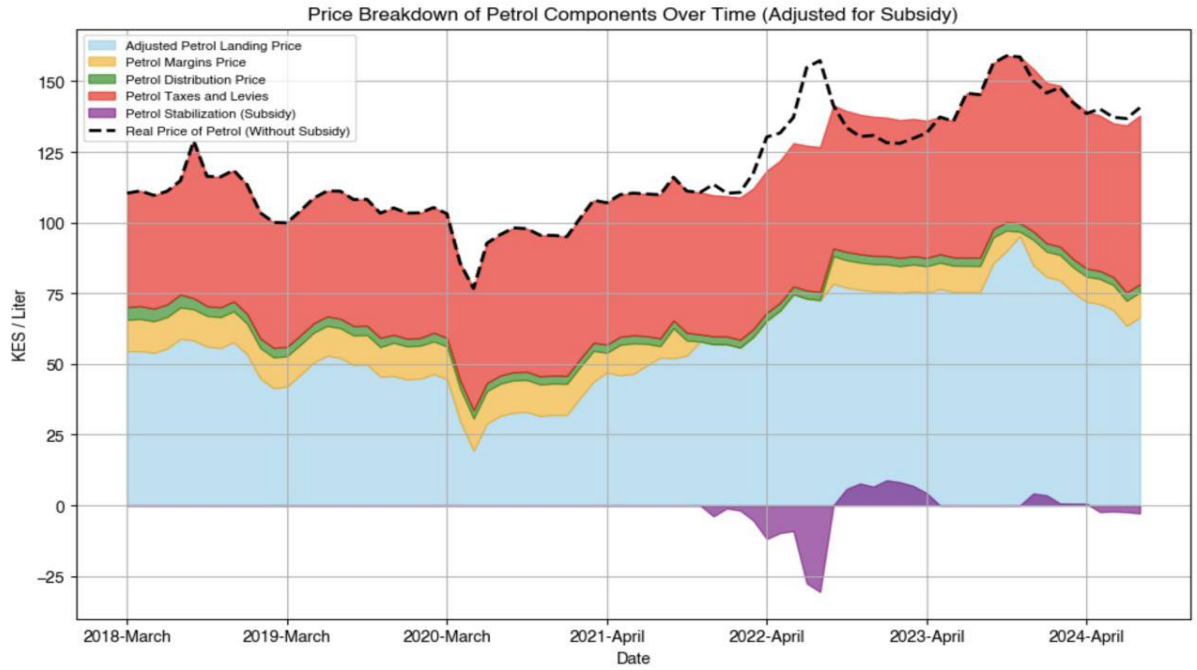
Sun, Y., Hao, Q., Cui, C., Shan, Y., Zhao, W., Wang, D., Zhang, Z., & Guan, D. (2022). Emission accounting and drivers in East African countries. *Applied Energy*, *312*, 118805.

Taghvaee, V. M., Nodehi, M., Arani, A. A., Rishehri, M., Nodehi, S. E., & Shirazi, J. K. (2023). Fossil fuel price policy and sustainability: Energy, environment, health and economy. *International Journal of Energy Sector Management*, *17*(2), 371–409. https://doi.org/10.1108/IJESM-09-2021-0012

