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Excise Taxation in Kenya: A Situation Analysis

James Ochieng' and Rodgers Agwaya

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**James Ochieng’
Rodgers Agwaya**

**Kenya Institute for Public Policy
Research and Analysis**

2020

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Abstract

Excise taxes are an important source of revenue in most developing countries including Kenya. Excise taxes constitute a significant proportion of revenue in Kenya, between 1980 and 2018, excises in Kenya yielded an average of 3.1 per cent of GDP. This paper analyses the performance of excise taxes in Kenya over the last 3 decades. It also reviews the institutional and regulatory framework governing the excise tax system in Kenya. Further, using KIHBS data and employing Deaton's AIDS model, elasticities of demand for tobacco, alcoholic products, financial services and petroleum products are measured by estimating the demand functions of the excisable products. The study finds negative price elasticities for all the excisable products. However, soft drinks and financial services have the least price elasticities of demand, ranging from -0.210 to -0.548 and -0.203 to -0.635 respectively. Depending on the policy objective, the levying of excise taxes should be treated with caution as any increases in excise tax rates may result in undesirable outcomes and therefore, should not be guided by the concept of elasticity alone.

Abbreviations and Acronyms

AIDS	Almost Ideal Demand System
ASEAN	Association of Southeast Asian Nations
ATM	Automated Teller Machine
CED	Customs and Excise Department
DTD	Domestic Tax Department
EAC	East African Community
EU	European Union
EGMS	Excisable Goods Management System
GDP	Gross Domestic Product
KIHBS	Kenya Integrated Household Budget Survey
KNBS	Kenya National Bureau of Statistics
KRA	Kenya Revenue Authority
OLS	Ordinary Least Squares
TMP	Tax Modernization Programme
SACU	Southern African Customs Union
VAT	Value Added Tax

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1. Introduction

1.1 Background of the Study

Excise taxes have been an important component of total tax revenue in Kenya. Excise taxes, also termed “sin taxes”, are applied selectively on particular goods and services. In theory, excise taxes have several advantages over other types of taxes, such as administrative ease of collection (Okello, 2001). These taxes also tend to be levied on specific types of commodities, and different countries levy them for different reasons. They can be applied to compel the users of excised commodities to internalize the externalities that excisable commodities such as tobacco, alcohol and petroleum products tend to have. Excise taxes may also be used merely to generate revenue at relatively low administrative and compliance costs and improve the vertical equity of the tax system. In developed countries, excise taxes are sometimes levied to steer the industry concerned towards a desired strategic direction.

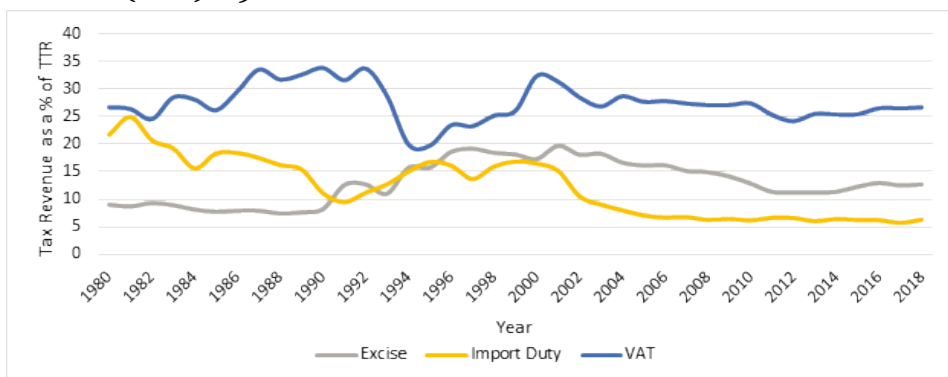
Excise taxes are taxes levied with discriminatory intent (Bolnick and Haughton, 1998). Goods selected for excise tax are often luxury goods and services. In Kenya, excise duties are levied mainly on alcoholic products, cigarettes and tobacco, mineral water, soft drinks and juices, airtime, financial transactions, automobiles e.t.c They are characterized by low-own price elasticity of demand and an income elasticity of demand greater than unity. The low-price elasticity implies low cut back on consumption of the goods as price increases. For this reason, coupled with low compliance or administrative costs and high tax rates, excise taxes are attractive to governments as sources of additional revenue to finance budget deficits.

In the case of Kenya, one can discern that excise taxes have been levied specifically for meeting the revenue requirements of the government. However, according to Osoro (1993), the revenue structures of most developing countries have not been as productive as desired. Too often the growth in revenue has failed to catch up with government spending pressures, a situation that has occasioned huge imbalances between the demand and supply of public budgetary resources. These countries have then had to reform their tax structures, with the general objectives of revenue adequacy, economic efficiency, equity and fairness, and simplicity. Kenya has undertaken several tax reforms between 1980 and 2017 aiming at, among others, boosting revenue collections. Despite these reforms, tax revenues in Kenya have remained at an average of 17 per cent of the GDP in the last 2 decades. This is below the vision 2030 target of 25 per cent of the GDP, with excise taxes constituting 3.6 per cent of the GDP. However, this is slightly above the Sub-

Saharan average of 16 per cent of the GDP but way below some Lower Middle-Income Countries (LMICs) in Africa such as Morocco (22%) Lesotho (30%) and Upper Middle-Income Countries (UMICs) such as Botswana (24%), South Africa (26%) and Namibia (30%).

Excise taxes as a percentage of total tax revenue averaged 13 per cent between 1980 and 2018. It portrays a consistent upward trend from an average of 8.2 per cent between 1980 and 1990, to 16 per cent between 1991 and 2000, before beginning to decline to an average of 14.3 per cent between 2001 and 2018 (Figure 1.1). The good performance of excise tax between 1990 and 2000 is in part due to expansion of excise tax basket to include imports and other products such as petroleum that were previously subjected to sales tax. The performance of import duty has been worsening, it declined from an average of 18.1 per cent between 1980 and 1991 to 14.4 per cent between 1991 and 2000, to 8.2 per cent between 2001 and 2010 and eventually to an average of 6.3 per cent between 2011 and 2018 (Figure 1.1). Compared to other taxes, VAT has been stable and constitute the largest share of taxes as a percentage of GDP, averaging 27.5 per cent between 1980 and 2018. Other than a decline which was experienced between 1993 and 1997 due to dropping of some products from the VAT list (like petroleum products in 1995), the performance of VAT taxes has been more stable compared to excise tax and import duty.

Figure 1.1: Excise, import and VAT taxes as percentages of total tax revenue (TTR): 1980-2018

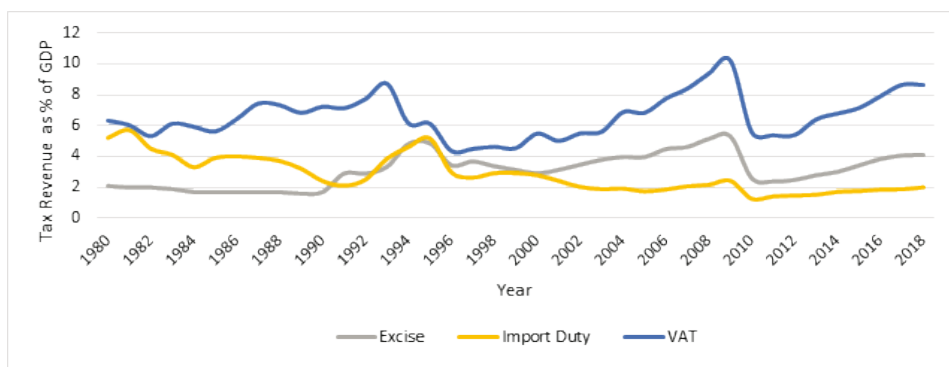


Data Source: KNBS, Economic Surveys, (Various Issues)

Excise taxes as a percentage of GDP averaged 3.1 per cent between 1980 and 2018 but demonstrate wide fluctuations. The share of excise taxes in GDP increased from an average of 1.8 per cent to 4 per cent between 2000 and 2010, before slowing down to 3.3 per cent of the GDP between 2011 and 2018. A sharp decline of revenue collection was witnessed for excise tax between 1997 and 2000 due to

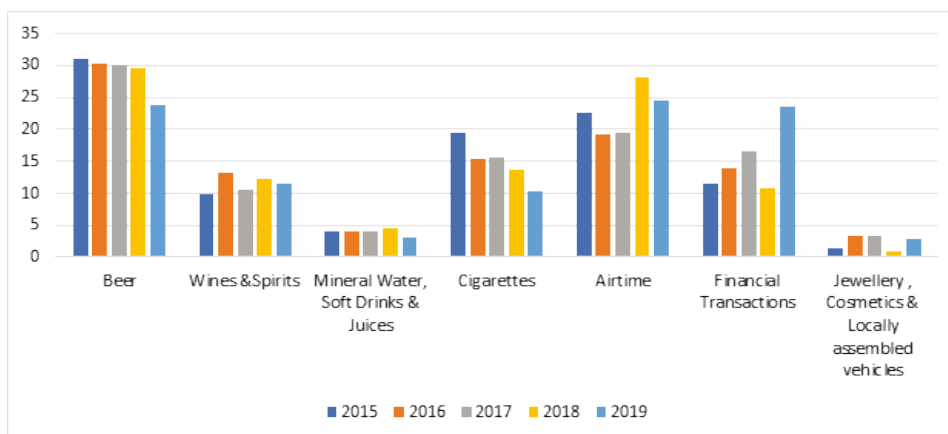
due to lower sales as a result of low output and reduced demand of the excisable products (KNBS, 2000). There was also a sharp decline between 2010 and 2012 due to removal of excise duty on kerosene and diesel and price wars among mobile telecoms firms. VAT taxes constitute the largest share of GDP, averaging 6.6 per cent of the GDP between 1980 and 2018. Import duty as a share of GDP averaged 2.8 per cent between 1980 and 2018, but fell from an average of 3.7 per cent between 1980-1999, to an average of 1.8 per cent between 2001-2017 (Figure 1.2).

Figure 1.2: Excise, import and VAT taxes as percentages of GDP: 1980-2018



Data Source: KNBS, Economic Surveys, (Various Issues)

Beer and airtime are the largest contributors to domestic excise tax revenues in Kenya (Figure 1.3). Between 2015 and 2019, contribution of beer to excise tax revenues was stable and averaged 29 per cent, though its share dropped from 31.2 per cent in 2015 to 23.8 per cent in 2019. Airtime revenue as a share of total excise revenue averaged 22.8 per cent between 2015 and 2019, the second largest contributor after beer. The contributions of airtime to excise tax revenue increased from 22.6 per cent in 2015 to 28.2 per cent in 2018, before dropping to 24.5 per cent in 2019. The share of financial transaction more than doubled, increasing from 11.5 per cent in 2015 to 23.5 per cent in 2019. Cigarettes are the fourth largest contributors to excise tax revenue, with an average share of 15 per cent. However, the share of cigarettes in excise tax revenue fell from 19.5 per cent in 2015 to 10.5 per cent in 2019. The contributions of wines and spirits averaged 11.5 per cent respectively between 2015 and 2019. The contribution from mineral water, soft drinks and juices averaged 4.0 per cent between 2015 and 2019, with the share dropping from 4.0 per cent in 2015 to 3.2 per cent in 2019. Jewellery, cosmetics and locally assembled vehicles are the smallest contributors to domestic excise tax revenue, with an average of 2.4 per cent between 2015 and 2019.

