

RAISING ADDITIONAL GOVERNMENT REVENUES IN GHANA BY RAISING THE EXCISE TAX ON TOBACCO AND ALCOHOL

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EXECUTIVE SUMMARY

This report presents the results of a simulation model that predicts how a change in the excise tax on cigarettes and alcohol influences, amongst others, the retail price of these products, total consumption of these products and government revenue. The focus of the model is on raising additional revenue, given Ghana's precarious fiscal situation.

Currently all *cigarettes* consumed in Ghana are imported. The excise tax is levied as an ad valorem rate of 150% of the CIF value, but because the CIF value is such a small fraction of the retail price, the excise tax as a percentage of the retail price is only between 10% and 14% of the retail price. This is well below the average tax burden of middle-income countries, and a far cry from the WHO's recommendation of an excise tax burden of 70% of the retail price.

Increasing the ad valorem excise tax will raise very modest extra revenues. The fundamental problem is that the base on which the excise tax is levied is small and subject to manipulation by the tobacco industry.

It is recommended that Ghana replaces the ad valorem tax with a specific tax.

To avoid cigarettes becoming more affordable over time, the specific tax would have to be adjusted on a regular (preferably annual) basis to keep up with inflation and the growth in income. If the government were to impose a specific tax of 1.50 GHS per pack, irrespective of the CIF value or the retail price, the model predicts that the average retail price would increase by 104%, consumption would decrease by 41%, excise tax revenue would increase by 439% and total government revenue (this includes VAT, and import duties and levies) from cigarettes would increase by 166% from 26 million GHS (0.028% of GDP) to 69 million GHS (0.073% of GDP).

Currently about 152 million litres of *beer* are consumed in Ghana. A large proportion of beer is produced in Ghana. The excise tax on beer is levied as an ad valorem duty on the ex factory price of domestically produced beer and on the CIF value on imported beer. The standard excise rate is 47.5%. Since late 2012, lower rates of excise have been levied on domestically produced beer that uses local content in the production process. The result has been a substantial decrease in government revenue from beer excise taxation between 2012 and 2013. Currently there are four tiers. Most beer is

reported to use between 30% and 49.99% of local content and attracts a concessionary excise tax rate of 30%. The concessionary tax rate for local content is based on the system in place in Uganda, but in Uganda there are only two tiers: a standard rate for beer with a local content of less than 75% and a concessionary rate for beer with a local content of more than 75%.

It is recommended that Ghana simplifies its local content rules and adopts a system similar to that used in Uganda.

The model was run with an ad valorem excise tax of 60% on the ex factory price for all beer with local content of less than 70%, and with an ad valorem rate of 25% on the ex factory price with local content of more than 70%. The average retail price would be expected to increase by 30%, beer consumption would be expected to fall by 12%, total excise tax revenue would be expected to increase by 78% (from 126 million GHS (0.135% of GDP) to 208 million GHS (0.222% of GDP)), and total government revenue from beer (i.e. including VAT and import duties and levies) would be expected to increase by 45% from 252 million GHS (0.270% of GDP) to 346 million GHS (0.370%).

The model was also run for larger increases in the ad valorem excise tax and, predictably, this would result in a larger increase in the average retail price and government revenue, and a larger decrease in beer consumption. Furthermore, the model also considered the impact of replacing the ad valorem excise tax with a specific tax of 3.00 GHS per litre of beer. This would yield the best fiscal outcome of the scenarios considered.

Most ***spirits*** consumed in Ghana are produced in Ghana, mostly in the form of gin. The excise tax is currently 25% of the ex factory price. Compared to the excise tax on spirits in most other countries, and to the excise tax on beer in Ghana, the excise tax on domestically produced spirits in Ghana is low.

The model was run with an ad valorem excise tax of 60% on the ex factory price of domestically produced spirits and an ad valorem rate of 60% of the CIF value of imported spirits. The average retail price of spirits would be expected to increase by 33%, spirits consumption would be expected to decrease by 15%, total excise tax revenue would be expected to increase by 125% from 33 million GHS to 75 million GHS and total government revenue from spirits (i.e. including VAT and import duties and levies) would be expected to increase by 58% from 82 million GHS to 129 million GHS.