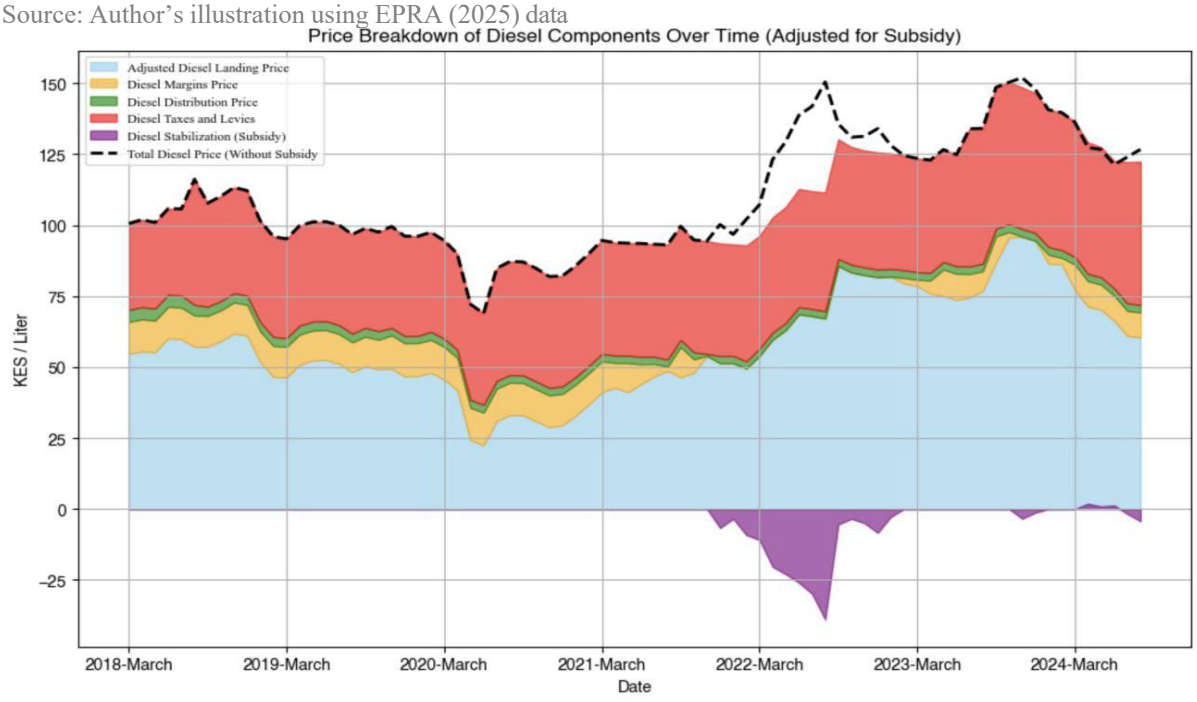
Appendix

A.1 Fuel Price Breakdown Over Time

The figures below show the different components of fuel prices from March 2018 – August 2024, adjusted for inflation. The purple components reflect the government subsidy on fuel prices, while the dotted line reflects what would have been the real price of the fuel without the subsidy.



Source: Author's illustration using EPRA (2025) data



Source: Author's illustration using EPRA (2025) data

A.2 Components of Fuel Costs in Tanzania

Breakdown of Fuel Costs in Tanzania, December 2022			
	Gasoline or Petrol	**Diesel or Gasoil**	**Kerosene**
Cost before taxes and levies	-	-	-
Excise	Tsh 379/Litre	Tsh 255/Litre	Tsh 465/Litre
Fuel Levy	Tsh 413/Litre	Tsh 413/Litre	
Petroleum levy	Tsh 100/Litre	Tsh 100/Litre	Tsh 150/Litre
Wharfage	($10/MT +18% VAT)	($10/MT +18% VAT)	($10/MT +18% VAT)
Railway Development Levy	1.5% of CIF	1.5% of CIF	1.5% of CIF
Customs Processing Fee	Tsh 4.80/Litre	Tsh 4.80/Litre	Tsh 4.80/Litre
Weight and Measures Fee	Tsh 1/Litre	Tsh 1/Litre	Tsh 1/Litre
TBS charges	Tsh 1.24/Litre	Tsh 1.24/Litre	Tsh 1.24/Litre
TASAC Charges	Tsh 3.54/Litre	Tsh 3.54/Litre	Tsh 2.36/Litre
Ewura Fee	Tsh 6.10/Litre	Tsh 6.80/Litre	Tsh 3.50/litre
Fuel Marking	$6.077/CM		
OMCs Overheads and Margins	Tsh 119/Litre	Tsh 119/Litre	Tsh 119/Litre
Charges paid to Executive Agencies	Tsh 1.03/Litre	Tsh 1.03/Litre	Tsh 1.03/Litre
Financing Cost	1% of CIF	1% of CIF	1% of CIF
Evaporation Losses	0.5% of CIF	0.3% of CIF	0.3% of CIF
Service Levy	0.3% of turnover	0.3% of turnover	0.3% of turnover
VAT	0%	0%	0%
	Tsh.2,827/Litre	**Tsh 3,330/Litre**	**Tsh 3,252/Litre**
Note: *the average nominal exchange rate in 2022 was 1 Kenyan Shilling = 19.73 Tanzanian Shillings*			

Source: EARA Data, 2024

A.3 Excise Tax Rates on Petroleum Products in EAC, 2022/23

	Per Litre Rate in Domestic Currency, 2022/23	**Per Litre Rate Converted to KES, 2022/23**
Kenya		
Motor Spirit (gasoline) premium	KES 21.95	KES 21.95
Jet fuel	KES 21.95	KES 21.95
Illuminating Kerosene	KES 11.37	KES 11.37
Gas oil (Automotive)	KES 11.37	KES 11.37
Rwanda		
Gasoline	RWF 183	KES 22.32
Diesel	RWF 150	KES 18.30