Figure 1.3: Components of domestic excise duty revenues (%): 2015-2019

Data Source: Economic Survey 2020

1.2 Statement of the Problem

A number of policy and administrative reforms have been implemented by the Government of Kenya through the revenue authority: KRA aimed at increasing efficiency and boosting tax revenue collections; Excise tax reforms have been a key component of the overall reform package, for example, implementation of excise goods management system in 2013; widening of excise tax base to include other goods and services; and increasing of excise tax rates over the years. Despite these reforms, overall tax revenue mobilization, including excise taxation remains low. The Vision 2030 target was to increase revenues from about 20 per cent of the GDP in 2006/07 to 25 per cent of the GDP in 2017/18 and maintain that level to 2030. Tax revenues as percentage of GDP have stagnated at about 20 per cent in two last decades, with excise taxes averaging 3.6 per cent of the GDP. Moreover, the share of excise tax revenue in total tax revenue has declined from 17 per cent between 1991 and 2004 to about 12.7 per cent between 2007 and 2017. The overriding objective of excise taxes in Kenya is to raise tax revenues, but the performance has been weak. Tax policy should take into consideration the price elasticities of demand for various products to optimize revenue collection. Therefore, a study that analyzes excise taxation in Kenya with specific focus on the elasticities of the commodities in the excise tax basket could improve the excise policy and hence revenues.

1.3 Objectives

The broad objective of this study is to review the performance of excise tax and nature of excise taxation in Kenya.

1.3.1 Specific Objectives

- i) To review the performance of excise tax revenues in Kenya
- ii) To provide an overview of regulatory and institutional framework on excise tax management
- iii) To review international best practices in management of excise tax
- iv) To estimate the elasticities of excisable goods in Kenya

1.4 Organization of the Study

The rest of the study is organized as follows: Section 2 reviews the related literature, it begins by providing history of excise tax reforms in Kenya; provides an evolution of excise tax basket in Kenya; presents administrative aspects relating to excise taxes; discusses the international experience of excise taxation and reviews empirical literature on excise taxation. Section 3 describes the estimation methodology using survey data. In section 4, the study discusses the estimated results and section 5 links excise taxation and revenue components. Lastly, section 6 concludes and gives policy implications based on the study findings.

2. Literature Review

2.1 Excise Tax Reforms in Kenya

According to Gill (2003), there are several reasons why tax reforms may be necessary for a country. First, weaknesses in revenue administration may result in shortfalls in tax collections. The actual amount collected by the government is largely determined by the efficiency and effectiveness of the revenue administration. Second, the quality of revenue administration impacts on the investment climate and private sector development. A revenue administration that is unpredictable dampens investments. Third, tax administration may carry out reforms to minimise revenue leakages through corruption. Lastly, revenue administration reforms may be required to allow the tax authority keep up with the increasing sophistication of business activity and tax evasion schemes. In Kenya, the general principle of excise tax reform has been to make excise taxes (i) simple to administer by keeping few domestic production points; (ii) Fair by netting products that are not consumed by the poor; (iii) Efficient by targeting consumption rather than production; and (iv) to generate an ample flow of revenue by targeting high total sales value.

The Government began to implement a tax modernization program in the late 1980s with a major objective of reforming the tax system through the standardization and rationalization of tax structures (Okello, 2001). A review of the excise tax policy indicates that at the time of implementing the tax modernization programme, Kenya maintained a specific excise tax regime. This is evident from the discretionary changes that were made in every budget speech from 1984/5 to 1988/9, when excise taxes on tobacco and beer were changed annually but the objective was always the same: to ensure that prices were kept in line with domestic inflation and to maintain the level of revenue in real terms.

In fact, excise taxes on cigarettes and tobacco products were raised annually until 1988/9 by an overall weighted average of 10 per cent. This clearly illustrates the challenge faced by the country in pursuing a specific tax regime at a time when the economy was experiencing moderate inflation. As long as the country used excise taxes for revenue maximization, maintaining a specific tax regime during a period of moderate inflation was going to be a challenge. Uncertainty in investment and consumption decisions regarding excised commodities was an issue: action was contingent on policy pronouncements of whether rates, depending on the inflation outcome, were going up or down.

Kenya introduced a Tax Modernization Programme (TMP) in 1986 to address issues affecting excise tax policy and system. At the time of implementing the TMP, Kenya maintained a specific excise tax regime. Before the TMP programme in 1986, the tax regime there was annual change in excisable tax to ensure prices are consistent with domestic inflation. This ensured constant level of real excise tax revenue (Mutua, 2011). This regime however was unpopular since excise tax rates depended on outcome of domestic inflation and therefore, created uncertainties on consumption and investment of excisable goods.

The major effort to reform excise taxation was undertaken in 1991 when fundamental changes were made to its structure. It was extended to cover not only an additional range of domestic goods, such as wines and carbonated soft drinks, but also imported goods as well. A number of excise rates were also converted from specific to *ad valorem* basis. Cigarettes, tobacco, and matches were also made subject to VAT at the standard rate of 18 per cent in addition to excise tax. As part of the TMP and to ensure revenue maximization, there was a switch between specific rate and *ad valorem* regimes in 1991/92. Specifically, there was a change from specific excise tax rates from specific to *ad valorem* for tobacco and alcoholic products. The move was aimed at helping the government achieve its multiple objectives of: i) Ensuring that excise tax revenue increased in parallel with inflation, thus eliminating the need for discretionary measures. This automatic inflation adjustment was intended to offset the anticipated revenue loss from reduced import duty rates; ii) Allowing for the rationalization of VAT rates and increasing control over high tax rate goods; and iii) Giving equal tax treatment to all types of beer and closing the gap between malt and non-malt beer. According to Karingi et al (2005), the regime switch to *ad valorem* excise taxes in 1991/2 did not eliminate discretion as had been expected. During the following year, for instance, in order to take advantage of increased beer consumption, rates for alcoholic products were raised for revenue generation purposes. Another issue with Kenya's excise tax policy was the persistent continuation of multiple tax rates.

The excise tax basket was extended in 1993/94 to include petroleum products (and mineral and aerated waters and to cosmetics in 1995) which were previously subject to VAT. In addition, excise duty on cigarettes, which had been linked to three different price-based brackets, was changed to two length-based bands; furthermore, this amendment also improved the ease of administration. The next period in 1997/98 resulted in actions to rationalize the number of rates and standardize rates, for instance, excise duty on cigarettes in 1998 was changed to a uniform 135% rate for ease administration, collection and prevent mis-declaration of imported cigarettes. Similar measures were implemented on alcoholic products but the multiple rates on malt, non-malt and other local alcoholic products was retained.

In the last two decades, Kenya's excise tax policy has also been influenced by the East African Community (EAC) regional integration policies which focuses on harmonization of policies (Karingi and Wanjala, 2005). Thus, following regional integration efforts through the EAC and the commitment of the Partner States to reduce the taxation gap among them, Kenya reduced the *ad valorem* rates for malt beers from 95 per cent to 90 per cent in 1999/2000. Duties on beer and cigarettes were further reduced in 2000/01 with the key objective of continuing with the rationalization of duty rates within the EAC. It was hoped that the rationalization would strengthen control over the smuggled or untaxed commodities on the market. It is noteworthy that while excise taxes for cigarettes and alcohol were converted from specific to *ad valorem*, petroleum products continued to remain within the specific tax regime. The partner States came up with the East African Customs Management Act, 2004 to facilitate implementation of custom matters. According to the Act, 'for the purpose of assessing, collecting, accounting and enforcing the payment of excise duty on the importation of goods into Kenya, the East African Community Customs Management Act shall apply as if excise duty were customs duty.

In 2003/04, excise tax policy regime was reversed from *ad valorem* back to specific taxation for tobacco and alcoholic products. This was intended to simplify and improve effective tax rate. A hybrid excise duty of minimum specific tax and additional *ad valorem* was also introduced on both domestic and imported cigarettes. The hybrid system was aimed at curbing increased cases of smuggling and under-declaration of taxable value. Excise taxation of cigarettes and beer had been reverted back to a specific regime based on four bands, equivalent to an effective rate of 110 per cent. A specific excise regime was introduced on beer with three bands in an effort to reduce tax evasion, to simplify and improve the effective tax rate and the subsequent revenue yield while encouraging investment in quality cigarette and beer products for export. Evidence suggests that specific excise tax regimes in low-inflation countries are more favourable to investments in high quality products than *ad valorem* regimes. The main challenge facing beer taxation in Kenya are the high tax rates. A study by Karingi et al (2001) revealed that beer taxation (contributing about 60 per cent of excise revenue) in Kenya was excessive since the revenue maximizing (optimal) tax rate was between 62.5% and 89.3%. In the case of tobacco excise taxation, revenue maximizing tax rate was 128% (Kiringai *et al.*, 2002).

In 2008, the Customs and Excise Act was amended to include the affixing of prescribed excise stamps on certain goods. The application of Excise stamps is governed by the Excise Stamps Regulations 2008. It is a requirement to affix Excise Stamps on packets or containers of cigarettes and wines or spirits. In 2013,

the first phase of EGMS was rolled out by KRA in a bid to combat illicit production of goods and tax evasion among manufacturers, hence sealing loopholes on excise revenue loss. With exception of motor vehicles, the reform required all excisable goods such as spirits, beer, wine and cigarettes be fixed with stamps.

Table 2.1 provides a summary of the reforms that are linked to excise taxation and have been undertaken between 1980 to 2016.

Table 2.1: Summary of excise tax-related reforms in Kenya: 1980-2016

Year	Reform	Nature of Reform
1986	Tax Modernization Programme (TMP)	Administrative reform
1992	Switch from specific to <i>ad valorem</i>	Policy reform
1994	Petroleum products from VAT to excise	Policy reform
1995	Establishment of KRA	Administrative reform
1998	Standardization of rates (on cigarettes and some alcoholic products)	Policy reform
2001/02	Addition of cosmetics and locally assembled vehicles to excise tax basket	Policy reform
2003/4	Switch from <i>ad valorem</i> to specific for alcohol and tobacco products	Policy reform
	Hybrid excise duty on domestic and imported cigarettes	Policy reform
2004	Ratification of East African Customs Management Act, 2004	Policy reform
2006/7	Inclusion of Jewellery in excise tax basket	Policy reform
2008	Affixation of excise stamps on specified goods	Policy reform
2013	Introduction of EGMS system	Administrative reform
2015/16	Introduction of excise tax on airtime and financial transactions	Policy reform

Source: Author's elaboration using information from KRA and Third Medium Term Plan

2.2 Evolution of excise tax basket in Kenya 1980-2017

A historical analysis shows that excise taxes in Kenya were levied on the domestic production of only four product groups, namely cigarettes and tobacco, sugar, beer and spirits, and matches. Between 1980 to 1990, cigarettes and tobacco accounted for an average of 58 per cent of total excise revenue while alcoholic beverages, sugar and matches accounted for 22 per cent, 19 per cent and 1 per cent respectively. Cigarettes and tobacco, sugar and matches were subject to excise tax only, while alcoholic beverages were subject to high rates of sales tax in addition

to excise tax (Okello, 2001).