Should the government replace the ad valorem excise tax on spirits with a specific tax of 3.00 per litre, this would be expected to raise substantially more revenues than raising the ad valorem tax to 60%, and would result in a more predictable source of revenue.

In conclusion, if the government of Ghana were to increase the excise taxes without changing the structure of the tax systems, it could expect additional revenue to the amount of 0.16% of GDP. However, if the government were to change the current excise system from an ad valorem system to a specific system and impose significantly higher rates than are currently levied, it would be able to gain additional revenues to the value of about 0.45% of GDP.

Internationally there has been a significant move towards the use of specific excise taxes on both tobacco and alcohol. International best practice is to impose uniform specific taxes, that are adjusted regularly to account for increases in the price level and increases in average incomes.

Based on the current situation and the results of this modelling exercise, a uniform specific excise tax is strongly recommended for cigarettes. A uniform specific excise tax would be desirable for spirits. It would certainly not do harm to impose a uniform specific tax on beer, but the structure of the cost chain is such that it would not be a priority.

The model is programmed in Excel and is available for users to perform sensitivity analysis and to investigate alternative tax scenarios.

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1. Introduction

The economy of Ghana has grown at a rapid pace of around 8% in the past 15 years. As a result, the World Bank has reclassified Ghana from a low-income country to a lower-middle income country in 2011. This is a source of pride to the government and people of Ghana (Terkper, 2014). Life expectancy has improved and Ghana has improved its human development index ranking. The discovery and subsequent extraction of oil has resulted in significant FDI flows and spiked the economic growth rate to about 15% in 2011.

Despite this rapid growth, the economy remains vulnerable. It is heavily dependent on natural resources, and thus decreases in the price of gold, oil and cocoa would have a significant negative impact on the economy.

The fiscal situation is precarious and a source of concern. Government expenditures have increased to an estimated 27% of GDP in 2012 and 26% in 2013, from an average of 22% of GDP between 2008 and 2011 (World Bank, 2014). On the other hand, government revenues have remained largely constant at around 18% of GDP. As a result, the overall fiscal balance (after grants) has increased from an average deficit of about 6%-7% of GDP between 2008 and 2011 to more than 10% in 2012 and 2013. According to the Mid-year Review the 2014 target for the deficit (8.5% of GDP) is likely to be missed (Terkper, 2014)

Government debt as a percentage of GDP has grown sharply from about 32% in 2008 to 48% in 2012 and 56% in 2013 (Terkper, 2014), and is predicted to increase further in 2014. Together with high interest rates, the cost of servicing the public debt has increased sharply. According to a recent World Bank publication (World Bank, 2014), debt interest costs by the government, expressed as a percentage of GDP, was 2.7% in 2011, increasing to 3.2% in 2012, 4.7% in 2013 and an expected 6.5% in 2014. This increase in the debt and the associated interest costs is unsustainable.

Within this context the government of Ghana has been under pressure to increase revenues. For example, in January 2014 it increased the VAT rate from 15% to 17.5%. The World Bank estimates that total revenue and grants will increase from 16.9% of GDP in 2013 to 21.3% of GDP in 2014, driven primarily by an increase in direct taxes and indirect taxes. Trade taxes, oil and grants make modest contributions to the predicted increase in revenue.

One source of revenue that has been underutilised has been excise taxes on tobacco and alcohol. Inconsistencies between different data sources complicate matters, but according to one source from the Ministry of Finance and Economic Planning, tax revenue from domestic alcohol in 2013 was 1.87% of total government revenue and 0.32% of GDP (Tony Dzadzra, via Felix Oppong, email correspondence). No official figures on the tax revenue from tobacco taxation were received, but these are likely to comprise a negligible proportion of total government revenue and GDP. Tobacco use in Ghana is not high by international or even African standards, and the excise burden on cigarettes (at less than 15% of the retail price) is particularly low. The World Health Organisation recommends that the excise tax should comprise at least 70% of the retail price (WHO, 2010).