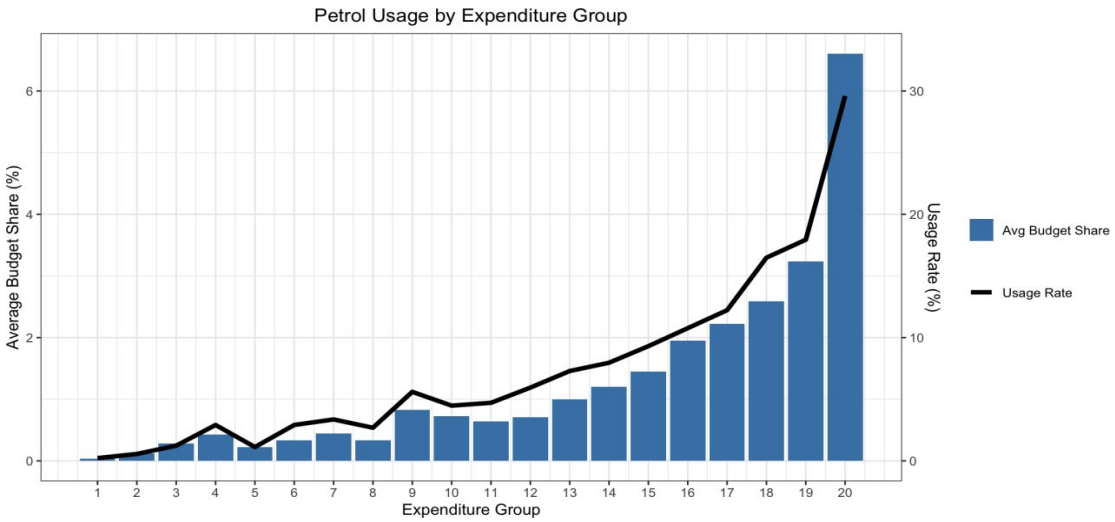
Tanzania		
Motor Spirit (gasoline) regular	TZS 379.00	KES 21.78
Illuminating Kerosene (IK)	TZS 465.00	KES 26.72
Gas oil (automotive, light, amber for high-speed engines)	TZS 225.00	KES 12.93
Residual fuel oils (marine furnace and similar fuel oils)	TZS 80.00	KES 4.60
Zanzibar		
Motor spirit (gasoline) regular	TZS.379.00	KES 21.78
Motor spirit (gasoline) premium	TZS.379.00	KES 21.78
Illuminating kerosene	TZS 122.00	KES 7.01
Other medium oils and preparations	TZS 871.45	KES 50.08
Gasoil (automotive, light, amber for highs peedengines)	TZS 255.00	KES 14.66
Diesel oil (industrial, heavy black for low-speed marine and stationary engines)	TZS 201.00	KES 11.55
Uganda		
Motor spirit (gasoline)	UShs. 900	KES 33.60
Gas oil (automotive, light, amber for high-speed engine)	UShs. 580	KES 21.64

Other gas oils	UShs. 530	KES 19.78
Illuminating kerosene	UShs. 200	KES 7.46
Jet A1 and aviation fuel	UShs. 530	KES 19.78
Burundi		
Fuels and Lubricants	210 BIF	KES 11.48
South Sudan		
Fuels/gasoline, diesel	5%	
Notes: *1) The rates in percentages are Ad valorem, while the others are specific rates* *2) Exchange rates used for conversion are the January-December 2023 average exchange rates where; one KES is equivalent to UGShs 26.8; TZS 17.4; BIF 18.3; RWF 8.2*		