In early 90s, the coverage of excise taxes was expanded to cover both domestic production and imports. That is, all manufacturers, providers and importers of excisable goods and services were to pay excise duty. Between 1991 and 1995, excise duties were levied on both domestic production and imports of seven products, namely alcoholic beverages, tobacco products, petroleum products, motor vehicles, perfumes, mineral water, and soft drinks. Specifically, in 1994, the government expanded the coverage of excise taxes to include mineral and aerated waters and petroleum products and to cosmetics in 1995. Petroleum products had been previously subject to VAT, but this was converted to an excise tax for revenue purposes. Matches were dropped from the list of excisable products in 1997. The excise rates of these products are presented in Table 2.2 and Table 2.3.

Table 2.2: Goods and services liable to excise duty

Descriptions	Rate of duty in Ksh
Juices	7% of the excisable value
Mineral water, ice blocks	5% or Ksh 3 per litre
Sodas,	7%of the excisable value
Cosmetics,	5% of the excisable value
Petroleum jelly	5% of the excisable value
Other non-alcoholic beverages	7% of the excisable value
Malted Beers	Ksh 54 per litre
Beer not made from malt	Ksh 45 per litre
Wine	Ksh 70 per litre or 50 % of the excisable value
Spirit	Ksh 120 per litre or 65 % of the excisable value
Petroleum fuels and motor vehicles	A specific exercise rate is being applied to all petroleum products. The rates for automotive fuels are Ksh 19.505 per litre for regular (leaded) gasoline, Ksh 19.895 per litre for premium (unleaded) gasoline, and Ksh 10.305 per litre for diesel. Motor vehicles are taxed at <i>ad valorem</i> rate of 20%.
Mobile Cellular phone services	10% of the excisable value
Other wireless telephone services	10% of the excisable value
Plastic shopping bags	50% of the excisable value
Processed Tobacco	130% of excisable Value

Source: KRA

Table 2.3: Excise tax rate on cigarettes

Category	Description	Rate of excise duty Ksh per mille
A	Plain cigarettes or plain cigarettes RSP of up to Ksh 2500 per mille	700
B	Soft Cap Cigarettes of <72 mm or Soft Cap cigarettes with RSP of Ksh 2501 -3500 per mille	1000
C	Soft Cap, cigarettes of > 7.2 mm or Soft Cap cigarettes with RSP of Ksh 3501 - 4500 per mille	1,500
D	Hinge lid or RSP of more than Ksh 4500 per mille	2500

Source: KRA

In an effort to increase the tax revenues collections, the Government further expanded the tax basket in 2006 to include Jewellery. The basket remained unchanged up to 2015 when the government expanded the basket further to include airtime and financial transactions. The government introduced excise duty on fees charged for money services by cellular phone service providers, banks money transfer agencies and other financial service providers at a rate of 10 per cent of their excisable value.

In conclusion, the excise tax basket in Kenya has changed over time, between 1980 and 2018. In addition, the excise taxation seems to undergo continuous reform, taxes are switched from specific to *ad valorem* rates, back to specific and in some cases a mixture of specific or *ad valorem*. Table 2.4 provides a summary of the evolution of excise tax basket in Kenya between 1980 and 2018.

Table 2.4: Summary of evolution of excise tax basket in Kenya: 1980-2018

Year	Excise Tax Basket	Nature of Excise Tax	Tax Rate
1980/81-1990	<ul style="list-style-type: none"> • Beer and Spirits • Sugar • Cigarettes and Tobacco • Matches 	<ul style="list-style-type: none"> • Specific charges for: Beer • <i>Ad valorem</i> for: Cigarettes 	<ul style="list-style-type: none"> • 17% for cigarettes
1991-1995	<ul style="list-style-type: none"> • Beer and Spirits • Sugar • Cigarettes and Tobacco • Matches • Petroleum products • Mineral and aerated waters 	<ul style="list-style-type: none"> • Specific for: Petroleum products • <i>Ad valorem</i> for: Cigarettes and carbonated soft drinks 	<ul style="list-style-type: none"> • 18% for cigarettes and matches • 15% for Cigarettes in 1995/96

1996-2000	Beer and Spirits Sugar Cigarettes and Tobacco Petroleum products Mineral and aerated waters Motor vehicles	Specific for: Petroleum products <i>Ad valorem</i> for: Cigarettes, carbonated soft drinks and motor vehicles	17% for Cigarettes in 1997/98 16% for Cigarettes in 1998/99 15% for Cigarettes in 1997/98 18% for Cigarettes in 2000/01 90% for beer
2001-2005	Beer and Spirits Sugar Cigarettes and Tobacco Petroleum products Mineral water Matches Cosmetics Locally assembled vehicles	2001-2003- <i>Ad valorem</i> for: Cigarettes and beer 2003/4- Switch from <i>ad valorem</i> to specific for: alcohol and tobacco products	18% for Cigarettes in 2000/01 16% for Cigarettes in 2003/04 Beer-85%
2006-2014	Beer and Spirits Sugar Cigarettes and Tobacco Petroleum products Mineral water Matches Cosmetics Locally assembled vehicles Jewellery Mobile Cellular Services	Specific for: Beer, plain cigarettes, wines and petroleum products <i>Ad valorem</i> for: Mobile cellular services, plastic bags	16% <i>ad valorem</i> 2008 Plain cigarettes-Ksh 700 per mile Malt beer-Ksh 54 per litre Wines-Ksh 7 per % of alcohol content in a litre Mobile cellular services-10% of their excisable value Plastic bags-50% excisable value
2015-2018	Beer and Spirits Sugar Cigarettes and Tobacco Petroleum products Mineral water Soft drinks and Juices Matches Cosmetics Locally assembled vehicles Jewellery Airtime Financial transactions	Specific for: Beer, wines, spirits, cigarettes, fruit juices, water, petroleum products, plastic shopping bags <i>Ad valorem</i> for: Soft drinks, cosmetics, airtime, financial transactions, motor vehicles Hybrid for: Mineral water	Beer- Ksh 100 per litre, wines- Specific (Ksh 150 per litre) Cigars-specific (Ksh 1,200 per mille) Mineral water- tax mix (Ksh 5 per litre or 5 % whichever is higher). Soft drinks - <i>Ad valorem</i> (7 %), fruit juices (Ksh 10 per litre) Airtime- <i>ad valorem</i> (10% of excisable value) Financial Transactions- <i>ad valorem</i> (10 %)

Source: KNBS, *Economic Surveys (Various Issues) and Excise Duty Act, 2015*

2.3 Levying and Administration of Excise Tax

Taxes are generally applied to raise government revenue and for redistribution of wealth. However, excise taxes are normally applied to a specific category of goods and services which in most cases are considered to have negative effects or externalities resulting from their consumption. Such commodities include tobacco

products, alcohol, petroleum products, motor vehicles and gambling (Cnossen, 2005). Excise taxes are also imposed on plastic bags to reduce their consumption in order to prevent environmental degradation. Excise taxes are also levied on imported goods which are similar to those manufactured domestically and are subject to excise taxes.

Excise taxes have traditionally been used to raise revenues, with taxes imposed on commodities with few substitutes¹ and exhibiting relatively low-price inelastic demand. For example, mineral water, other non-alcoholic beverages, mobile phones and petroleum jelly do not have a clear rationale rather than for purposes of raising revenue. In the modern world, excise tax policies are designed to correct negative externalities, this explains why commodities such as alcohol, tobacco, petroleum products, motor vehicles are subjected to excise tax in order to account for the negative externalities in the prices paid by the consumers. In addition, excise taxes are also levied to promote vertical equity of the tax system.

The actual amount of tax revenues collected depend largely on the efficiency and effectiveness of a tax administration. Therefore, according to Gill (2003), there is need for regular tax reforms to keep up with the pace of changing business activities and tax evasion schemes. Excise tax administration and compliance costs involves both administration by relevant government body and administration by the taxpayers. Government administration constitute costs of licencing and monitoring production and payments and ensuring compliance through a system such as permanent presence in factories or conducting audits all of which require large amount resources (Preece, 2014). In principle, complex tax structures are more difficult to administer, create more avenues for tax evasion and avoidance and less effective in realising government revenue goals. A simplified tax structure for excisable goods will ease tax administration, minimize tax avoidance and evasion and improve revenue collection.

The nature of tax rate, whether *ad valorem* or specific tax have implications on administration and compliance. According to Preece (2014), excise taxes are easier to administer in terms of administration and compliance costs when levied at a specific rate since 'the excise is determined by a simple count of volume passing the taxing point'. On the other hand, *ad valorem* taxes are more complex to administer and sometimes results in disputes between tax authorities and taxpayers on which cost component should and should not be part of the excisable value. In addition, under *ad valorem* tax, taxpayers always look for strategies to lower their burdens by transferring some costs above the taxing point and hence not within the excisable value used to calculate the tax.

¹ Excise taxes tend to be less effective in situations where there are many substitutes for the product subjected to tax.

2.3.1 Legal and Institutional Framework

The various laws governing the levying of excise taxes are in the Constitution of Kenya, 2010, Acts of Parliament and Finance Acts which are enacted on annual basis. The Constitution of Kenya, 2010 gives a distinction of which form of taxes may be imposed by which level of government. Article 209 (1) gives the national government powers to impose income tax; VAT, custom duties and other duties on import and export goods; and excise taxes.²

Excise taxes in Kenya are imposed under the Excise Act 2015. The Excise Act 2015 and Tax Procedures Act came into effect in December 2015 and repealed the Customs and Excise Act, Cap 472 of 2010 of the Laws of Kenya, that previously administered excise duty in Kenya. The Act provides for the management, administration, charging, assessment and collection of excise duty in Kenya. The Finance Act 2018 made amendments to Excise Act 2015 to introduce excise duty on internet data and telephone services at the rate of 15 per cent.

Customs and Excise Act Cap 472 generally defines the goods and services subject to excise duty; the administrative structure of the goods; collection and accounting of tax; specifies the penalties for non-compliance, dispute resolution mechanisms and highlights the powers of the Commissioner. Other legislations used in the administration of excise duty includes: East African Customs Management Act, 2004; Alcoholic Drinks Control Act for administrative purposes; and Poisons and Drugs Act and Medical Practitioners Act for exemptions.

