

To what extent do excise taxes affect Malawi's cigarette trade gap with Kenya and South Africa?



Authors:

Michael Masiya¹ 
Zurika Robinson¹ 

Affiliations:

¹Department of Economics,
University of South Africa,
Pretoria, South Africa

Corresponding author:

Michael Masiya,
michaelmasiya@gmail.com

Dates:

Received: 29 Mar. 2022
Accepted: 04 Nov. 2022
Published: 30 Jan. 2023

How to cite this article:

Masiya, M. & Robinson, Z.,
2023, 'To what extent do
excise taxes affect Malawi's
cigarette trade gap with
Kenya and South Africa?',
*South African Journal of
Economic and Management
Sciences* 26(1), a4605.
[https://doi.org/10.4102/
sajems.v26i1.4605](https://doi.org/10.4102/sajems.v26i1.4605)

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Background: While economic theory supports the perception that cigarette taxes incentivise producers and users to identify ways of evading the tax, leading to the smuggling of cigarettes through a profit-maximising mechanism, empirical evidence has produced mixed findings.

Aim: This study bridges the knowledge gap and contributes to the debate by evaluating the impact of the taxation of cigarettes on cigarette smuggling and assessing the correlates of cigarette smuggling.

Setting: In the study Malawi's cigarette imports from Kenya and South Africa from 2007 to 2016 are examined.

Method: Quintile regression and correlation analysis.

Results: Empirical results show that increased excise taxes are not associated with increased smuggling as measured by the trade gap. Using the correlation analysis, the study found that an increase in the bilateral exchange rate and corruption in the partner countries are associated with an increase in the smuggling of cigarettes into Malawi.

Conclusion: Results tally with several empirical studies while conflicting with others. On the policy implications, the results suggest that tackling cigarette smuggling, using taxes only, may not be sufficient. To be effective, combating smuggling must also include combating corruption, strengthening the rule of law and imposing punitive excise taxes on cigarettes.

Contribution: This article contributes to the debate on the impact of cigarette taxes on smuggling of cigarettes using Malawi's trade data. Interestingly, increased excise taxes on cigarettes were not associated with increased cigarette smuggling. The findings provide valuable insights for policymakers on the complexities of cigarette smuggling and the need to consider a range of factors, such as strengthening the rule of law, to combat cigarette smuggling.

Keywords: excise taxes; trade gap; cigarette smuggling; trade openness; corruption; rule of law; tax evasion.

Introduction

Evidence pointing to the existence of cigarette smuggling has been discussed by Galbraith and Kaiserman (1997) and Goel (2008), among others. Price and non-price factors are argued to be the leading causes of cigarette smuggling. As a price factor, cigarette taxes give rise to differential prices between neighboring countries, thereby encouraging price arbitrage and smuggling (Chaloupka et al. 2010; Guindon et al. 2014; Merriman 2012; Merriman, Yurekli & Chaloupka 2000), while as a non-price factor, the effectiveness of law enforcement acts as an incentive, or disincentive, for cigarette smuggling across borders (Goel 2008). Additionally, cigarette taxes give rise to smuggling through a rational profit-maximising mechanism in two ways. Firstly, cigarette taxes incentivise producers and users to identify ways of evading tax – hence the smuggling of cigarettes (Guindon et al. 2014). Economic theory suggests that increasing taxes in one jurisdiction, which – all else equal – increases the potential profit from evading those taxes, should induce smuggling (Joossens et al. 2010; Prieger & Kulick 2018). Secondly, in an attempt to reduce tax liability, producers resort to producing counterfeit cigarettes – incurring less cost in production, and consumers readily resort to the black market as a substitute for expensive cigarettes – given a shifted tax burden (Guindon et al. 2014; Prieger & Kulick 2018).

Much as some researchers downplay the importance of cigarette excise taxes in inducing smuggling,¹ significant evidence points to the increasing relevance of tobacco taxes in influencing cigarette

1. Researchers propose that other factors outside taxes, such as corruption, are key to inducing cigarette smuggling; see for instance, Joossens et al. (2010, 2014); Townsend (2015), who contend that the role of cigarette taxes in influencing taxes is overrated.

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smuggling (Baltagi & Levin 1986; Goel 2008; Prieiger & Kulick 2018; Saba et al. 1995; Stehr 2005; Thursby & Thursby 1994); while Van Walbeek and Shai (2015) argue that though increasing the excise tax is the single most effective tobacco control measure, smuggling would distort any estimates of tax incidence resulting from a change in excise tax on cigarettes (Saba et al. 1995). Stehr (2005) concurs by observing that the cigarette excise tax incidence includes both a consumption response and a tax avoidance response. Hence any estimate of the effect of a cigarette excise tax on consumption can be overstated if it does not account for the other crucial component of the response – the cigarette smuggling response.

Trade taxes remain a significant source of revenue in Malawi and other sub-Saharan African countries (Kassim 2016). In Malawi, on average, customs revenues contribute 35% to gross tax revenues. Despite this heavy reliance on customs revenues, most African countries continue to reduce their reliance on trade taxes and increasingly use VAT (ATAF 2017). High cigarette taxes would induce smuggling and so reduce customs revenues. To curb this, the government must measure the extent of the smuggling and determine the appropriate action.