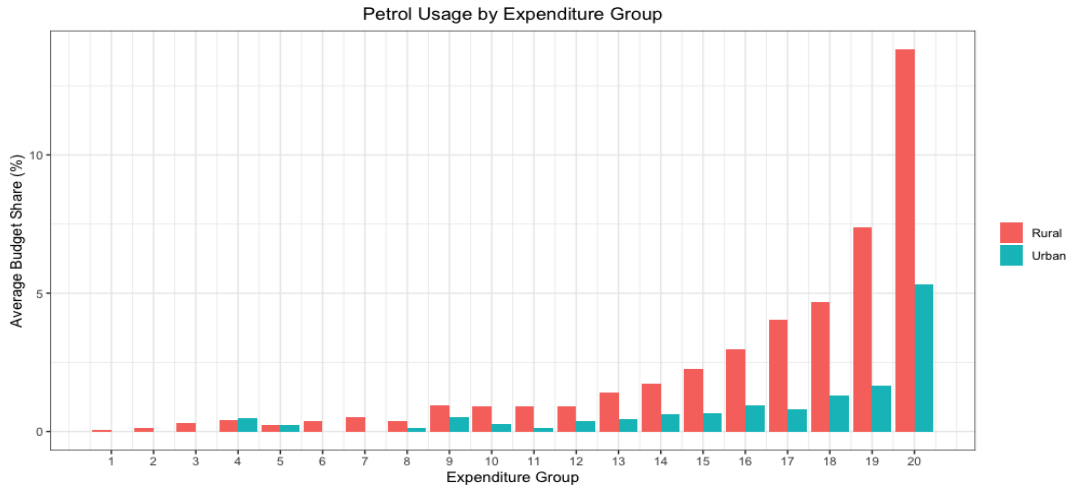
Source: EARA Data, 2024

A.4 Direct and Indirect Usage

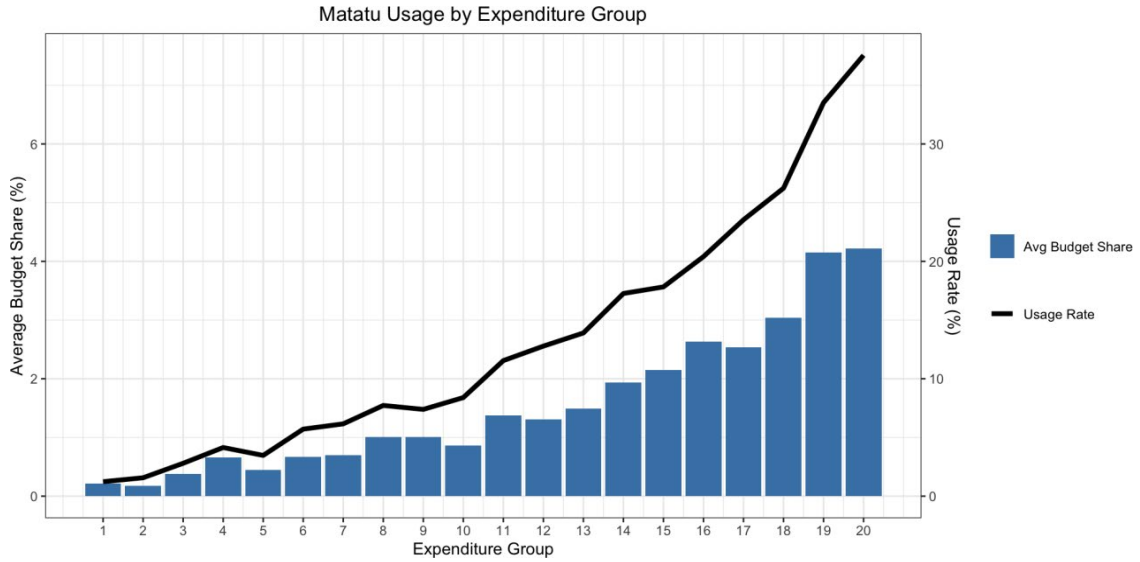
In the figures below, expenditure group is along the x-axis (each group represents 5% of the population), average budget share is shown in the blue bars, and usage rate is shown by the black line. The figures show that as household expenditure rises, so does the usage rate and average budget share of spending on petroleum, matatus, and private rides. The spread is the most pronounced for petrol usage, where 29.6% of households in the top expenditure group reported spending on petrol and it constituted on average 6.6% of their total expenditure, while only 0.2% of the bottom expenditure group reported any spending on petrol, and it constituted on average 0.04% of their expenditures. Similar trends, though less extreme, can be seen in the figures for matatus and private rides. Furthermore, the urban and rural breakdown largely follow the same trends, though consumption tends to constitute a higher budget share among rural groups compared to urban, particularly for petrol and private rides. This means that rural consumers may feel tax changes more strongly compared to urban ones.



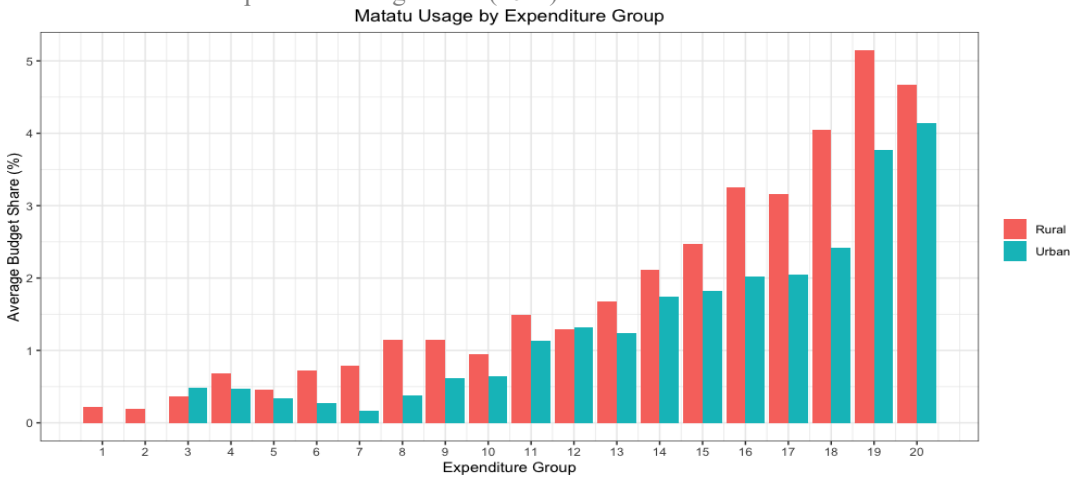
Source: Author's computations using KCHS (2022)