KRA is a government agency mandated with the collection and receipt of all revenues of national government.³ KRA was established in 1995 by an Act of Parliament under Chapter 469 of the Laws of Kenya. The Act established KRA as a 'central body for the assessment and collection of revenue, for the administration and enforcement of the laws relating to revenue and to provide for connected purposes. The KRA body is under the general supervision of the Cabinet Secretary, the National Treasury. KRA has two main departments: Domestic Taxes Department (DTD) and Customs and Excise Department (CED). All excise taxes, both on domestic production and imports are under CED. In addition, CED is responsible for VAT on imports and trade taxes. DTD is responsible for PAYE taxes, corporate income taxes (CITs), withholding tax, VAT on domestic production and domestic excises.

The KRA Commissioner General is the chief executive of the revenue authority. Under the Commissioner general are six other Commissioners in charge of: DTD, Customs and Border Control Department, Corporate Support Services

² See the Constitution of Kenya, 2010 for further details.

³ As stipulated in the Public Finance Management Act of 2012 (78).

Department, Strategy, Innovation and Risk Management, Legal Services and Board Coordination, Intelligence and Strategic Operations and Investigations and Enforcements (KRA, 2019). The Excise duty on locally manufactured excisable goods and services is payable to the Commissioner of Domestic Taxes at the rates specified in the 5th Schedule. Excise duty on imported goods and services is accounted to the Commissioner, Customs and Border Control Department.

The National Treasury, which supervises the KRA, is established pursuant to Article 225 of the Constitution of Kenya. It comprises of the Cabinet Secretary who is the head, Principal Secretary, Departments and other offices dealing with economic and financial affairs. According to Public Finance Management (PFM) Act of 2012, the National Treasury is responsible for formulation and implementation of macro-economic policies related to expenditure and revenues. In this regard, the National Treasury shall enforce the tax rates and appropriate tax reforms.

2.3.2 Excise tax procedures

A manufacturer of excisable goods must apply to the Commissioner General for a licence at least 60 days before the manufacturer or importation of excisable good. The excise tax licence specifies the following: the class or classes of excisable goods that the manufacturer is licenced to manufacturer; the factory of factories at which the manufacturer is permitted to manufacture excisable goods and for excisable services, it must specify the excisable services to be supplied by the licenced supplier. Every excisable commodity, other than motor vehicles, manufactured in Kenya or imported is required to be affixed with an excise tax stamp (GoK, 2018).

A licenced manufacturer liable to excise duty shall pay excise tax not later than 20th day of the succeeding month once excisable goods have been removed from a manufacturer's factory in a given calendar month. Similarly, suppliers of excisable services shall remit excise taxes not later than the 20th day of the succeeding month once the excisable services have been supplied in a given calendar month. Excise duty on imports is payable to the Commissioner by the importer at the time of importation.

2.4 Excise Taxation: International Experience

2.4.1 Excise Tax in EAC and Other Regional Economic Blocs

Table 2.5 shows the excisable commodities and tax rates within the East African Community.

Table 2.5: Excisable Commodities in EAC

Commodity	Burundi	Kenya	Rwanda	Tanzania	Uganda
Beer-Malted	US \$ 20	Ksh 54 per litre	60%	US \$ 0.35 per litre	60%
Beer-Unmalted	-	Ksh 45 per litre	-	US \$ 0.2 per litre	30%
Wine	80%	50%	70%	2,466.45-25% imported grapes 200-75% local grapes	20%-local grapes 80%% imported grapes
Spirit, Liquor etc	US \$ 0.07 per litre	65%	70%	US \$ 1.60 per litre	60% local raw materials 100% imported raw materials 80% ready to drink spirits
Cigarettes	US \$ 0.01 per unit	35%	36%	30%	150%
Carbonated drinks	US \$ 16.44	7%	39%	US \$ 0.03 per litre	12%
Juices	US \$ 16.44	7%	5%	US \$ 0.10 per litre	13%
Bottled Water	13%	5%	10%	US \$ 0.03 per litre	10%
Motor vehicle	5% less than 1500cc 10% (1500-3000cc) 15% (above 3000cc)		5% less than 1500cc 10% (1500-2500cc) 15% (above 2500cc)	5% 1500-2000cc 10% 2000-3000cc 15% 8-10yrs 30% more than 10 yrs	
Cellular Phone Services	-	12	10%	-	14%
Kerosene	-	-	-	US \$ 0.18 per litre	US \$ 0.05 per litre
Cosmetics	-	5%	-	10%	10%

Source: EAC Secretariat and Various Country Authorities

Table 2.6 indicates the nature of commodities subject to excise taxation in different regional economic blocs around the world.

Table 2.6: Excisable Commodities in EAC vs other Economic Blocs

Product in EAC	Excisable in EU	Excisable in SACU	Excisable in ASEAN	Comments
Alcohol	Yes	Yes	Yes	Universally excisable
Tobacco	Yes	Yes	Yes	Universally excisable
Petroleum	Yes	Yes	Yes	Universally excisable
Soft drinks	No	No	Yes	Excisable in EAC and ASEA
Mineral water	No	No	No	Only excisable in EAC
Motor vehicles	No	No	No	Only excisable in EAC
Plastics	No	No	No	Only excisable in EAC
Sugar	No	No	No	Only excisable in EAC
Cosmetics	No	Yes	No	Excisable in EAC and SACU
Cement	No	No	No	Only excisable in EAC

Source: PricewaterhouseCoopers (PWC), (2014)

2.4.2 Excise Taxation: Country Experiences

Excise Taxation in Nigeria

Excise taxes in Nigeria yield relatively low revenue and constitute less than 2.3 per cent and 0.04 per cent of the total tax revenue and GDP respectively (IMF, 2018). The excise tax basket in Nigeria only tobacco products and alcoholic beverages at a rate of 20 per cent regardless of the alcohol content (Table 5). Petroleum products do not attract excise tax while non-alcoholic beverages, fruit juices and telephone cards previously attracted excise tax at 5 per cent rate but was abolished in 2009. Further, excise duties on imported excisable goods are not levied in Nigeria but incorporated in the import duty.

Table 5: Excise Tax Rates in Select Countries

Commodity	Kenya	Nigeria	South Africa ⁴	Botswana
Beer	54 per litre	20%	35%	40%
Wine	50%	20%	23%	40%
Spirits	65%	20%	48%	40%
Tobacco	35%	20%	50%	30%
Soft Drinks	7%	0	-	-
Airtime	12%	0	-	-

Source: IMF (2018)

⁴ South Africa's rate is excise plus VAT. With a VAT of 14 per cent, VAT tax = $0.14/1.14=12.3$ per cent. Therefore, excise tax is approximately 23.3, 10.7, 35.7 and 37.7 per cent respectively for beer, wine, spirits and tobacco.

Excise Taxation in South Africa

South African government levies excise tax to raise tax revenue and to control the consumption of such products that have potential harmful effects on society. In South Africa, alcoholic products, tobacco attract excise taxes (Republic of South Africa, 2014). South Africa's excise tax collections averages about 3.5 per cent of the GDP and constitutes 12 per cent of total tax revenue (IMF, 2018)

Excise Taxation in Botswana

In Botswana, custom and excise taxes accounts for the largest share of total tax revenue at 44 per cent as of 2016 (Republic of Botswana, 2016). Excise taxes for tobacco and alcohol products in Botswana are 30 per cent and 40 per cent respectively. This makes the prices of tobacco and alcohol products to be more expensive in Botswana than in South Africa. For example, the cheapest beer price in Botswana cost more than double the cheapest price of beer on the South African border side. This could be a motivation for smuggling, however, there is efficient and effective customs and border control in Botswana that ensures that smuggling of the excisable goods is limited (World Bank, 2018). Therefore, no extremely low prices are experienced for such products in Botswana which would be the case if there was smuggling.

2.5 Empirical Literature

Using monthly data covering the period 1981-2000 to analyze tobacco excise tax in Kenya, Kiringai *et al.* (2002) illustrated the possibility of generating both short- and long-run effects of change in quantity demanded resulting from price changes. Their OLS estimates indicate high long-run responses ranging between -1.78 for all cigarette types to -1.36 for filter cigarettes and very low short-run responses for all cigarettes. They also argued that elasticities of demand for cigarettes are not always as low as assumed by the tax authorities. However, Okello (2001) employed an error correction model and established a much lower long -run price elasticity of demand at -0.36 for filter cigarettes and -0.26 for plain cigarettes in Kenya. He also found that Guinness beer was price elastic both in the short- and long-run, but the other beer were price inelastic in the short-run but elastic in the long-run. Specifically, the prices elasticity of demand for Guinness and other beer were -1.13 and -0.74 in the short-run and -5.49 and -1.11 in the long-run respectively.

Osoro *et al.* (2001) estimated the elasticity and buoyancy of excise taxes in Tanzania using an error correction framework using quarterly data for the period 1990-1998. Their results reveal that excise taxes are inelastic with respect to quarterly change in GDP but the buoyancy was higher than elasticity. In addition, products such as cigarettes, motor fuel, beer, *Chibuku* and *Konyagi* gin had inelastic demand both in the short-and long-run. The elasticities cigarettes, motor fuel and beer were -0.11, -0.16 and -0.22 respectively in the short-run and -0.16, -0.28 and -0.31 respectively in the long-run.

Some studies have employed micro data to estimate the elasticities of excisable commodities. Mugosa *et al.* (2018) applied Deaton demand model to estimate the price elasticity of tobacco in Montenegro using data from Household Budget Survey (HBS) for the period 2006-2017. They established that the price elasticity of demand for cigarettes was -0.58 among the sample of households studied. In a similar study, Selvaraj *et al.* (2015) used consumer expenditure survey data for 101,662 Indian household to establish the price elasticity of tobacco products. They disaggregated the households into low- and high-income households and established that price elasticities of cigarettes were higher (-0.83) among the low-income households and lower (-0.26) among the high-income households. The findings are similar to Rijo (2008) who found a relatively higher own-price elasticity of demand for cigarettes among rural households in India than those in urban. He concluded that the elasticities of tobacco products range between -0.4 to -0.9 with cigarettes being the least elastic with elasticity of less than 0.5 in India. Other studies that have used household survey data include Eozenou and Fishburn (2001) who relied on spatial variations in prices and quantities to estimate an Almost Ideal Demand System (AIDS) in Vietnam. Their findings revealed that price elasticity of cigarette was about -0.53 for Vietnam while that of alcohol was -0.63.

Studies which have been done the demand for cigarettes in South Africa have found that price elasticity range between -0.5 and -0.9 (Walbeek, 1996; Economics of Tobacco Control South Africa (ETCSA), 1998). The study by Walbeek (1996) employed single equation approach while ETCSA (1998) employed a system of equations. Reekie (1994) estimated price elasticity of tobacco at -0.88 for South Africa using time series data between 1970-1989.