Malawi imports a significant number of cigarettes, while cigarette taxes constitute over 90% of the cigarette import price (National Statistical Office [NSO] 2016). Before 2008, the excise tax regime in Malawi was *ad valorem*, when a 90% excise tax rate was applied on the value of cigarettes in the Local Currency Unit (LCU) – the Malawi Kwacha. In this case, the excise tax was higher than the 70% prescribed by the Framework Convention on Tobacco Control (FCTC) (World Health Organization 2005).

In 2008, the Ministry of Finance announced extensive changes to the taxation of tobacco cigarettes to curb the smuggling of cigarettes and develop a strong tobacco sector (Government of Malawi [GoM] 2009). Enhancing the tobacco sector would ensure that Malawi attracts investment into value-adding within the country by producing cigarettes, as it is one of the largest producers and exporters of tobacco.² The Ministry proposed three tax laws: to tax cigarettes containing about 70% of Malawian tobacco at a lower rate,³ the introduction of mandatory tax stamps to curb smuggling, and a change in the duty system from *ad valorem* to a specific tax considered to be administratively easy. Several other studies have concurred on the undesirability of the *ad valorem* tax system of taxing cigarettes.⁴

Whether the government switches from *ad valorem* to a specific tax, the extent of cigarette smuggling must inform the decision for the purposes of tax policy impact measurement. At the

2. Tobacco and its products are also a significant foreign exchange earner in many developing countries. Some countries like Malawi and Zimbabwe earned from tobacco exports as much as 74% and 30% of their respective foreign exchange earnings (Sarma 2000).

3. See GoM (2009). Likewise, Turkey once taxed cigarettes containing at least two-thirds of oriental tobacco at relatively lower rates than other cigarettes to boost the demand for oriental tobacco grown on a large scale in Turkey (Chaloupka, Yurekli & Fong 2012).

4. See <https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS>

policy level, the government would be ignorant about implications of the tax revenue on any changes in the cigarette excise tax regime. Cigarette taxes (such as excise taxes) are raised too high to discourage smoking in line with World Health Organization advocacy (WHO 2005). However, smuggling may defeat this purpose by making cheaper cigarettes available to the public (Chaloupka et al. 2010; Merriman 2012). In a similar vein, it would be challenging to estimate the actual number of smokers based only on local production volumes and imported volumes consumed, when there is a surge of illegal cigarettes on the market. Therefore, determining the degree of cigarette smuggling in Malawi is crucial for achieving a number of goals, including raising revenues, improving the efficiency of tax policies, and reducing smoking prevalence.

Additionally, no research has been done in Malawi to evaluate the effects of the tax policies outlined in the 2008 Budget statement. By analysing the influence of Malawi's cigarette tariff on cigarette smuggling, this research fills a knowledge gap. Should the Malawi government keep using tax mechanisms to combat the smuggling of cigarettes? These are some of the questions we attempted to address in this study.

The study is narrowed down to the case of Malawi – a country in sub-Saharan Africa. Malawi is a special and interesting case, because it is a large exporter of tobacco. Yet, because of its stagnant domestic cigarette industry, it is also a large importer of cigarettes (Chirwa 2011; Food and Agricultural Organization (FAO) 2001; Jaffee 2003). Additionally, Malawi is one of the third poorest countries in the world, according to the International Monetary Fund (IMF 2017) country report. This means domestic revenue mobilisation is critical for Malawi's economic survival. Hence, any threats to tax revenue reduction, such as cigarette smuggling, must be averted at any cost. Cigarette smuggling reduces the tax revenue collectable from cigarettes since, as cigarette taxes increase, the number of smuggled cigarettes is likely to increase as well. Furthermore, tobacco smuggling makes tobacco cheaper and sabotages national tobacco taxation and control strategies.

Literature review

Theoretical literature

Bhagwati and Hansen smuggling theory

Bhagwati and Hansen (1973) were the first authors to introduce theoretical discussions on modern smuggling. Thus, the theory is regarded as very pivotal in discussions on smuggling. This study adopts their theory to form a foundation for understanding the links between cigarette smuggling and excise tax in Malawi. The theory is anchored to the assumptions that there are zero transport costs in legitimised trade and that smuggling has special real resource costs (Norton 1988). Bhagwati and Hansen (1973) further qualify smuggling as a risk-free transaction within the international trade framework. It is also based on the assumption of perfect competition. Bhagwati and Hansen

(1973) introduce an assumption that allows the smuggling sector to have a constant or increasing rate of transformation of exportable into importable items (Norton 1988). Furthermore, as argued by Norton (1988), the authors assume that an individual smuggler has a constant rate of transformation, thus leaving his output indeterminate.

Excise tax and smuggling: A theoretical model

Merriman (2012) provided a theoretical rationale for the changes in cigarette consumption, given some tax adjustments. At an initial price p_0 , in the absence of taxes, the producer's gross return will just be equal to the price. Why? A producer will continue supplying cigarettes until additional cigarettes bring in the same return (in addition to the ones shipped to alternative countries), and this rate of return becomes the international norm. Thus the firms will continue supplying until the net (after tax) returns are equal in all countries whereto the cigarettes are being shipped. With tax t imposed, the price moves up to p_0+t so that the supplier can make a profit. The supply curve hence shifts to p_0+t , reaching a new equilibrium. At this point, the new equilibrium price increases from p_0 to p_0+t , and consumption falls, because it is now more expensive to purchase the old quantity of cigarettes.