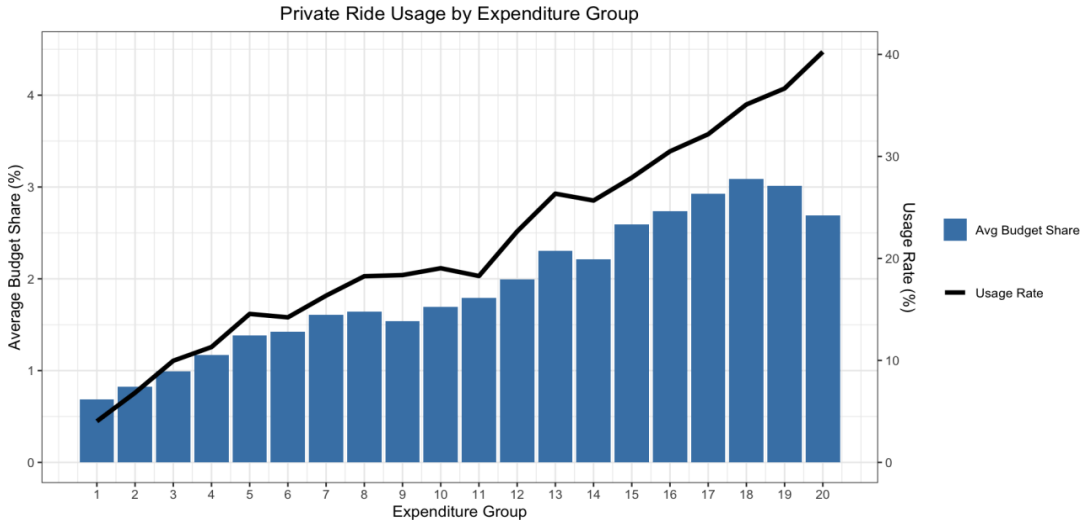
Source: Author's computations using KCHS (2022)



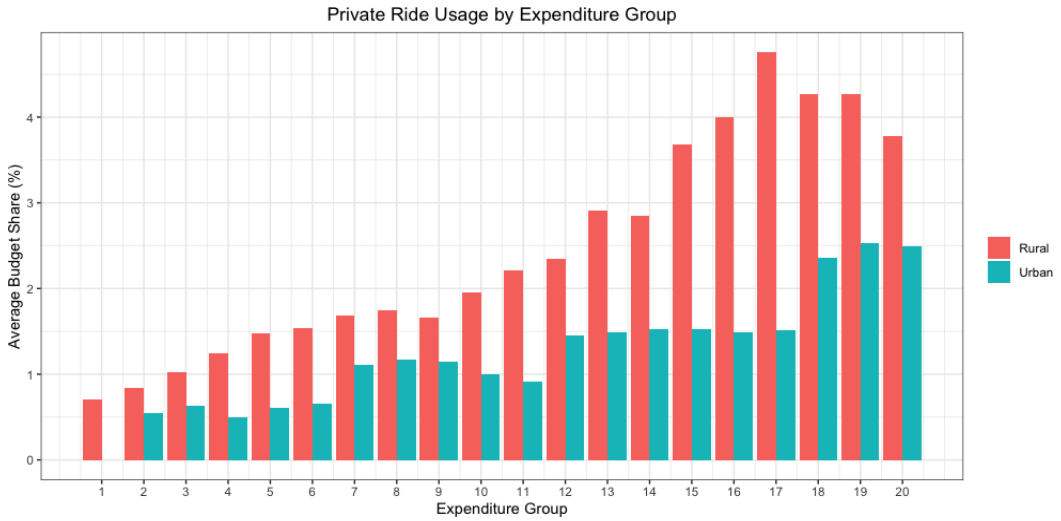
Source: Author's computations using KCHS (2022)



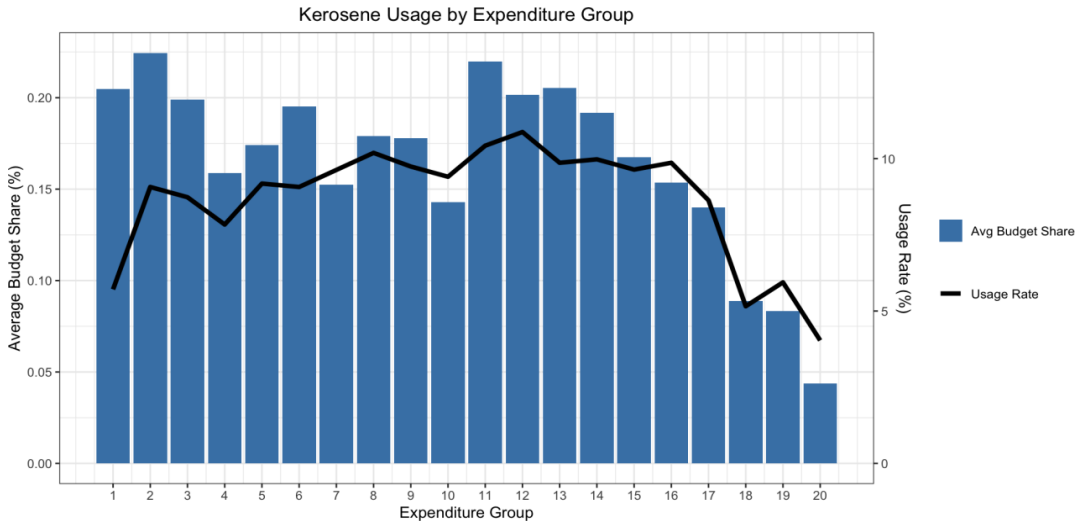
Source: Author's computations using KCHS (2022)