Ghana has a comparatively high incidence of alcohol consumption, with slightly more than 50% of people indicating that they consume alcohol (WHO, no date). Per capita consumption of beer is about 6 litres per year and that of spirits about 3.5 litres per year, based on data supplied by the Revenue Authority. The excise tax on both beer and spirits is low, comprising less than 20% of the average retail price of these two products.

The international experience clearly shows that increasing the excise tax on tobacco and alcohol have proven to be particularly effective at raising revenues, while at the same time reducing the consumption of these two goods (IARC, 2011). This report presents the results of a simulation exercise that indicates that Ghana can generate substantially more revenues by increasing the excise tax burden on these two products.

2. Increasing the excise tax on cigarettes

Currently the excise tax in Ghana on cigarettes is levied as an ad valorem tax on the CIF value. The rate of 150% is one of the highest in the ECOWAS region. However, despite this high rate, the yield from cigarette excise taxation is low. The reason is that the CIF value, as reported by the importer, is very low. A high tax percentage on a low base amount yields only a modest amount of revenue. In fact, according to the Tobacco Atlas (2012) the excise tax in Ghana comprised 14% of the retail price. According to a 2012 WHO scorecard for Ghana, the excise tax comprised only 9.7% of the retail price of cigarettes. Despite the discrepancy in the data, it is clear that the excise tax burden is below the average for African countries and very far from the WHO targeted excise tax burden of 70% of the retail price.

Table 1 below lists 47 countries classified as middle-income countries by the World Bank, and nine low-income ECOWAS countries, together with a number of relevant statistics, taken from the Tobacco Atlas (2012). Per capita consumption is defined in terms of the whole population. The cigarette price is converted to USD using the average yearly exchange rate. Affordability is defined as the percentage of per capita GDP required to buy 100 packs of cigarettes. Thus the higher the affordability index, the less affordable the cigarettes are. For more detailed technical notes, please see the Tobacco Atlas (2012).

The list is alphabetical. Countries that are members of ECOWAS are shown in ***bold italics***. Some of these countries are classified as low-income countries and this is indicated by “(LIC)” in the WHO region column. Ghana is shown in **bold**. Other AFRO countries are shown in *italics*.

Table 1: Some cigarette-related statistics for middle-income countries (and low-income ECOWAS member states)