Merriman (2012) proceeds to introduce smugglers and bootleggers. Due to the limited nature of alternatives, the smuggler's curve is upward-sloping. *Ceteris paribus*, the higher the price, the more the smugglers will supply. However, price is unaffected despite, any increase in the consumption of cigarettes because consumers make decisions considering the transaction price, plus the inconvenience price.

Relaxing the assumption of static prices, the equilibrium price is lower at the higher supply, and consumption is higher than if smuggling were eliminated. Eventually, the increase in cigarette taxes reduces consumption. The tax increase also leads to increased smuggling, unless countermeasures are taken, but the increase in smuggling is less than the decline in legal consumption.

Empirical literature

In this study, we cited most findings from empirical studies in the introductory section. We hereby briefly discuss some tax changes in Kenya and South Africa that have a bearing on the estimations and empirical findings of this study.

In July 2011, the government of Kenya introduced a single tax rate of KShs 1200 per 100 cigarettes or 35% of RSP, whichever was higher. This is called an *ad valorem* tax system with a specific floor (Nargis et al. 2015), and the rate on RSP was targeted at the high-end tobacco products. The 2011 tax reform generated additional revenues and a higher tax yield per cigarette which, combined with an increase in the size of the legal market, indicates shrinking in the illegal cigarette market (Ross 2017). This was significant because of reduced tax evasion arising from false declaration of the quantity of

cigarettes (Ngeywo & Kenya Revenue Authority [KRA] 2012). However, under the new system, manufacturers were incentivised to under-declare the retail price of cigarettes to reduce tax liability (Nargis et al. 2015).

South Africa makes changes to the excise tax regime every year in line with world standards (Legote & Axelson 2018). Some of the criteria include benchmarks for tax incidence and domestic price movements (Legote & Axelson 2018). South Africa uses a targeted incidence approach, which came into force in the year 1994 and 1995 (Legote & Axelson 2018). An initial tax incidence was set at 52% of the RSP of the most popular brand in each cigarette category (Legote & Axelson 2018). The overall incidence encompassed both excise tax and VAT (Legote & Axelson 2018). In the year 2015, the government removed the VAT component and the excise tax incidence alone was pegged at 40%. Henceforth, every year the excise tax rates have been adjusted to be in line with the tax incidence of 40% (Legote & Axelson 2018).

Vellios, Walbeek and Ross (2020) used the Media and Products Survey and the National Income Dynamics Study to compare tax-paid cigarette sales with consumption estimates from two nationally representative surveys by exploring the size of the illicit cigarette market in South Africa and its changes over the period 2002–2017. The results indicate that since 2009, illicit trade has increased sharply and that it was between 30% and 35% of the total market in 2017. Prior to that, Van Walbeek (2014) found no significant evidence that illicit trade in cigarettes in South Africa had increased between 2002 and 2009.

Overall, we observed mixed evidence of the impact of changes in taxes and the tax regime on illicit cigarette trade in the two countries. In our analysis, we estimate Malawi's cigarette trade gap with Kenya and South Africa. We also discuss how some of the aforementioned tax changes in the two countries may have played a role in the variation in Malawi's excise tax regime and estimated cigarette smuggling.

Methods

Estimation of the trade gap in cigarettes

In this article, the evasion/trade gap is defined as the difference between Malawi's reported value and quantity of cigarette imports at a disaggregated product level (HS12), for instance, from Kenya and South Africa, and the corresponding value and quantity of cigarette exports, reported by the same trading partners as their exports to Malawi. Following Donda (2015), the evasion gap is presented in Equation 1 as follows:

$$Gap_Value = I_Value_{Mip} - E_Value_{ip} \quad [Eqn 1]$$

Where I_Value_{Mip} is the import value of product p as reported by Malawi from its trading partner i . Where trading partners i for this study represent Kenya and South Africa. On the other hand, E_Value_{ip} as the value of exports of the product p reported by trading partners i destined for Malawi.

According to the accuracy assumption, in the absence of measurement errors and tax evasion, the reported exports from partners and imports at the destination should be equal. However, if some large discrepancy is found, it may be attributed to tax evasion given that the margin of error is minimal.

The misclassification trade gap

By observing trade data, errors can be categorized by origin, currency, and product classification. In analysing the cigarette data, some discrepancies that revealed the underlying measurement errors were observed.

After computing all the errors associated with misclassification (MIS), we computed the average arithmetic error (ϵ_{MIS}^t) for a specified time period t , which is a year, and $t = 2007, 2008, \dots, 2016$:

$$\epsilon_{MIS}^t = \frac{\sum_i \epsilon_i}{7} \text{ where } i \text{ represents all misclassification errors [Eqn 2]}$$

After the computation, we adjusted the value gap (adjusted for Cost-Insurance-Freight (CIF)) for the errors as follows:

$$Gap_Value_{MIS} = (1 - \epsilon_{MIS}^t) Gap_Value_{CIF} \text{ where } 0 < \epsilon < 0.5 \text{ [Eqn 3]}$$

This equation represents the value adjusted for the CIF and the absence of all errors.