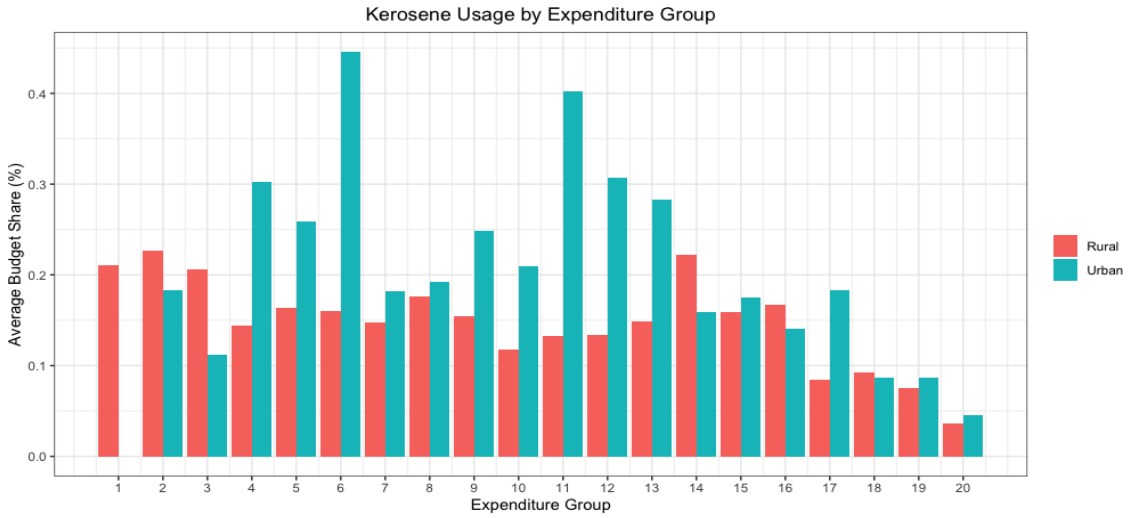
Source: Author's computations using KCHS (2022)



Source: Author's computations using KCHS (2022)



Source: Author's computations using KCHS (2022)



Source: Author's computations using KCHS (2022)

A.5 Household Expenditure Levels

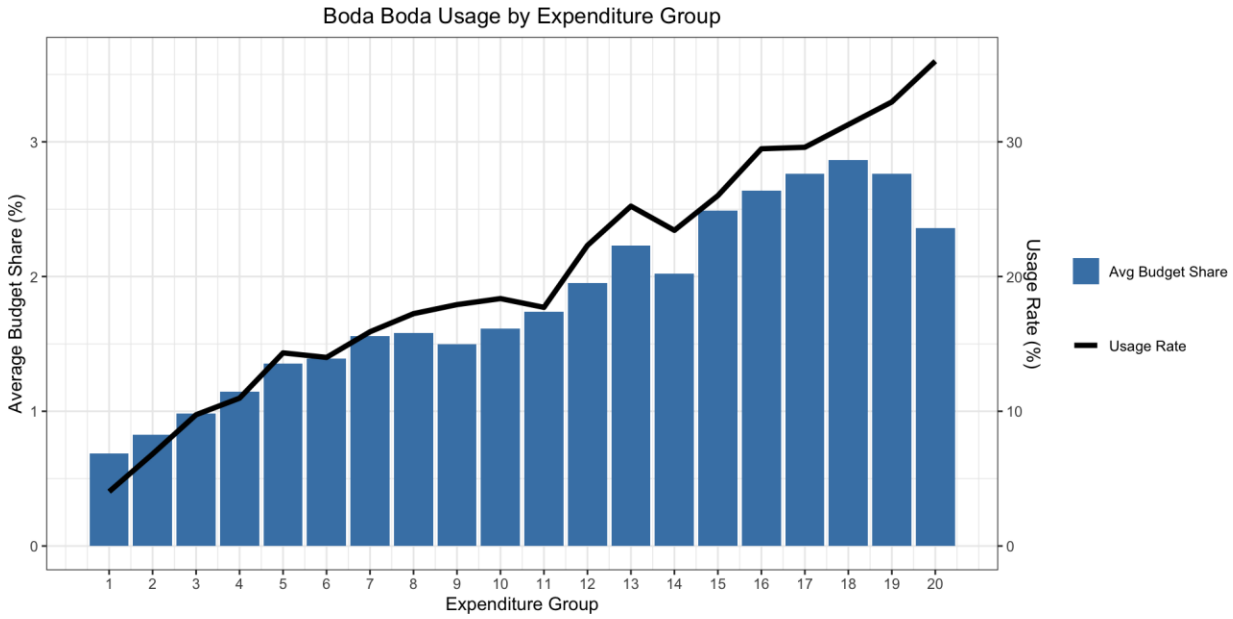
The table below shows the average household expenditure by expenditure group, with group 1 representing the lowest 5% of households, and group 20 representing the highest 5%, with average annual spending rising from KES 41,436 in the lowest group to KES 1,008,933 in the highest. This indicates a more than 24-fold increase from the bottom to the top, suggesting significant disparities in household spending power. The spending progression highlights a high level of spending inequality.