Table 4.1: Summary of elasticities of excisable products from previous studies

Study/Country	Method/Data	Products	Price Elasticity
Kiringai <i>et al.</i> (2002) Country-Kenya	OLS estimation using annual data	All Cigarettes types	-1.36 to -1.78
Okello (2001) Country-Kenya	Error correction mechanism using monthly data for beer and cigarettes	Guinness Other beer Filter cigarettes Plain cigarettes	-1.13 (Short-run) -5.49 (Long-run) -0.74 (Short-run) -1.11 (Long-run) -0.4 (Short-run) -0.36 (Long-run) -0.35 (Short-run) -0.26 (Long-run)
Osoro <i>et al.</i> (2001) Country- Tanzania	Error correction mechanism using quarterly data	Cigarettes Beer Motor Fuel	-0.16 (Long-run) -0.31 (Long-run) -0.28 (Long-run)
Mugosa <i>et al.</i> (2018) Country-Montenegro	AIDS model using HBS data	Cigarettes	-0.58
Selvaraj <i>et al.</i> (2015) Country-India	AIDS model using expenditure survey data	Cigarettes	-0.83
Rijo (2008) Country-India	AIDS Model HBS data	Tobacco products	-0.4 to -0.9
Eozenou and Fishburn (2001) Country- Vietnam	AIDS Model HBS data	Cigarette Alcohol	-0.53 -0.63
Reekie (1994) Country-South Africa	Time series data and OLS to estimate a demand equation	Cigarette	-0.88
Walbeek (1996) Country-South Africa	Single Equation approach using annual data	Cigarettes	-0.5 to -0.9
ECTSA (1998) Country-South Africa and Zimbabwe	Time series data for South Africa: 1970-1994, Zimbabwe: 1970-1996	Cigarettes	South Africa: -0.57 to -0.59 (Short-run) -0.69 (Long-run) Zimbabwe: -0.52 (Short-run) -0.85 (Long-run)

3. Methodology and Data

3.1 Almost Ideal Demand System

This study adopts the Almost Ideal Demand System (AIDS) model by Deaton and Muellbauer (1980). The AIDS model is a popular approach because of its generality and it satisfies many properties of standard utility functions. The AIDS model is chosen because of several strengths: the model provides arbitrarily the first order approximation for any demand system and definite estimations of axioms of choice. It aggregates consumers perfectly (PIGLOG class). Further, according to Blanciforti and Green (1983), the model has a functional form which is consistent with household budget data. In addition, it is easier to make estimations in the form of linear approach and easily used to test homogeneity and symmetry constraints. Therefore, the empirical model adopted in this study follows Deaton and Muellbauer AIDS model.

According to Deaton and Muellbauer (1980), the demand functions derived expresses budget shares (w_i) as functions of prices (P_j for good j and P for the price index) and income Y : The model is specified as:

$$w_i = \alpha_i + \sum_{(j=1)}^N \varphi_{ij} \ln P_j + \delta_i \ln (Y/P) + \sum_k \varphi_k D_k \dots\dots\dots (1)$$

$i = 1, 2, \dots, N$ and $j = 1, 2, \dots, N$

Where w_i is the share of a good i in the total expenditure; P_j are prices; Y is the total expenditure on all products; P is the price index; i and j are goods; D_k is the demographic and socioeconomic characteristics. The price index is defined as:

$$\ln P = \alpha_o \sum_{(i=1)}^N \alpha_i \ln P_i + 1/2 \sum_{(i=1)}^N \sum_{(j=1)}^N \varphi_{ij} \ln P_i \ln P_j \dots\dots\dots (2)$$

Where α_o , α_i , δ_i , and φ_{ij} are different parameters to be estimated.

To ensure the demand system takes a linear form and minimize the inconsistencies associated with the price index, Equation (2) is usually replaced by a Stone price index defined as:

$$P^* = \ln P = \sum_{(h=1)}^N w_h \ln P_h \dots\dots\dots (3)$$

Where w_h is the mean of the budget share in period t .

The expression of the budget shares in terms of the Stone geometric index is obtained by substituting equation (3) into (1):

$$w_i = \alpha_i + \sum_{(j=1)}^N \varphi_{ij} \ln P_j + \delta_i \ln (Y/P^*) + \sum_k \varphi_k D_k + \mu_i \dots\dots\dots (4)$$

In economic theory, Equation (4) (budget shares) are referred as the Linear Approximation of the Almost Ideal Demand system (LA/AIDS) because the model yields a system of linear parameters. One advantage of using budget shares is that zero consumptions are taken into account, contrary to the case where the demand equation is expressed in a logarithmic form.

For consistency with microeconomic theory, additive, homogeneity and symmetry restrictions must be satisfied. They are denoted as:

Adding up

$$\sum_{(i=1)}^N \alpha_i = 1, \sum_{(i=1)}^N \varphi_{ij} = 0, \sum_{(i=1)}^N \delta_i = 0 \dots\dots\dots (5)$$

The adding-up restriction given by Equation (5) ensures that budget shares add up to total expenditures.

Homogeneity

$$\sum_{(j=1)}^N \varphi_{ij} = 0 \dots\dots\dots (6)$$

The homogeneity restriction given by Equation (6) ensures that demands are homogenous of degree 0 in prices and income.

Symmetry

$$\varphi_{ij} = \varphi_{ji} \dots\dots\dots (7)$$

For $i = 1, 2, \dots, N$ and $j = 1, 2, \dots, N$

Equation (7) ensures that the Slutsky matrix is symmetric

According to Hayes *et al.*, (1990), using the specified equations 5-7, Marshallian (uncompensated) and expenditure elasticities can be derived.

The estimated Marshallian own-price elasticity of demand is given as:

$$\epsilon_{ii}^M = -1 + \varphi_{ij} / w_i - \delta_i \dots\dots\dots (8)$$

The estimated Marshallian cross-price elasticity of demand is obtained as:

$$\epsilon_{ij}^M = -\gamma_{ij} + \varphi_{ij} / w_i - \delta_i (w_j / w_i) \dots\dots\dots (9)$$

Expenditure elasticities is given by

$$\eta_i = 1 + \delta_i / w_i \dots\dots\dots (10)$$

Where $\gamma_{ij} = 1$ for $i=j$ and $\gamma_{ij} = 0$ for $i \neq j$. ϵ_{ij}^M and η_i are Marshallian and expenditure elasticities respectively. The Hicksian (compensated) elasticities can be derived the Marshallian elasticities using the Slutsky equation. The Hicksian elasticities are given as:

Hicksian own-price elasticities

$$\epsilon_{ij}^H = -\gamma_{ij} + \varphi_{ij} / w_i + w_{jt} \dots\dots\dots (11)$$

Hicksian cross-price elasticities

$$\epsilon_{ij}^H = -\gamma_{ij} + \varphi_{ij} / w_i + w_{jt} \dots\dots\dots (12)$$

The estimation of the AIDS model requires one to group the commodities consumed by households into different related commodity groups such as tobacco products, alcoholic products, soft drinks e.t.c. It requires data on the prices of various commodities, quantity consumed of each commodity by a given household, expenditure on a given product e.g. beer, and the total expenditure on related commodities such as alcoholic products. For example, the total expenditure on the alcoholic products would be obtained by the summation of expenditure on beer and traditional beer. The household survey data gives data on prices, quantities consumed and the expenditures for various commodity groups used in this analysis. The budget shares (w_i) within a group of commodities are estimated from the survey data as total expenditure on good i out of the total expenditure on a given group of commodities (Y). Prices (P_i) are given as the amount paid by the households on the various commodities in the past one week. The quantities (Q_i) are derived from how much was purchased in the past one week. The household survey data shows the weekly demand for various commodities at given prices. The budget elasticities indicate the how quantity purchased change with respect to change in household's expenditure (income). The price elasticities estimate the responsiveness of consumer demands to changes in prices. If price elasticity of demand is greater than 1, then the demand is said to be price elastic and increase in price would lower the quantity demanded by more than the proportionate increase in prices. Price elasticities of less than 1 indicate less responsiveness of consumers to price changes. Such kind of commodities are likely to generate more tax revenues.

The expenditure on a group of commodities such as alcoholic products would be given as:

$$Y_i = \sum_i^k P_i Q_i \dots\dots\dots (13)$$

Where P_i and Q_i are prices and quantities of various consumed by households such as beer and traditional beer. Equation (13) is used to generate the total expenditure on different commodity groups. The budget shares (w_i) are obtained by Y_i/Y , where Y is the total expenditure on a group of commodities such as tobacco products, alcoholic products etc. To compute expenditure and price elasticities in Stata, a program developed by Poi (2002) uses the commands *estat expenditure* and *aidsills elas* to automatically generate the expenditure shares w_i and the elasticities for a given group of products.

3.2 Data

Estimation of the LA/AIDS model requires data on budget shares of the excisable goods and their respective prices. For this study, household expenditures are distributed on main product groups: Tobacco products: cigarettes and tobacco pipe/raw (snuff); Alcoholic products: beer and traditional beer; Soft drinks: mineral water, squashes, sodas, and other drinks; and Financial Services. Data on expenditure on tobacco products, alcoholic products, soft drinks and financial services was obtained from Kenya Integrated Household Budget Survey (KIHBS) conducted by the Kenya National Bureau of Statistics (KNBS) for 2015/16 period. Budget shares for the respective excisable goods are obtained by dividing household expenditure on a particular commodity group by the total household expenditure. To compare the change in trends overtime, the study also estimated the price elasticities of demand using KIHBS 2005/06 by KNBS.

One advantage of using household survey data over aggregate data is that it is possible to estimate a system of demands, accounting for different kinds of goods purchased, instead of a single demand equation. The estimation of a single demand equation may give a wrong picture of consumption patterns because substitution and complementarity effects between different kinds of commodities are discarded.

4. Price Elasticity of Demand

4.1 Price Elasticities for Tobacco Products

4.1.1 Descriptive Statistics

From the KIHBS 2015/16 survey, a total of 2,738 surveyed individuals consumed cigarettes and tobacco products. Out of this, the youth were 576, representing 21 per cent while non-youth were 2, 162, representing 78.9 per cent. Overall, cigarettes were the most consumed products at 63.4 per cent, followed by tobacco (tobacco pipe/raw) at 36.56 per cent. Cigarettes were mostly consumed by non-youth at 78.4 per cent compared to 25.2 per cent for the youth. A similar observation was made for tobacco, which was consumed by 86.1 per cent of the non-youth compared to 13.9 per cent for the youth. In terms of the specific age cohorts, 75.9 per cent of the surveyed youth (18-34 years) consume cigarettes, while tobacco pipe/raw was only consumed by 24.13 per cent of the youth. Among the surveyed non-youth (35 years and above), cigarettes are the most consumed at 60.13 per cent while tobacco at 39.87 per cent (Table 4.1).