Country	WHO region	PC cigarette consumption	Cigarette price (USD per pack)	Affordability of cigarettes*	Excise tax as percentage of cigarette price
<i>Angola</i>	<i>AFRO</i>	<i>414</i>	<i>-</i>	<i>-</i>	<i>16.0</i>
Argentina	AMRO	1042	1.67	1.47	68.8
Azerbaijan	EURO	1877	1.88	1.45	9.3
Benin	AFRO (LIC)	71	1.01	14.68	25.4
Bolivia	AMRO	179	-	4.64	29.0
Bosnia and Herzegovina	EURO	2278	-	3.62	55.2
<i>Botswana</i>	<i>AFRO</i>	<i>336</i>	<i>2.08</i>	<i>3.48</i>	<i>39.1</i>
Brazil	AMRO	504	2.73	2.10	26.3
Bulgaria	EURO	2822	3.29	2.56	68.9
Burkina Faso	AFRO (LIC)	109	-	24.03	6.9
<i>Cameroon</i>	<i>AFRO</i>	<i>93</i>	<i>2.03</i>	<i>25.73</i>	<i>9.2</i>
Cape Verde	AFRO	339	-	7.62	4.9
China	WPRO	1711	2.25	2.93	26.2
<i>Congo</i>	<i>AFRO</i>	<i>-</i>	<i>1.57</i>	<i>3.39</i>	<i>16.3</i>
Cote d'Ivoire	AFRO	148	2.13	15.62	21.4
Djibouti	EMRO	309	1.02	8.14	30.7
Ecuador	AMRO	227	2.50	5.02	53.6
Egypt	EMRO	1104	1.68	2.92	73.8
Gabon	AFRO	501	-	2.31	6.6
Gambia	AFRO (LIC)	85	-	5.93	30.0
Georgia	EURO	1039	0.81	2.74	46.2
Ghana	AFRO	44	-	10.66	14.0
Guatemala	AMRO	235	1.89	3.77	46.0
Guinea	AFRO (LIC)	9	-	7.75	11.1
Guinea-Bissau	AFRO (LIC)	97	-	11.93	16.1
India	SEARO	96	2.03	13.22	27.7
Indonesia	SEARO	1085	1.40	4.56	45.7
Iran	EMRO	657	2.03	1.56	-
Jamaica	AMRO	283	5.81	13.21	36.2
<i>Lesotho</i>	<i>AFRO</i>	<i>62</i>	<i>3.28</i>	<i>45.65</i>	<i>27.5</i>
Liberia	AFRO (LIC)	113	-	30.52	6.8
Malaysia	WPRO	539	3.30	2.88	47.5
<i>Mauritius</i>	<i>AFRO</i>	<i>787</i>	<i>3.16</i>	<i>3.21</i>	<i>58.7</i>
Mexico	AMRO	371	2.50	1.74	48.9
Mongolia	WPRO	555	1.18	5.00	21.7
Morocco	EMRO	500	3.98	3.95	50.6
<i>Namibia</i>	<i>AFRO</i>	<i>534</i>	<i>2.71</i>	<i>6.51</i>	<i>33.2</i>
Niger	AFRO (LIC)	52	1.06	26.54	10.1
Nigeria	AFRO	116	1.43	9.66	15.9
Pakistan	EMRO	468	1.23	9.09	47.9
Paraguay	AMRO	619	1.34	2.26	7.4
Peru	AMRO	137	2.53	3.07	31.1
Senegal	AFRO	398	0.82	9.29	26.3
Sierra Leone	AFRO (LIC)	177	-	12.32	18.3
<i>South Africa</i>	<i>AFRO</i>	<i>459</i>	<i>4.14</i>	<i>4.87</i>	<i>40.7</i>
Sri Lanka	SEARO	195	3.62	13.80	59.2
<i>Swaziland</i>	<i>AFRO</i>	<i>303</i>	<i>3.47</i>	<i>11.90</i>	<i>32.5</i>
Togo	AFRO (LIC)	307	1.13	24.26	15.0
Tunisia	EMRO	1628	2.95	2.83	49.6
Turkey	EURO	1399	4.38	2.88	63.0
<i>Uganda</i>	<i>AFRO (LIC)</i>	<i>24</i>	<i>-</i>	<i>14.76</i>	<i>29.3</i>
Uruguay	AMRO	770	3.61	2.58	54.3
Venezuela	AMRO	496	4.66	4.66	67.6
Vietnam	WPRO	1001	1.66	5.61	32.6
Yemen	EMRO	402	-	6.40	53.5
<i>Zambia</i>	<i>AFRO</i>	<i>74</i>	<i>1.83</i>	<i>13.62</i>	<i>30.9</i>

Source: Tobacco Atlas, 4th edition, 2012

WHO regions: AFRO = African region; AMRO = Region of the Americas; EMRO = Eastern Mediterranean Region; EURO = European region; SEARO = South-East Asia region; WPRO = Western Pacific region

A number of inferences can be made from Table 1. Firstly, there are very large disparities in per capita cigarette smoking between countries. Relative to other WHO regions, per capita smoking in the African region is low. Within the context of rapid economic growth and aggressive marketing by multinational tobacco companies, the challenge is to keep cigarette consumption low, because economic factors and the tobacco industry's marketing efforts suggest that tobacco consumption would increase. Even within the AFRO region, there are substantial differences in per capita cigarette consumption, with Ghana being the lowest.