Household Expenditure Group	Average Annual Expenditure (KES)
1	41,436
2	69,077
3	89,221
4	105,863
5	122,546
6	139,474
7	155,382
8	171,580
9	188,230
10	204,731
11	222,504
12	241,870
13	263,024
14	286,818
15	315,926
16	353,040
17	404,489
18	470,500
19	586,848
20	1,008,933

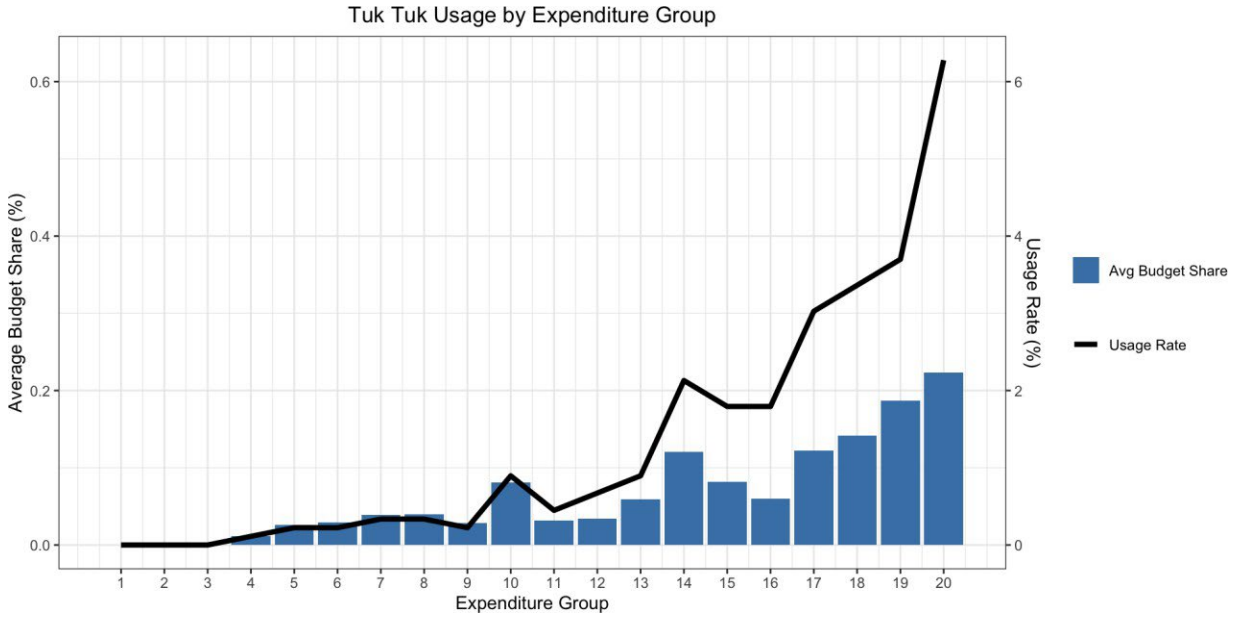
Source: Author's computations using KCHS (2022)

A.6 Private Ride Usage Breakdown

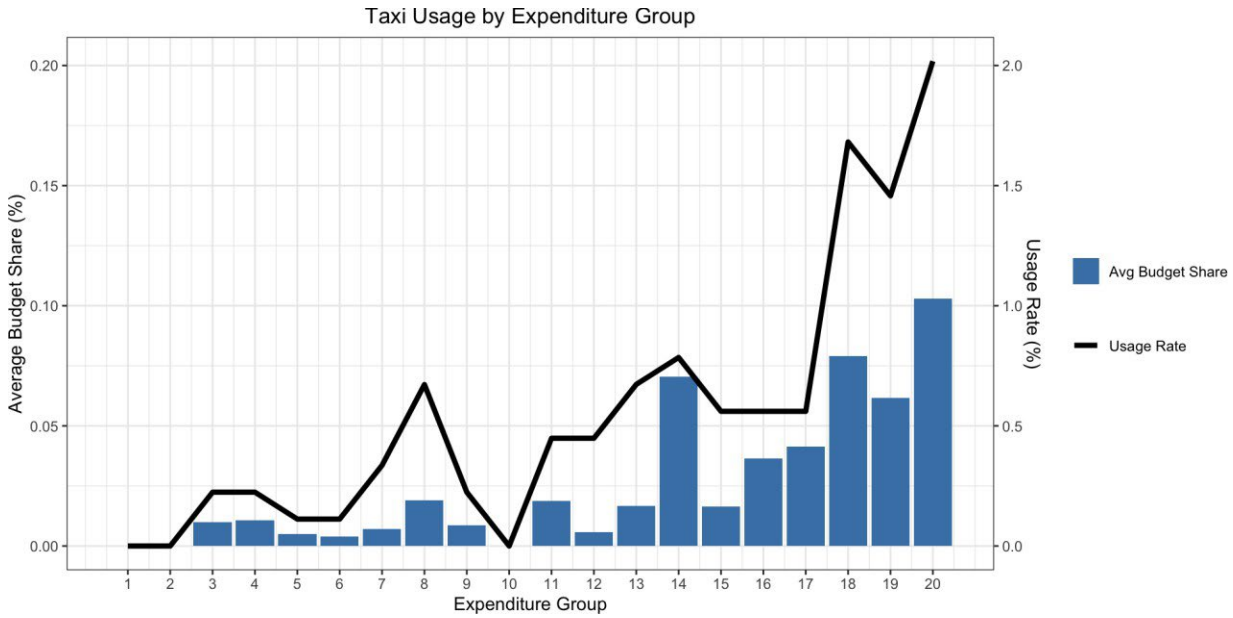
The figures below show usage in the individual components of private rides (boda bodas, tuk tuks, and taxis). They show that boda bodas are the primary component of private ride usage, while spending on tuk tuks and taxis are minimal.