Table 4.1: Summary Statistics for Tobacco Products 2015/16

Commodity	Overall Population		Youth		Non-youth	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Cigarettes	1,737	63.44	437	75.87	1,300	60.13
Tobacco	1001	36.56	139	24.13	862	39.87

Source: Authors Computation using KIHBS 2015/16 Data

Table 4.2: Summary Statistics for Tobacco Products 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Cigarettes	1,259	72.14	205	70.44	1,054	72.49
Tobacco	486	27.85	86	29.55	400	27.51

Source: Authors Computation using KIHBS 2005/06 Data

In comparison to the KIHBS 2005/06 survey (Table 4.2), Cigarettes were the most consumed product at 72.1 compared to 27.9 for tobacco. This indicates a likely switch from cigarettes consumption to tobacco consumption in 2015/16. From the two surveys, cigarette consumption among the youth increased from 70.4 per cent in 2005/06 to 75.9 per cent in 2015/16, but tobacco consumption dropped from 29.6 per cent in 2005/06 to 24.1 per cent in 2015/16. However, among the non-youth, there was a switch towards tobacco consumption between 2005/06 and 2015/16. 72.5 per cent of the non-youth consumed cigarettes in 2005/06 compared to 60.1 per cent in 2015/16 while 27.5 per cent consumed tobacco in 2005/06 but the share increased to 39.9 per cent in 2015/16.

4.1.2 Expenditure Shares and Budgets Elasticities for Tobacco Products

For the entire population, the expenditure share for cigarettes and tobacco are 0.732 per cent and 0.268 per cent, respectively (Table 4.3). This implies that cigarettes take the largest budget share of 73.2 per cent ($0.732 \times 100 = 73.2\%$) compared to raw tobacco products at 26.8 per cent. The expenditure elasticities for cigarettes and tobacco 1.148 and 0.595 respectively. The youth spend relatively larger share on cigarettes, 68 per cent compared to non-youth at 58 per cent. The youth spend 32 per cent of their budget on tobacco products while the non-youth spend 42 per cent. However, the budget elasticity of cigarettes for the youth is relatively inelastic (0.39) compared to the non-youth (0.56) but more elastic on tobacco (1.84) compared to the non-youth (1.60).

Table 4.3: Expenditure Shares and Budget Elasticities for Tobacco Products 2015/16

Commodity	Overall Population		Youth		Non-youth	
	Share	Budget	Share	Budget	Share	Budget
Cigarettes	0.732*** (0.019)	1.148*** (0.031)	0.68*** (0.013)	0.39*** (0.026)	0.58*** (0.010)	0.565*** (0.021)
Tobacco	0.268*** (0.019)	0.595*** (0.087)	0.322*** (0.013)	1.84*** (0.045)	0.42*** (0.010)	1.60*** (0.032)

** $p < 0.05$, *** $p < 0.01$

Table 4.4: Expenditure Shares and Budget Elasticities for Tobacco Products 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Share	Budget	Share	Budget	Share	Budget
Cigarettes	0.621*** (0.066)	1.15*** (0.062)	0.645** (0.083)	0.76* (0.341)	0.682*** (0.041)	0.317*** (0.001)
Tobacco	0.379*** (0.016)	1.75*** (0.022)	0.355** (0.062)	2.19*** (0.154)	0.318*** (0.041)	1.630*** (0.001)

** $p < 0.05$, *** $p < 0.01$

Estimations based on KIHBS 2005/06 indicate that there were slight changes to the budget shares between cigarettes and tobacco for the aggregate population (Table 4.4). The budget share for the aggregate population was 62.1 per cent for cigarettes and 37.9 per cent for tobacco. The youth spent 64.5 per cent of their total spending on stimulants on cigarettes and 35.5 per cent on tobacco. The non-youth spent 68.2 per cent and 31.8 per cent on cigarettes and tobacco respectively.

4.1.3 Price Elasticities of Demand for Tobacco Products

The results for Marshallian (uncompensated) own-price and cross price elasticities are reported in Table 4.5.

Table 4.5: Marshallian Price Elasticity of Demand for Tobacco Products 2015/16

Commodity	Overall Population		Youth		Non-youth	
	Cigarettes	Tobacco	Cigarettes	Tobacco	Cigarettes	Tobacco
Cigarettes	-0.920*** (0.048)	0.017 (0.035)	-0.38*** (0.029)	-0.15*** (0.031)	-0.44*** (0.025)	-0.13*** (0.027)
Tobacco	-0.220 (0.131)	-1.046*** (0.097)	0.85*** (0.046)	-0.79*** (0.045)	-0.77*** (0.034)	-0.82*** (0.036)

** $p < 0.05$, *** $p < 0.01$

Table 4.6: Marshallian Price Elasticity of Demand for Tobacco Products 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Cigarettes	Tobacco	Cigarettes	Tobacco	Cigarettes	Tobacco
Cigarettes	-0.55*** (0.07)	-0.19* (0.08)	-0.595*** (0.016)	0.897*** (0.039)	-0.341*** (0.001)	0.0051 (0.049)
Tobacco	0.26*** (0.017)	-1.65*** (0.027)	-0.252*** (0.007)	-1.559*** (0.013)	-0.917 (0.833)	-0.929*** (0.004)

** $p < 0.05$, *** $p < 0.01$

The Marshallian own-price elasticities of demand for the two commodities have negative signs. This implies that they have a downward sloping demand curve. The Marshallian own-price elasticities of demand for cigarettes are less than one in absolute terms, implying that they exhibit inelastic demand. However, the price elasticity of demand for tobacco tends to one in absolute terms and therefore could be said to be less inelastic. For the disaggregated data, the youth and non-youth are both less responsive to price changes of cigarettes compared to tobacco. However, the youth exhibit a lower price elasticity of demand for cigarettes, at 0.38 compared to non-youth at 0.44 (Table 4.5). For tobacco, the price elasticity of demand for the youth is 0.79 and 0.82 for the non-youth category. These results are consistent with the findings of Walbeek (1996) who found the elasticities of demand for cigarettes for South Africa to range between 0.5 to 0.9. Other studies that have obtained similar results include: Reekie (1994), ECTSA (1998), Rijo (2008) and Selvaraj *et al.* (2015). The cross-price elasticity between cigarettes and tobacco is negative, implying that they are complementary.

The price elasticities of demand using KIHBS 2005/06 for the aggregate population was -0.55 for cigarettes and -1.65 for tobacco (Table 4.6). For the youth, the price elasticity was -0.595 for cigarettes and -1.559 for tobacco, while for the non-youth the elasticity was -0.341 for cigarettes and -0.929 for tobacco. The elasticities for tobacco became more inelastic in 2015/16 compared to 2005/06 for both youths and non-youths while that of cigarettes became relatively elastic. This indicates that the households switched from consumption of cigarettes to more of tobacco, this is further emphasized by the share of tobacco consumers which increased from 27.85 per cent in 2005/06 to 36.56 per cent in 2015/16 while that of cigarettes fell from 72.14 per cent in 2005/06 to 63.44 per cent in 2015/16, mainly driven by upward movement in prices.

Hicksian own-price have the expected negative sign as shown in Table 4.7. The absolute values of Hicksian own-price elasticities are smaller than the Marshallian own-price elasticities of demand.

Table 4.7: Hicksian/ Compensated Price Elasticity of Demand for Tobacco Products

Commodity	Cigarettes	Tobacco/Raw
Cigarettes	-0.236*** (0.039)	0.236*** (0.039)
Tobacco/Raw	0.657** (0.088)	-0.657** (0.088)

** $p < 0.05$, *** $p < 0.01$

The Hicksian own-price elasticities of demand range between -0.236 (for cigarettes) and -0.657 (for tobacco). The cross-price elasticities between cigarettes and tobacco are all positive implying that they are substitutes to each other. The implication is that an increase in price of cigarettes would increase the quantity demanded of tobacco as consumers will switch from cigarettes to other substitutes.

4.2 Price Elasticities for Alcoholic Products

4.2.1 Descriptive Statistics

Majority of the surveyed households consume traditional beer (53.5%) compared to beer (46.5%). Overall, the youth constitute 36.71 per cent of the beer (lagers and stouts) consumers while non-youth constitute 63.29 per cent. For the traditional beer, the youth constitute 22.78 per cent while non-youth constitute 77.22 per cent. For the disaggregated data, most youth consume beer while non-youth consume more of traditional beer. Among the youth, 55.09 per cent consume beer compared to 41.70 per cent for the traditional beer. For the non-youth majority consume the traditional beer, at 58.44 per cent compared to beer at 41.56 per cent (Table 4.8).

Table 4.8: Summary Statistics for Alcoholic Products

Commodity	Overall Population		Youth		Non-youth	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Beer	899	46.5	330	58.30	569	41.56

Traditional Beer	1036	53.5	236	41.70	800	58.44
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Source: Authors Computation using KIHBS 2015/16 Data

Table 4.9: Summary Statistics for Alcohol Products

Commodity	Overall Population		Youth		Non-youth	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Beer	573	32.54	466	31.17	107	40.2
Traditional Beer	1,188	67.46	1029	68.83	159	59.8

Source: Authors Computation using KIHBS 2005/06 Data

KIHBS 2005/06 indicate that traditional brew/beer (Muratina, Busaa and Chang'aa) was the most consumed at 67.46 per cent and beer was at 32.54 per cent (Table 4.9). The shift was reflected more among the youth, from 67.46 per cent of traditional beer consumption in 2005/06 to 41.7 per cent in 2015/16. While the share of beer consumption increased 31.2 per cent in 2005/06 to 58.3 per cent in 2015/16. Consumption of alcoholic products among the non-youth did not display significant changes. Consumption of beer and traditional beer was 40.2 and 59.8 per cent respectively in 2005/06 and 41.6 and 58.4 per cent in 2015/16. The statistics suggest a gradual shift from traditional beer consumption to beer consumption between 2005/06 and 2015/16.

4.2.2 Expenditure Shares and Budgets Elasticities for Alcoholic Products

The aggregate data indicates that expenditure of beer (lagers and stouts) is the largest in total alcoholic expenditure. The expenditure on beer constitute 72.3 per cent against 27.7 per cent of the traditional beer expenditure. In addition, the budget elasticity of beer is relatively inelastic at 0.46 against 2.38 for the traditional beer which is highly elastic. A decrease in the overall population of consumers income would not significantly lead to a fall in consumption of beer as it would for the traditional beer (Table 4.10). Both youth and non-youth also spend more on beer compared to traditional beer.