The duty-free goods trade gap

Consider a good, K , which is duty-free (DF) with no levied import taxes⁵. Then, the gap value computed from the good K is given as:

$$Gap_Value_K = I_Value_K - E_Value_K \text{ [Eqn 4]}$$

Then, the average size of the error from DF goods (ϵ_{DF}^t) is given by:

$$\epsilon_{DF}^t = \frac{Gap_Value_K}{I_Value_K} \text{ [Eqn 5]}$$

Using this to adjust the gap value, we get the following:

$$Gap_Value_{DF} = (1 - \epsilon_{DF}^t) Gap_Value_{CIF} \text{ [Eqn 6]}$$

This now represents the value adjusted for CIF and is absent of all the errors.

Indicators of cigarette smuggling

We rely on import misinvoicing of cigarette imports to denote smuggling. Having adjusted values for CIF, we remove measurement errors and make adjustments to obtain a discrepancy that may be classified as import misinvoicing. In this study, we have two estimates (Smuggling [DF and MIS]) which differ in the method used to remove measurement errors.

5. We assume that with duty-free goods, there is zero incentive to evade import taxes.

Data sources and description

In the analysis of cigarette imports, two contrasting datasets are used. First, official disaggregated trade data were obtained from the NSO in Malawi which provide detailed 8-digit HS codes of all products which were imported into Malawi, covering 10 years from 2007 to 2016. These are the data that form the basis of what Malawi reported as imported cigarettes from its trade partners. Secondly, trade data were obtained from the UN COMTRADE, which is a repository of official statistics on international trade, comprising imports, exports, reimports, and re-exports of all countries and their bilateral and multilateral trade partners.

That data set was used to obtain the exports to Malawi, as reported by trade partners, and compared these to the imports Malawi reported as originating from these partners. Kenya and South Africa are the topmost trading partners for Malawi in cigarettes⁶; hence, in this study, we focused on these two countries. Other trading partners have many missing observations, and they were ignored. All data that showed only an export value or quantity, but not a corresponding import value or quantity, and vice-versa, were also ignored.

The data on the other variables have been obtained from several sources, and all data span from the year 2007 to 2016. The World Bank (2019) databank, the World Development Indicators (WDI), acted as reliable sources of data for the study, providing data on the following variables: Trade openness, gross domestic product (GDP) per capita, and real exchange rates. Data on the corruption index were sourced from the Global Integrity Index (GII), data available on the World Bank's website, as well as Worldwide Governance Indicators (WGI). Data on crime rates were obtained from the UN Office on Drugs and Crime's International Homicide Statistics database. Finally, the effective excise tax rate was computed from NSO's detailed trade data.

The quintile regressions utilise disaggregated trade data from 2007 to 2016 and across the products within the dataset. The data cover various tax rates or tariffs applicable for each traded product within the dataset. The data are obtained from the NSO. It is the same data that are utilised in the rest of the study, only that for the quintile regressions, we use the disaggregated form of the data rather than the aggregated form used in the estimation of trade gaps and correlates. The disaggregated form allows the excise tax rates to be segmented into quintiles and permits the analysis of the trends in the various categories across different years.

Quantile regression: Trends in the excise tax rate

The study uses quantile regression to understand the trends in the main independent variable of interest to the study, the excise tax rate. Quantile regression is a technique that quantifies the association of explanatory variables with a conditional quantile of a dependent variable without assuming any specific

6. Cigarette imports from Kenya and South Africa account for approximately 90% of all Malawi's cigarette imports on average.

conditional distribution. Quantile regression determines the median of a data set across a distribution based on the variables within that distribution (Buhai 2005). It is an extension of the linear method of regression. It models the quantiles instead of the mean as done in standard regression. In cases where either the requirements for mean regression, such as homoscedasticity, are violated, or interest lies in the outer regions of the conditional distribution, quantile regression can explain dependencies more accurately than classical methods (Waldmann 2018).

Correlates of cigarette smuggling

To determine the correlates of cigarette smuggling, this study employed a correlation analysis of the smuggling variables (Smuggling [DF and MIS]), as well as other theoretically and empirically established causes of smuggling. The choice of this technique was based on data availability and sufficiency. While the Multiple Indicators Multiple Causes (MIMIC) model, or panel analysis (gravity model), would be a suitable estimation technique for this kind of analysis, the data which were collected from 2007 to 2016 and from two trade partners, namely South Africa and Kenya, and Malawi itself, were not sufficient for data-hungry techniques like the MIMIC and panel models. With $T = 10$ and $N = 2$ (cigarette imports from 2 trade partners), this study's total number of observations is 20. The sample size does not permit using the MIMIC or panel models.

We resorted, therefore, to the use of correlation analysis. Correlation analysis is a term used to denote the association or relationship between two or more quantitative variables (Gogtay & Thatte 2017). Unlike regression analysis, correlation analysis is not used for prediction, but rather shows the degree of association between two or more variables (Asuero, Sayago & González 2006). Therefore, the results in this study should only be treated as an indication of an association between cigarette smuggling and other theoretically and empirically established causes of smuggling, and not necessarily an indication of causation.