Unfortunately there are numerous omissions on the price of cigarettes in the Tobacco Atlas, especially for the AFRO region. Despite that, the Atlas published estimates of cigarette affordability, which incorporates the impact of both price and income on how affordable cigarettes are in different countries. Given the generally low levels of income in the African region, cigarettes tend to be less affordable in the AFRO region than in other WHO regions. For the middle-income countries in the sample, it takes about 5% of per capita GDP to buy 100 packs of cigarettes. For the non-ECOWAS AFRO countries in the sample (classified as middle-income countries) it requires about 13.3% of per capita GDP and for the 15 ECOWAS countries it requires about 14% of per capita GDP. Within the ECOWAS region, cigarettes in Ghana are somewhat more affordable, as it requires 10.7% of per capita GDP to buy 100 packs of cigarettes.

There is similarly a large distribution in the tax burdens (expressed as the excise tax as a proportion of the retail price) across countries. For all 56 countries in the sample, the average tax burden is about 33%. Amongst middle-income countries in the AFRO region (but excluding ECOWAS) the average tax burden is 30%, and amongst the 15 ECOWAS member states the average is 15%. While some ECOWAS countries are atypical (e.g. the Gambia with 30%, Senegal with 26% and Cote d'Ivoire with 25%), as a bloc, ECOWAS has amongst the lowest cigarette excise tax burdens in the world. Within the ECOWAS bloc, Ghana's excise tax burden is slightly below the average.

With this as background, we present a model where the impact of an increase in the excise tax on cigarettes is presented. The details of the model are explained in Appendix A. In short, the model allows one to predict the likely changes in cigarette consumption and government revenue in response to a change in the excise tax (or any other cost component in the cigarette value chain).

A number of scenarios are presented. In the first scenario, the impact of a doubling of the excise tax from 150% of CIF value to 300% of CIF value is evaluated. All assumptions are listed in Appendix A, but some of the crucial ones are the following: (1) the tobacco industry is assumed to increase its profit per stick by 10%. Experience from other countries indicates that this is a typical response by industry to the threat of reduced sales caused by an increase in the excise tax. By raising the profit per stick, the industry protects its overall profitability. (2) The price elasticity of demand is -0.8 for low quality and medium quality cigarettes and -0.5 for premium cigarettes. (3) It is assumed that income grows at an annual rate of 7%, and that the income elasticity varies between 0.5 and 0.8, depending on the price segment.

Where appropriate, we present some statistics as a percentage of GDP. We use the 2013 estimate of nominal GDP of 93.461 billion GHS (Terkper, 2014). Other government statistics also refer to 2013 and are taken from the Mid-year Review (Terkper, 2014).

The results are shown in Table 2 below. The base scenario is based on information taken from a variety of sources. Officials from the Revenue Authority and the Ministry of Finance have considered the base scenario and are in agreement that it represents reality fairly well.

Should the government increase the excise tax to 300% of the CIF value, it will have predictable consequences. See column 2 of Table 2. It will increase the retail price (by 16%), decrease consumption (by 3.5%) and increase the excise tax revenue (by 94%), and overall tobacco-related tax revenues (i.e. the sum of excise, VAT and import duty and other import levies) by 40%. The excise tax burden (i.e. the average excise tax per cigarette as a percentage of the average retail price) will increase from 9% to 16%. The total tax burden will increase from 25% of the retail price to 31% of the retail price. The absolute increase in excise tax revenue would be approximately 8.5 million GHS, and the increase in overall tobacco-related revenues would be approximately 10.3 million GHS. Relative to the magnitude of the fiscal deficit of around 9.45 billion GHS, this is a very small amount (about 0.1%), and hardly worth the political cost of making such a change.

Even if the government were to increase the excise tax to 500% of the CIF value, the effect on the retail price, consumption and the absolute increase in excise tax revenue will be modest. The results are not shown in Table 2, but the changes in the variables of interest are the following: the retail price would be expected to increase by 33%, consumption would decrease by 10% and total excise revenue would increase by 82% from 26 million GHS to 47 million GHS.

Even though the current excise rate, at 150%, sounds high, the major drawback of the current system is that the base on which it is levied is very low. In fact, for most cigarettes the CIF value that is declared at entry is less than 10% of the retail selling price. The CIF value can easily be manipulated by the importer and the foreign exporter. The fact that a large proportion of cigarettes imported into Ghana come from Nigeria, and the exporting and importing firms both are subsidiaries of the same company, would act as an incentive for them to engage in transfer pricing.