Table 4.10: Expenditure Shares and Budget Elasticities for Alcoholic Drinks 2015/16

Commodity	Overall Population		Youth		Non-youth	
	Share	Budget	Share	Budget	Share	Budget
Beer	0.723*** (0.003)	0.460*** (0.016)	0.795*** (0.003)	1.16*** (0.002)	0.72*** (0.003)	0.48*** (0.018)
Traditional Beer	0.277*** (0.003)	2.385*** (0.051)	0.205 (0.003)	-2.570 (4.94)	0.28*** (0.003)	2.32*** (0.053)

** $p < 0.05$, *** $p < 0.01$

Table 4.11: Expenditure Shares and Budget Elasticities for Alcohol Products 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Share	Budget	Share	Budget	Share	Budget
Beer	0.714*** (0.011)	0.947*** (0.089)	0.736*** (0.012)	0.951*** (0.090)	0.690*** (0.045)	0.283*** (0.016)
Traditional Beer	0.286*** (0.011)	1.132*** (0.021)	0.264*** (0.012)	1.136*** (0.024)	0.310*** (0.045)	-2.01** (0.282)

** $p < 0.05$, *** $p < 0.01$

In 2005/06, for the aggregate data, the expenditure share on beer was 71.4 per cent and 28.6 per cent for the traditional beer. Youth spent 73.6 per cent on beer and 26.4 per cent on traditional beer compared to 79.5 for beer and 20.5 for traditional beer in 2015/16. The non-youths spent 69 per cent on beer and 31 per cent on traditional beer in 2005/06 (Table 4.11).

4.2.3 Price Elasticities of Demand for Alcoholic Products

The results for Marshallian own-price and cross price elasticities are reported in Table 4.12.

Table 4.12: Marshallian price elasticity of demand for alcoholic Products 2015/16

Commodity	Overall Population		Youth		Non-youth	
	Beer	T. Beer	Beer	T. Beer	Beer	T. Beer
Beer	-0.366*** (0.012)	-0.094*** (0.005)	-0.80*** (0.001)	-0.37*** (0.001)	-0.38*** (0.015)	-0.11*** (0.007)
Traditional Beer	-1.652*** (0.043)	-0.755*** (0.012)	-3.295 (8.18)	5.909 (3.326)	-1.58*** (0.046)	-0.73*** (0.016)

** $p < 0.05$, *** $p < 0.01$

Table 4.13: Marshallian price elasticity of demand for alcohol products 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Beer	Traditional Beer	Beer	Traditional Beer	Beer	Traditional Beer
Beer	-0.713*** (0.073)	-0.224*** (0.022)	-0.73*** (0.075)	-0.21*** (0.021)	-0.86*** (0.047)	-1.13*** (0.020)
Traditional Beer	-0.717*** (0.015)	-0.441*** (0.075)	-0.77*** (0.181)	-0.41*** (0.081)	7.82* (0.716)	-5.76*** (0.467)

** $p < 0.05$, *** $p < 0.01$

Alcoholic products have inelastic price elasticities of demand, with elasticities ranging between -0.366 and -0.755 (Table 4.12). Beer products have the most inelastic price elasticities of demand at -0.366. This implies that a 10 per cent increase in the price of beer would lower consumption by 3.7 per cent. The price elasticity of demand for traditional beer is -0.76, therefore, inelastic and implies that a 10 per cent increase in the price of traditional beer would result in a 7.6 per cent decrease in the quantity demanded. The findings of this study are consistent with previous studies by Okello (2001) and Osoro *et al.* (2001). For a disaggregated data, the youth are more responsive to changes in price of alcoholic products compared to the non-youth. The price elasticity of demand for beer was -0.80 for the youth compared to -0.38 for the non-youth.

In 2005/06, the price elasticity of demand for the aggregate consumers of alcoholic products was -0.713 for beer and -0.441 for traditional beer (Table 4.13). The price elasticity of demand for youths was -0.73 for beer and -0.41 for traditional beer. For the non-youth, the price elasticity was -0.86 for beer and -5.76 for traditional beer. The declining price elasticity of demand for beer between 2005/06 and 2015/16 suggest a switch from traditional beer consumption to more of modern

beer consumption by households. This low-price elasticity of demand for beer explains why it is the largest contributor to excise tax revenues.

The Hicksian own-price elasticities of demand for alcohol range between -0.117 (for traditional beer) and -0.037 (for beer). The cross-price elasticities between beer and traditional beer are all positive implying that consumers treat them as substitutes (Table 4.14). The implication is that increases in prices of beer would lead to some consumers switching to traditional beer, hence increasing the quantity demanded for traditional beer.

Table 4.14: Hicksian/compensated price elasticity of demand for alcohol products

Commodity	Beer	Traditional Beer
Beer	-0.037** (0.015)	0.047** (0.012)
Traditional Beer	0.091** (0.037)	-0.117** (0.028)

** $p < 0.05$, *** $p < 0.01$

4.3 Price Elasticities for Soft Drinks

4.3.1 Descriptive Statistics

Sodas are the most consumed soft drinks, at 75.27 per cent followed by mineral water and squashes at 20.14 and 4.6 per cent respectively (Table 4.15).

Table 4.15: Summary statistics for soft products

Commodity	Overall Population		Youth		Non-youth	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Mineral water	1,152	20.14	524	21.93	928	18.85
Squashes	263	4.60	111	4.65	152	4.56
Sodas	4,306	75.27	1,754	73.42	2552	76.59

Source: Authors Computation using KIHBS 2015/16 Data

In KIHBS 2005/06, the soft drinks comprised of Mineral water and Sodas (Table 4.16). For the aggregate population, Sodas were the most consumed, at 91.58 per cent and mineral water at 8.42 per cent. This was also reflected among the youth and non-youth populations that consumed Sodas at 92.38 and 86.18 per cent respectively and mineral water at 8.42 and 13.82 per cent respectively.

Table 4.16: Summary Statistics for Soft Drinks

Commodity	Overall Population		Youth		Non-youth	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Mineral Water	278	8.42	219	7.62	59	13.82
Sodas	3,022	91.58	2,654	92.38	368	86.18

Source: Authors Computation using KIHBS 2005/06 Data

4.3.2 Expenditure Shares and Budgets Elasticities for Soft Drinks

Table 4.17 shows the expenditure shares and budget elasticities of soft drinks by households.

Table 4.17: Expenditure shares and budget elasticities for soft drinks 2015/16

Commodity	Overall Population		Youth		Non-youth	
	Share	Budget	Share	Budget	Share	Budget
Mineral Water	0.233*** (0.005)	0.732*** (0.051)	0.297*** (0.008)	2.205*** (0.084)	0.256*** (0.017)	0.47** (0.088)
Squashes	0.430*** (0.004)	0.615*** (0.021)	0.457*** (0.002)	0.825*** (0.022)	0.517*** (0.021)	1.26*** (0.003)
Sodas	0.336*** (0.007)	1.678*** (0.051)	0.246*** (0.007)	-0.129 (0.150)	0.227*** (0.031)	0.84*** (0.024)

** $p < 0.05$, *** $p < 0.01$

Table 4.18: Expenditure shares and budget elasticities for soft drinks 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Share	Budget	Share	Budget	Share	Budget
Mineral Water	0.497*** (0.007)	1.042*** (0.049)	0.494*** (0.007)	1.128*** (0.073)	0.536*** (0.021)	1.014*** (0.079)
Sodas	0.503 (0.007)	0.959*** (0.049)	0.506*** (0.007)	0.875*** (0.073)	0.464*** (0.021)	0.984*** (0.091)

** $p < 0.05$, *** $p < 0.01$

Expenditure on squashes constituted the largest expenditure on soft drinks by households. Overall, households spent 43 per cent of their expenditures on soft drinks on squashes, followed by soda drinks at 33.6 per cent. Households spent the least amount in mineral water with a budget share of 23.3 per cent. The youth and non-youths spent more on squashes at 45.7 and 51.7 per cent compared to mineral water at 29.7 and 25.6 per cent, respectively (Table 4.17). In terms of budget elasticities, squashes and mineral water were relatively inelastic with budget elasticities of 0.615 and 0.732, respectively, implying that a reduction in income of consumers would decrease their quantity demanded but less than proportionately. Sodas had income elasticities of 1.678, greater than 1, hence income elastic, implying that households consider it as a luxury. Sodas constituted 24.6 and 22.7 per cent of the budget of the youth and non-youth categories, respectively.

In 2005/06, budget allocation for mineral water and sodas was at 49.7 and 50.3 per cent, respectively, for the aggregate population (Table 4.18). Youths allocated 49.4 per cent for mineral water and 50.6 per cent for sodas. The non-youth allocated a slightly higher share for mineral water at 53.6 per cent, while allocation for sodas was at 46.4 per cent.

4.3.3 Price Elasticities of Demand for Soft Drinks

The Marshallian price elasticities of demand for soft drinks are presented in Table 4.19 for the aggregate data and Table 4.20 for the disaggregated data.

Table 4.19: Marshallian/uncompensated price elasticity of demand 2015/16

Commodity	Mineral Water	Squashes	Sodas
Mineral Water	-0.210*** (0.045)	-0.266*** (0.158)	-0.257*** (0.048)
Squashes	-0.081*** (0.017)	-0.319*** (0.015)	-0.214*** (0.127)
Sodas	-0.444*** (0.040)	-0.686*** (0.035)	-0.548*** (0.049)

** $p < 0.05$, *** $p < 0.01$

Table 4.20: Marshallian price elasticity of demand by age cohort 2015/16

Commodity	Youth			Non-youth		
	Mineral Water	Squashes	Sodas	Mineral Water	Squashes	Sodas
Mineral Water	-0.764*** (0.0052)	-0.871*** (0.064)	-0.570*** (0.050)	-0.35*** (0.085)	-0.21* (0.098)	-0.33*** (0.023)
Squashes	-0.170*** (0.008)	-0.428*** (0.012)	-0.227*** (0.006)	-0.33*** (0.039)	-0.90*** (0.049)	-0.25*** (0.020)
Sodas	(0.031) (0.067)	-0.012 (0.070)	-0.760*** (0.030)	0.05** (0.016)	-0.64*** (0.021)	-0.76*** (0.018)

** $p < 0.05$, *** $p < 0.01$

Table 4.21: Marshallian price elasticity of demand for soft drinks 2005/06

Commodity	Overall Population		Youth		Non-youth	
	Mineral Water	Sodas	Mineral Water	Sodas	Mineral Water	Sodas
Mineral Water	-0.632*** (0.029)	-0.410*** (0.027)	-0.681*** (0.041)	-0.446*** (0.037)	-0.595*** (0.053)	-0.418*** (0.067)
Sodas	-0.363*** (0.026)	-0.596*** (0.030)	-0.311*** (0.037)	-0.565*** (0.041)	-0.468*** (0.059)	-0.517*** (0.084)

** $p < 0.05$, *** $p < 0.01$

Soft drinks have inelastic price elasticities of demand, ranging from -0.21 and -0.548 for the aggregate data (Table 4.19). Mineral water has the most inelastic price elasticity of demand of -0.21, implying that a 10 per cent in prices of mineral water would result only in 2.1 per cent decrease in quantity demanded. Squashes

have price elasticity of demand of -0.32 which is inelastic. This means that an increase in prices of squashes by 10 per cent would lower consumption by 3.2 per cent. Sodas have a price elasticity of -0.548, slightly higher than that of mineral and squashes. This implies that households would reduce their consumption of Sodas by 5 per cent if their prices increase by 10 per cent. It is also notable that all the cross-price elasticities of demand are negative and statistically significant, implying that the commodities are complementary, and households tend to consume them together. By age categories, squashes are the most inelastic among youth while mineral water and sodas have similar elasticities of -0.76. For the non-youth, mineral water is the most inelastic at -0.35 while the elasticities for squashes and sodas are -0.90 and -0.76, respectively (Table 4.20).