Potential correlates of cigarette smuggling from literature

We resorted to literature to identify some correlates of cigarette smuggling, and we justified the inclusion of each.

Tariff rates on imported cigarettes

In the analysis, we have used the effective tax rate (Excise Tax Collected over Value for Duty Purposes [VDP]) since the actual tax rate may be fixed, and the assumption of variability may be violated (Gujarati 2009). It is included because high excise tax rates on imported cigarettes are among the leading causes of cigarette smuggling. The prohibitive nature of cigarette excise tax encourages importers to resort to illegal ways of trade, such as smuggling and the misinvoicing of cigarettes (Buehn & Farzanegan 2012).

Trade restrictions

Buehn and Farzanegan (2012) postulated that increased trade restrictions encourage the smuggling of goods. To measure

the extent to which trade is restricted, we use the standard-defined measure of trade openness, which is the share of trade (both imports and exports) in GDP.⁷ We obtain data on Trade Openness for both Malawi and the Partner Countries (Kenya and South Africa) since trade is a two-sided coin; restrictions on the partner's side could affect exports of cigarettes and encourage smuggling out while restrictions in Malawi could catalyze the smuggling in of cigarettes.

Rule of law

Non-price factors are also the main drivers of cigarette smuggling (Goel 2008). While smugglers anticipate higher profit margins from selling cigarettes, they face potential costs of punishment when caught. This depends on how stringent the laws of a country are in terms of fines and penalties for smugglers. A measure of the 'Rule of law' is available annually and provided by the Worldwide Governance Indicators (WGI) of the World Bank, initially developed by Kaufmann, Kraay and Mastruzzi (2009). The WGI Rule of law indicator ranges from -2.5, which signifies weak governance, to 2.5, which indicates strong governance performance. However, there is likely to be a correlation problem using this indicator because the Corruption Index by the WGI also uses the same scale. In addition, the rule of law resonates with levels of corruption in a country; that is, the lower the quality of enforcement, the higher the likelihood of corruption. Hence, to avert any possible errors, we select another indicator of rule of law which is given at a different scale and which is less likely to be closely linked to corruption. Due to data scarcity of more ideal variables, crime data (particularly homicide rates data) available from the UN Office on Drugs and Crime's International Homicide Statistics database⁸ is used to measure the strength of rule of law. In addition, homicide may be present even in countries with the lowest levels of corruption and hence may not be correlated with corruption. Yet, high rates of homicide also reflect the strength of law enforcement, hence, this is what the study intends to capture.

Corruption

Smuggling is easier in countries with rampant corruption, characterised by bureaucracies that are more likely to abuse power for private gain, and allow smugglers to go scot-free (Buehn & Farzanegan 2012). The WGI Control of Corruption measure, which seeks to ascertain the extent to which power is abused for private gain in both petty and grand forms of corruption,⁹ is used as a measure of corruption. The index ranges from -2.5 (weak governance and high levels of corruption) to 2.5, indicating strong governance.

Real exchange rate

We also postulate that a real exchange rate could influence smuggling. A depreciation of the currency can cause imports to be more expensive when converted to VDP before taxes

7. See <https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS> for a full description of the variable.

8. See www.unodc.org/unodc/en/data-and-analysis/statistics.html

9. See <http://info.worldbank.org/governance/wgi>

are imposed. Thus, we include a real exchange rate. Indeed, ideally, we would have also wanted to include the Black-Market Premium (BMP) as one of the variables, but the data are scarce. The reliable data on BMP, which the Pick's World Currency Report issued, are only available up to December 1998 (Buehn & Eichler 2009). In this case, we include the real bilateral exchange rate, which is expressed in terms of Malawi Kwacha per currency unit of the trading partner obtained by expressing the nominal exchange rate in real terms.

Results and discussion

Summary statistics

Table 1 is the summary statistics of key variables used in the correlation analysis.

The means of smuggling (DF), and smuggling (MIS) itself, are very close at \$473.96 thousand and \$463.96 thousand, respectively. Additionally, they are highly correlated with a significant coefficient of 0.97. From Table 1, one observes that, on average, the corruption index in Malawi has a lower mean value than other partner countries. Thus, over the years under study, Malawi has had slightly higher levels of corruption than its trade partners combined. On the other hand, crime is high in the trade partners' countries as well, as indicated by a mean that is over five times more than the mean of the crime rate in Malawi. Regarding trade openness, Malawi has a higher average than its trade partners combined. Malawi predominantly imports, and so trade forms a significant portion of GDP. In terms of the excise tax rate, on average, the cigarette tax rate is over 180% of the value of cigarette imports, which is significantly high. Before the

TABLE 1: Summary statistics.

Variable	Obs	Mean	SD	Min	Max
smuggling_mis	20	473.96	675.664	23	2580
smuggling_df	20	463.193	715.358	24.8	3080
corruption_mw	20	0.5	0.163	0.25	0.68
corruption_partnerss	20	0.7	0.128	0.4	0.85
crime_mw	20	3.15	1.197	1.7	5.5
crime_partners	20	18.765	14.602	2.9	36.9
trade_open_mw	20	63.88	10.183	48.8	78.3
trade_open_partners	20	57.01	7.797	36.8	72.9
effective_excise	20	1.875	0.693	0.9	3.36
bilateral_exchange_rate	20	42.328	34.701	7.13	91.8

SD, standard deviation.