Source: Author's computations using KCHS (2022)



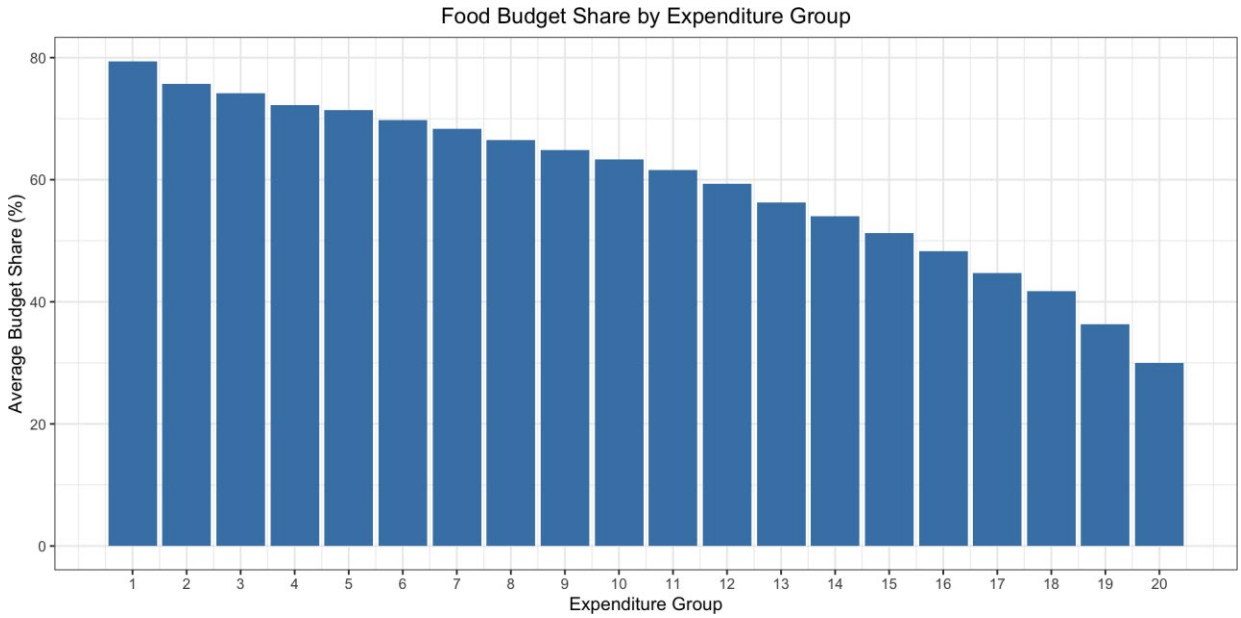
Source: Author's computations using KCHS (2022)



Source: Author's computations using KCHS (2022)

A.7 Food Expenditure

The figure below shows that households in the bottom expenditure group spend approximately 80% of their budget on food. Furthermore, more than 55% of the population (through expenditure group 11) spends over 60% of their budget on food, before gradually dropping to 30% for the highest expenditure group.



Source: Author's computations using KCHS (2022)

Mission

To strengthen local capacity for conducting independent,
rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

Bringing Rigour and Evidence to Economic Policy Making in Africa

- Improve quality.
- Ensure Sustainability.
- Expand influence.

www.aercafrica.org

Learn More

www.facebook.com/aercafrica

www.instagram.com/aercafrica_official/

twitter.com/aercafrica

www.linkedin.com/school/aercafrica/

Contact Us
African Economic Research Consortium
Consortium pour la Recherche Economique en Afrique
Middle East Bank Towers,
3rd Floor, Jakaya Kikwete Road
Nairobi 00200, Kenya
Tel: +254 (0) 20 273 4150
communications@aercafrica.org