The WHO recommends that countries should impose the excise tax on cigarettes as a specific tax, rather than as an ad valorem tax (WHO, 2010). A specific tax is administratively much easier to implement than an ad valorem tax. It is less subject to manipulation than the ad valorem tax. It also has better public health consequences, because it makes it more difficult for tobacco companies to sell very cheap cigarettes, which would often be bought by people who would otherwise have quit. Ad valorem taxes essentially subsidise price discounts offered by tobacco companies. Specific taxes do not.

Within this context, we ran a simulation of the model where, instead of simply increasing the ad valorem excise tax, the government replaces it with a uniform specific excise tax of 1.50 GHS. The results are shown in column 3 of Table 2. The same set of assumptions to derive the results in column 1 was used to get the results in that column.

The simulation shows that a change in the excise tax structure from an ad valorem tax to a specific tax will have a substantial impact. Given the assumptions of the model, the retail price would be expected to increase by more than 100% to an average price of 3.83 GHS per pack, with a resultant decrease in cigarette consumption of 41%. The excise tax burden would increase from the current level of nearly 9% to nearly 40% of the retail price. Even though this is still very far from the WHO target of 70%, it is

broadly in line with the average excise tax burden in middle income countries. The total tax burden would increase from the current level of 25% to approximately 55%.

As a measure to increase tax revenue, such a change would be very beneficial. Whereas an increase in the excise tax from 150% ad valorem to 300% ad valorem would be expected to increase total government revenue by 40% from 26 million GHS to 36 million GHS, this structural shift would be expected to increase total government revenue by 166% to 69 million GHS. Expressed as a percentage of total GDP, these increases are still modest (from 0.028% of GDP to 0.073% of GDP), but one needs to keep in mind that tobacco use in Ghana is currently limited, and thus the revenue potential from this source should not be overstated.

Table 2: Simulation results of increasing the ad valorem excise tax to 300% of the CIF value and imposing a 1.50 GHS specific excise tax on cigarettes

	Base scenario	Scenario 1 Increase ad valorem tax to 300% of CIF	Scenario 2 Impose specific tax of 1.50 GHS per pack
	(1)	(2)	(3)
Total cigarette consumption (million pieces)	1100	1062	654
Average cigarette price (GHS per pack)	1.88	2.17	3.83
Average excise tax burden (excise as percentage of price)	8.8	15.7	39.7
Average tax burden (total tax as percentage of price)	25.0	31.3	54.7
Total excise tax revenue (million GHS)	9.1	17.6	49.1
(Percentage of GDP in parentheses)	(0.010%)	(0.019%)	(0.053%)
Total government revenue (excise, VAT and levies, million GHS)	25.8	36.1	68.5
(Percentage of GDP in parentheses)	(0.028%)	(0.039%)	(0.073%)
Total expenditure on cigarettes (million GHS)	103.1	115.3	125.4
(Percentage of GDP in parentheses)	(0.110%)	(0.123%)	(0.134%)
Percentage change in:			
Total cigarette consumption (million pieces)		-3.5	-40.5
Average cigarette price (GHS per pack)		15.8	104.4
Total excise tax revenue (million GHS)		93.5	439.4
Total government revenue (excise, VAT and levies, million GHS)		39.9	165.7
Total expenditure on cigarettes (million GHS)		11.8	21.6

Imposing such a high specific excise tax would require strong political will, because it would be strongly opposed by the tobacco industry.

The industry will argue that the increased excise tax will increase illicit trade. This tactic has been used around the world. By creating the impression that the illicit trade is high and growing, and is caused by high excise taxes, they try to take governments' focus away from increasing the excise tax as a means to generate additional revenue. Often these statements are made as articles of faith, with little, if any, empirical evidence to back it up. A recent study in South Africa has shown that the tobacco industry has regularly adjusted the "illicit trade market share" in order to suit their narrative, namely that the problem is worse than it has ever been and that it has become increasingly worse over a very short period of time (Van Walbeek and Shai, 2014).