TABLE 2: Quintiles of average effective tax rates by year.

Quintiles of average effective tax rate	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
q1	0.88	0.83	0.45	0.00	0.00	0.23	0.00	0.24	0.00	0.18	0.28
q2	1.13	1.07	1.13	1.10	-	-	1.04	-	1.03	1.09	1.08
q3	1.14	1.36	1.41	1.49	1.40	1.57	1.47	1.54	1.52	1.40	1.43
q4	-	1.77	1.77	1.70	1.72	1.77	1.82	1.72	1.73	-	1.75
q5	-	2.01	1.98	1.92	1.91	2.00	-	-	1.90	1.98	1.96
q6	-	2.25	2.22	2.14	2.25	2.19	2.19	2.20	-	2.12	2.20
q7	-	2.70	2.40	2.66	2.75	2.88	2.91	2.72	-	2.58	2.70
q8	-	-	-	3.27	3.17	3.10	3.26	3.30	-	-	3.22
q9	-	3.36	-	3.32	5.75	4.47	3.59	3.36	-	-	3.98
Average	1.05	1.92	1.62	1.95	2.37	2.28	2.03	2.16	1.24	1.56	-

adoption of the specific excise tax regime, the rate was 90%, and after 2008, the unit tax regime is likely to have resulted in values over 200% in some instances to yield such a high average. The bilateral exchange rate average has no plausible meaning since it varies widely, depending on the partner country.

Variation in effective tax rates of cigarette imports

Before the excise tax regime changed to a specific tax in 2008, the average effective tax rate was 105%, and the bands of the excise tax rate did not exceed the 3rd quintile. In the years before 2007, the excise tax rate was fixed at 90% but what is evident from the computation of the effective excise tax rate is that other cigarette importers paid slightly beyond 90%.

However, the margin of overpayment did not exceed 25 percentage points. On the contrary, soon after introducing the unit excise tax, the average effective tax rate shot up to quintile 9 at 336%. This can be regarded as an immediate impact of the tax regime change. The year after that, the number of quintiles remained at 7. However, the average dropped to 240%, and it rose again in 2010 shooting up to 332% while occupying all deciles.

What is most interesting is how the average values kept fluctuating in the post-*ad valorem* era despite exchange rate regimes. A major exchange rate reform occurred in 2012 when Malawi changed from fixed to float (GoM 2013). This moved the exchange rate from an annual average of MK155/USD to MK255/USD, and a year later, in 2013, the value soared to MK361/USD (GoM 2013). Indeed, one would have expected that with such a change, the average effective excise taxes would rise and keep occupying all deciles. However, an opposite effect was experienced when, from 2013, the value in the last decile (q9) declined, and the trend continued until the number of deciles fell to 7 in 2016 and 5 in 2015. Thus, despite an era of a high exchange rate, the effective excise tax on cigarettes was not significantly affected.

Two quintile regressions were estimated to provide insight into how each quintile of the effective tax rate is affected by year and country of origin. Lessons are drawn from the

TABLE 3: Excise tax quintiles and years of cigarette imports regression results.

Quintiles of excise tax	Coef.	SE	<i>t</i>	<i>p</i>	Sig.
NEWCIF (USD)	0.000	0.000	0.33	0.745	-
CURRATE	0.008	0.002	4.15	0.000	***
2007 base.year	0.000	-	-	-	-
2008. year	2.929	0.421	6.95	0.000	***
2009. year	4.940	0.428	11.54	0.000	***
2010. year	4.825	0.438	11.01	0.000	***
2011. year	4.903	0.461	10.64	0.000	***
2012. year	6.729	0.508	13.24	0.000	***
2013. year	6.428	0.583	11.03	0.000	***
2014. year	4.895	0.713	6.86	0.000	***
2015. year	0.646	0.843	0.77	0.444	-
2016. year	0.726	1.137	0.64	0.523	-
_cons	-0.092	0.357	-0.26	0.797	-
Mean dependent var	5.349 SD dependent var			3.060	

SE, standard error; SD, standard deviation.

***, $p < 0.01$.**TABLE 4:** Excise tax quintiles and origin of cigarette imports regression results.

Quintiles of excise tax	Coef.	SE	<i>t</i>	<i>p</i>	Sig.
NEWCIF (USD)	0.000	0.000	3.36	0.001	***
CURRATE	0.006	0.001	4.83	0.000	***
China	0.000	-	-	-	-
Denmark	1.024	6.240	0.16	0.870	-
Egypt	-0.598	6.238	-0.10	0.924	-
Germany	-1.348	3.840	-0.35	0.726	-
Hong Kong	1.119	6.241	0.18	0.858	-
India	2.682	6.238	0.43	0.667	-
Israel	0.615	6.238	0.10	0.922	-
Italy	3.207	6.237	0.51	0.607	-
Kenya	4.052	1.659	2.44	0.015	**
Lebanon	0.614	6.238	0.10	0.922	-
Pakistan	3.615	6.238	0.58	0.562	-
South Africa	2.657	1.665	1.60	0.111	-
Tanzania	8.825	1.894	4.66	0.000	***
United Arab Emirates	0.614	3.835	0.16	0.873	-
Zambia	-0.117	2.589	-0.04	0.964	-
Zimbabwe	-1.179	6.240	-0.19	0.850	-
_cons	-0.563	1.644	-0.34	0.732	-
Mean dependent var	5.349 SD dependent var			3.060	

SE, standard error; SD, standard deviation.