Estimations using KIHBS 2005/06 for mineral water and sodas are presented in Table 4.21. The price elasticity of demand for mineral water was -0.632 and for soda was -0.596, both inelastic. A disaggregated analysis indicates that the youth exhibited a relatively higher price elasticities of demand compared to the non-youth. Youths had price elasticities of demand for mineral water and sodas at -0.681 and -0.565 respectively. For non-youth, the price elasticity of demand for mineral water and sodas were -0.595 and -0.517 respectively. The low-price elasticity of demand exhibited for mineral water in 2015/16 implies that majority of the surveyed households shifted towards consumption of clean water. The changes in the price elasticity of demand for sodas could be partially explained by the introduction of squashes in the budget and most households consume both products as indicated by the negative cross-price elasticities of demand.

The compensated prices elasticities of demand for soft drinks are presented in Table 4.22 for the aggregate data.

Table 4.22: Hicksian/compensated price elasticity of demand

Commodity	Mineral Water	Squashes	Sodas
Mineral Water	-0.039 (0.040)	0.049 (0.033)	-0.010 (0.042)
Squashes	-0.062*** (0.016)	-0.055*** (0.013)	-0.007 (0.018)
Sodas	-0.053 (0.037)	0.036 (0.032)	0.016 (0.043)

** $p < 0.05$, *** $p < 0.01$

The compensated prices elasticities of demand range from -0.039 to 0.016. However, only the compensated price elasticity of demand for squashes is statistically significant.

4.4 Price Elasticities for Financial Services

4.4.1 Descriptive Statistics

Among the financial services products, mobile money transfer is the most used at 77.8 per cent followed by ATM services at 21.1 per cent. Bankers cheque services is used by only 1.1 per cent of the households (Table 4.23).

Table 4.23: Summary statistics for financial services

Item	Frequency	Per cent	Cumulative	Min	Mean	Max
ATM and other bank Charges	2,166	21.12	21.12	85	216.6	264
Bankers Cheque charges	110	1.07	22.19	3	11.0	18
Mobile Money Transfer Charges	7,981	77.81	100.00	401	798.1	894

Source: Authors Computation using KIHBS 2015/16 Data

4.4.2 Expenditure Shares and Budgets Elasticities for Financial services

The study established the nature of elasticities of demand in the financial sector. The findings are presented in Table 4.24.

Table 4.24: Expenditure shares and budget elasticities for financial services

Service	Share	Budget
ATM and other bank Charges	0.230*** (0.008)	0.937*** (0.283)
Bankers Cheque charges	0.342*** (0.006)	0.550*** (0.156)
Mobile Money Transfer Charges	0.428*** (0.006)	1.394*** (0.108)

** $p < 0.05$, *** $p < 0.01$

The largest expenditure by households on financial related services is on mobile money transfer services. Households spend 42.8 per cent of the financial related

expenses on mobile money transfer services (Table 4.24). This is followed by expenditure on bankers cheque services and ATM and other bank charges at 34.2 and 23 per cent respectively. In terms of income elasticities, mobile money transfer charges are the most income elastic at 1.39, implying that any decrease in income in would significantly reduce household's expenditure on mobile money transfer services. Bankers cheque charges and ATM and other bank charges are relatively budget inelastic with budget elasticities of 0.55 and 0.94 respectively.

4.4.3 Price Elasticities of Demand for Financial Services

The Marshallian price elasticities of demand for financial services are presented in Table 4.25.

Table 4.25: Marshallian price elasticity of demand for financial services

Financial service	ATM and other bank Charges	Bankers Cheque charges	Mobile Money Transfer Charges
ATM and other bank Charges	-0.267** (0.094)	-0.342*** (0.104)	-0.328** (0.101)
Bankers Cheque charges	-0.110** (0.040)	-0.203** (0.075)	-0.236*** (0.052)
Mobile Money Transfer Charges	-0.306*** (0.027)	-0.454*** (0.044)	-0.635*** (0.047)

** $p < 0.05$, *** $p < 0.01$

All financial related transactions have inelastic price elasticities of demand ranging from -0.20 to -0.64 (Table 4.25). Bankers cheque charges have the most inelastic price elasticity of demand of -0.20, implying that bank customers are likely to be less responsive to changes in bankers cheque charges. Similarly, ATM and other bank charges have elasticity of demand of -0.27, which is inelastic. Therefore, increases in cost of withdrawals at ATM's are less likely to significantly lower the usage of ATM services. Mobile money transfer service has a price elasticity of demand of -0.64, implying that at 1 per cent level of significance, a 10 per cent increase in the cost of mobile money transfer services would result in a 6.4 per cent decline in demand for mobile money transfer services. The negative and statistically significant cross-price elasticities of demand for financial products indicate that most household always use the all the different categories of financial services products.

Table 4.26 presents the Hicksian price elasticities of demand for financial services.

Table 4.26: Hicksian/compensated price elasticity of demand

Financial service	ATM and other bank Charges	Bankers Cheque charges	Mobile Money Transfer Charges
ATM and other bank Charges	-0.052 (0.035)	-0.021 (0.028)	0.073 (0.039)
Bankers Cheque charges	0.016 (0.019)	-0.015 (0.024)	-0.001 (0.028)
Mobile Money Transfer Charges	0.015 (0.017)	-0.023 (0.018)	-0.038** (0.018)

** $p < 0.05$, *** $p < 0.01$

The Hicksian price elasticities of demand for financial services range from -0.015 to -0.052.

4.5 Price Elasticities for Petroleum Products

4.5.1 Descriptive Statistics

From the petroleum products, petrol is the most used by most households at 91.3 per cent while diesel is used by 8.7 per cent of the households (Table 4.27).

Table 4.27: Summary statistics for petroleum products

Item	Frequency	Per cent	Cumulative	Min	Mean	Max
Diesel	101	8.74	8.74	401	798.1	894
Petrol	1,055	91.26	91.26	59	105.5	134

Source: Authors Computation using KIHBS 2015/16 Data

4.5.2 Expenditure Shares and Budgets Elasticities for Petroleum Products

The expenditure share and budget elasticities for petroleum products were computed and presented in Table 4.28.

Table 4.28: Expenditure shares and budget elasticities for petroleum products

Fuel	Share	Budget
Diesel	0.510*** (0.015)	1.013*** (0.037)
Petrol	0.490*** (0.015)	0.986*** (0.038)

** $p < 0.05$, *** $p < 0.01$

Households consume almost proportionate amounts in petroleum products. Households spend 51 per cent of their petroleum products expenditure on diesel against 49 per cent on petrol (Table 4.28). The budget elasticities of petroleum products are almost unitary. Petrol and diesel have budget elasticities of 0.99 and 1.01 respectively, this implies that any change in household income would result in proportionate change in consumption of petroleum products.

4.5.3 Price Elasticities of Demand for Petroleum Products

The Marshallian price elasticities of demand for petroleum products are presented in Table 4.29.

Table 4.29: Marshallian/uncompensated price elasticity of demand for petroleum products

Fuel	Diesel	Petrol
Diesel	-0.665*** (0.025)	-0.348*** (0.057)
Petrol	-0.349*** (0.022)	-0.637*** (0.052)

** $p < 0.05$, *** $p < 0.01$

Petroleum products exhibit inelastic price elasticities of demand. Diesel and petrol have price elasticities of demand of -0.67 and -0.64 respectively (Table 4.29). A 10 per cent increase in the prices of diesel and petrol would respectively result in a 6.7 and 6.4 per cent decrease in the quantity demanded these products. This implies that petrol exhibits a relatively inelastic demand compared to diesel.

Table 4.30 presents the compensated price elasticities of demand for petroleum products.

Table 4.30: Hicksian/compensated price elasticity of demand

Fuel	Diesel	Petrol
Diesel	-0.148*** (0.035)	0.148*** (0.035)
Petrol	0.154*** (0.039)	-0.154*** (0.039)

** $p < 0.05$, *** $p < 0.01$

The Hicksian price elasticities of demand for diesel and petrol are -0.148 and -0.154 respectively.

5. Conclusions and Policy Implications

The study did a comprehensive analysis of excise taxation in Kenya with special focus on the elasticities of the basket of commodities subject to excise taxation. The analysis of elasticities of various commodities is important in formulation and review of tax policy which should rely heavily on the nature of elasticities of various commodities for optimum tax revenue.

Several reforms, both administrative and policy, have been undertaken by the government of Kenya through the KRA aimed at improving excise tax collections. However, these efforts have not yielded much, excise tax revenue collections remain low. Therefore, understanding the nature of elasticities of various excisable commodities is critical.

The results of this study indicate that commodities under soft drinks and financial services categories have the most inelastic price elasticities of demand. Under soft drinks, mineral water is the most inelastic followed by squashes and sodas with price elasticities of demand of -0.210, -0.319 and -0.548 respectively. Bankers cheque has the most inelastic price elasticity of demand under the financial services category with a price elasticity of demand of -0.203. ATM and other bank charges and mobile money transfers also exhibit inelastic demand with price elasticities of -0.267 and -0.635 respectively.

Cigarettes and alcohol products have price elasticities of demand that range from -0.38 to -0.92 and -0.366 and -0.80 respectively. Cigarettes have a price elasticity of demand of -0.38 for the youth and -0.44 for the non-youth while tobacco have price elasticities of -0.79 and -0.82 for the youth and non-youth respectively. For alcoholic products, beer (lagers and stouts) have lower price elasticity of demand of -0.366 compared with traditional beer with a price elasticity of demand -0.755. The price elasticity of demand for beer is -0.80 for the youth and -0.38 for the non-youth.

Petroleum products exhibit relatively similar and moderate inelastic demand. Of the petroleum products, petrol has the least price elasticity of demand of -0.637 while diesel has a price elasticity of demand of -0.665.

Theory suggest that commodities with highly inelastic price elasticities of demand are less responsive to price changes. Therefore, in view of these findings, therefore, if the policy objective is to increase excise tax revenues, then commodities with lower price elasticities of demand should bear a larger tax burden. However, depending on the policy objective, the levying of excise taxes needs careful considerations. For example, caution should be taken especially for the financial services as heavy taxation on the sector may reverse the gains made in financial inclusion.

From a policy perspective, commodities such as mineral water, squashes, sodas, beer and petroleum products are price inelastic, indicating that increases in their prices will not lower their consumption significantly. However, any increase in excise duty should take into account the likely negative effect it may have on consumer pattern; for example, increase in excise duty on alcoholic products may result in an uptake of illicit brew.

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