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

coefficient estimates to understand what other factors could be driving the effective exchange rate apart from simply the change in regime to unit tax. The CIF values of cigarette imports in USD are included, which denotes the value of cigarette imports but is not affected by the exchange rate.¹⁰ The average exchange rate is also included to examine if the changes in the exchange rate regime had any impact on the average effective exchange rate. Alongside these independent variables, we then control for the various dummies of year and country of origin. The results are as presented in Table 3 and Table 4.

Overall, the years 2008 to 2014 (after the introduction of specific tax) were statistically significant at 1% significance level, as shown in Table 3. Thus, the years after the

10. When this value is converted into local currency, what results is the VDP which was the value which we later used to compute the effective excise rate via the formula

$$\text{average effective excise rate (effex), } \text{effex} = \frac{\text{Excise Tax (LCU)}}{\text{Value for Duty Purposes (VDP)}}$$

TABLE 5: Results from correlation analysis using Smuggling (MIS) as the indicator of cigarette smuggling.

smuggling_mis	Coefficient	<i>P</i>	Obs
corruption_malawi	0.279	0.234	20
corruption_partners	-0.570	0.009	20
effective_excise_rate	0.037	0.877	20
bilateral_exchange_rate	0.616	0.004	20
trade_openness_malawi	-0.120	0.613	20
trade_openness_partners	-0.095	0.690	20
crime_malawi	0.006	0.980	20
crime_partners	-0.289	0.217	20

introduction of specific excise were associated with higher quintiles of excise tax rates, which slowed down after 2015. The results are shown in Table 4, signifying the importance of cigarettes from Kenya in influencing overall effective excise tax rates. It is also clear that the currency rate was significantly affecting the excise tax rate, albeit a negligible coefficient. However, the exchange rate was not significant in influencing average effective excise tax rates.

As shown by Table 4, Kenya was significantly associated with higher quintiles of effective excise tax rates at 1%. Tanzania was also significant at 1% level, although not considered in this study. The rest of the countries were not statistically significant.

Correlates of cigarette smuggling

Two models were estimated, one with Smuggling (DF) and the other with Smuggling (MIS) as an indicator for cigarette smuggling. Table 5 shows the results from correlation analysis using Smuggling (MIS) as the indicator for cigarette smuggling.

Based on the results in Table 5, the effective tax rate is positively associated with increased smuggling of cigarettes into Malawi. This is consistent with the findings in other studies for example, Farzanegan (2009). The finding implies that an increase in the effective tax rate is associated with an increase in the smuggling of cigarettes from Kenya and South Africa to Malawi. However, the results show that the correlation between effective tax rate and cigarette smuggling is statistically insignificant with a p -value of > 0.05 . The correlation coefficient of 0.037 also appears to be weak.

Surprisingly, the results show a positive correlation between corruption in Malawi and cigarette smuggling. As already noted, a positive and increasing value of the corruption index implies decreasing corruption. Therefore, the correlation results in Table 5 imply that perceptions of corruption decreasing in Malawi is associated with increasing levels of cigarette smuggling. The result is, however, statistically insignificant at 5%, and a correlation coefficient of 0.28 is weak. A possible explanation could be that decreased corruption in Malawi translates into the precise and accurate valuation of the imports from the trade partners, such as that the discrepancy between what was reported as exports by

the trade partners and what is recorded as imports in Malawi, widens (smuggling [MIS] rises).

Corruption in the partner countries is negatively correlated with cigarette smuggling into Malawi, and the result is significant at 5%. The correlation coefficient of -0.57 is also strong. This implies that lack of corruption is associated with decreasing levels of cigarette smuggling into Malawi, or increased corruption (corruption index approaching -2.5) in the partner countries is associated with increased levels of cigarette smuggling into Malawi. As overall corruption increases, so do corrupt practices in the trade of cigarettes to Malawi. The result conforms to the expectation.

The results from the correlation analysis also show that the bilateral exchange rate has a significant positive correlation with cigarette smuggling and the correlation coefficient (0.62) is strong. The bilateral exchange rate was captured as the trading partner's Malawi Kwacha per currency unit. The positive correlation implies that as the local currency depreciates, the smuggling of cigarettes rises. This is likely since an increase in the exchange rate implies expensive imports, stimulating the propensity to smuggle.

Trade openness for Malawi and its trading partners were negatively correlated with cigarette smuggling into Malawi. This implies that as Malawi and the trade partners remove trade barriers (become more open trade-wise), the tendency to smuggle cigarettes declines. The results are, however, insignificant in both the trade openness variable for Malawi, while the trade partners and the correlation coefficients in both cases are very weak. This finding contradicts the positive relationship which was advanced by the theoretical propositions of Pitt (1981), as well as Thursby and Thursby (1994), that in so many instances, legal trade covers or camouflages smuggling to such an extent that an increase in legal trade openness consequently reduces the cost of smuggling. Findings in a study in Iran by Farzanegan (2009) were similar, but is not in line with the findings in this study.

Crime rate (a variable that denotes the strength of the police and law enforcement agencies) in Malawi was found to have a positive correlation with cigarette smuggling, while that of the trading partners was found to have a negative relationship. The result, that the crime rate in Malawi is positively associated with increased cigarette smuggling, is consistent with the expected positive relationship that the higher the crime rate, the higher the cigarette smuggling. This entails that the stronger enforcement of the rule of law, depicted by the significant reduction in crime rate, has a negative relationship with smuggling. Buehn and Farzanegan (2012) stated:

Given the large standardized coefficient of the rule of law it seems that rather the ease to circumvent administrative rules than high tariffs and trade restrictions determine the level of smuggling. (p. 3057)

TABLE 6: Correlation between Smuggling (DF) and all other established causes of cigarette smuggling.

smuggling_df	Coefficient	P	Obs
corruption_malawi	0.273	0.244	20
corruption_partners	-0.534	0.015	20
effective_excise_rate	0.065	0.784	20
bilateral_exchange_rate	0.554	0.011	20
trade_openness_malawi	-0.090	0.707	20
trade_openness_partners	-0.071	0.765	20
crime_malawi	0.013	0.956	20
crime_partners	-0.266	0.256	20

However, the correlation is statistically insignificant for both the crime rate in Malawi and its trade partners.

The negative correlation between the crime rate in trade partners and the smuggling of cigarettes (measured by smuggling [MIS]) to Malawi could be due to increased crime rates in the countries of trade partners which are associated with a high level of export undervaluation.

When smuggling (DF) is used as an indicator for cigarette smuggling into Malawi, results from correlation analysis match those found previously in which Smuggling (MIS) is used as an indicator of cigarette smuggling. Table 6 shows the correlation between Smuggling (DF) and all other established causes of cigarette smuggling.

As seen from Table 6, all the variables maintain their direction of correlation and significance with smuggling. Regardless of the estimation method of smuggling used, the theoretically and empirically proposed determinants of cigarette smuggling employed in this study have determinants a consistent association with cigarette smuggling.

Conclusion

This study set out to estimate the level of cigarette smuggling in Malawi using missing cigarette imports. The study presented two estimates of cigarette smuggling based on two different error calculation methods that were discussed in the study. The estimates are highly correlated at 0.97, and the means are very close. Smuggling (DF) has a mean of \$463.96 thousand, while smuggling (MIS) has a mean of \$473.96 thousand. Thus, despite the different error calculation methods, the estimates are robust.

The study proceeded to use the two cigarette smuggling estimates in the correlation analysis of factors that determine cigarette smuggling. Results from the correlation analysis show that corruption in trade partner countries and bilateral exchange rates are significantly associated with the smuggling of cigarettes into Malawi. While the bilateral exchange rate is positively associated with smuggling cigarettes into Malawi, a low incidence of corruption in partner countries is negatively associated with smuggling cigarettes into Malawi.

Interesting results have also been found in the relationship between cigarette smuggling and other domestic factors,

including corruption, trade openness, crime rate, and effective excise tax rate, even though the correlation is not statistically significant. While increasing crime rate, effective tax rate, and lack of trade openness are associated with increased smuggling, low incidence of corruption in Malawi is negatively associated with smuggling. This situation can be explained by an accurate valuation of imports which unmasks the smuggling activities initiated by the trade partners.

In summary, the results mostly agree with the *a priori* expectations laid out in the methodology section, especially on most of the variables for Malawi. High crime rate, low trade openness, and bilateral exchange rates are each associated with increases in cigarette smuggling. Other results from partner countries are against *a priori* expectations but provide an insightful perspective to understanding cigarette smuggling in Malawi.

Additionally, in the objectives of this article, two questions that this article sought to answer were raised, that is, firstly, whether excise tax rates would be effective in curbing cigarette smuggling, and secondly, whether it should be continued as a measure to curb cigarette smuggling. Based on the results it can be conclusively stated that excise tax rates do not curb the smuggling of cigarettes across borders. However, based on the findings, it can be deduced that to be effective, combating smuggling must also include strengthening the rule of law, in addition to imposing punitive excise taxes on cigarettes.

Limitations of the study and areas for further research

The study is limited to Malawi; thus, the results cannot be generalised to developed or developing countries. The study is also limited to the period from 2007 to 2016. Hence, the small sample size of the data has not permitted the study to employ data-intensive econometric methodologies such as panel-data regressions and MIMIC models.

Acknowledgements

Competing interests

The author(s) declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

Authors' contributions

This article was adapted from part of the doctoral research of M.M. who executed and wrote the article, while Z.R. was the study leader and provided conceptualisation guidelines and editorial inputs.

Ethical considerations

The authors obtained permission to conduct the research from the University of South Africa (UNISA) Economics Ethics Committee and, further, ethical clearance to conduct

the study was obtained, prior to data collection. The ethical clearance was valid during the analysis stage and is further valid for a period of 5 years. Ethical Clearance Number: 2022_DE_05(SD)_M_MASIYA.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

The original dataset from which the results of this article were analysed are available on the researchers' electronic database and can be made available on reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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