That does not mean to say that illicit trade is not a problem at all. In many countries it is a very serious problem, and should be treated as such. However, mechanisms like the Protocol to Eliminate Illicit Trade in Tobacco Products, adopted by the Parties to the WHO Framework Convention on Tobacco Control (WHO FCTC) in November 2012 allow countries to tackle the illicit trade in tobacco products in a concerted and coordinated way. Using GPS-based tracking and tracing devices, countries like Kenya and Brazil have been able to substantially reduce the incidence of illicit trade. These technologies are becoming increasingly affordable.

The tobacco industry is likely to argue that such a substantial increase in the excise tax would put Ghana out of sync with other ECOWAS countries. As it is, there is substantial variation in the excise tax burden in the ECOWAS region. Also, with a current excise tax burden of 14%, Ghana is below the ECOWAS average (see Table 1).

In late 2013 Botswana was contemplating the imposition of an additional 30% levy on cigarettes, over and above the excise tax of about 1.10 USD that was common to all Southern African Customs Union (SACU) countries. The tobacco industry argued fervently that the levy would put Botswana out of sync with her neighbours and that the price and tax differential would result in major smuggling and other illicit trade issues. Despite the protestations of the industry the government of Botswana imposed the tax in February 2014 and preliminary reports indicate that it has been going well.

Most countries in the ECOWAS region impose ad valorem taxes on products like tobacco and alcohol. The tax directive implicitly assumes this. However, in apparent contravention to the ECOWAS tax directive, the Gambia has recently imposed a specific tax, without major fallout. Also, Senegal imposed a specific tax on cigarettes for a period in order to stabilise its excise tax revenues, since under the ad valorem system the tobacco industry's pricing changes made their revenue flows very unpredictable.

Having said all this, it may be politically and practically infeasible to implement such a large increase in the excise tax in a single year. It is suggested that the government implements the change in the excise tax over a number of years, but where the eventual target tax amount is clearly stated at the outset. For example, in the first year the government could announce its decision to change the excise tax from an ad valorem tax to a specific tax, and impose a rate of 0.75 per pack. The rate of the specific tax could be adjusted to 1.00 GHS in the second year, 1.25 GHS in the third year and 1.50 GHS in the fourth year, all adjusted for inflation.

A significant drawback of a specific tax is that it can be easily eroded by inflation if it is not adjusted on a regular basis. The WHO (2010) recommends that the specific excise tax be adjusted on at least an annual basis by the sum of the inflation rate and the economic growth rate, to ensure that the product does not become more affordable over time.

3. Increasing the excise tax on alcohol

Beer (including milk stout) and spirits are the primary alcoholic beverages consumed in Ghana. A small quantity of wine is imported into Ghana, but the numbers are too small to warrant significant attention. According to numbers supplied by the Revenue Authority, a total of about 152 million litres of beer and 88 million litres of spirits were consumed in Ghana in 2013. This yielded a total of 158 million GHS in excise revenue (128 million GHS from beer and 30 million GHS from spirits). Based on a

nominal GDP of 93.46 billion GHS (Terkper, 2014), this accounted for 0.83% of total government revenue and grants received and 0.17% of total GDP in 2013.

“Tax burden” is typically expressed as either the excise tax as a percentage of the retail price, or as all taxes (i.e. excise tax, plus VAT and levies) as a percentage of the retail price. Table 3 shows the excise tax burden for the three main alcohol categories for a number of countries for which the WHO collects data.¹ As for the analysis on tobacco, the list is alphabetical. Countries that are members of ECOWAS are shown in **bold italics**.

With the exception of three countries where the tax burdens were clearly unrealistic (e.g. the tax is greater than the retail price), and where these countries are excluded from the table, the table presents all countries for which data were published by the WHO. Despite a fairly comprehensive search, we found no other sources which were more comprehensive than this one. The data for Ghana, shown in **bold**, were taken from the data provided by the officials of the Revenue Authority. The derivation of the data is discussed in more detail in Appendix B.

Table 3: Excise tax on beer, wine and spirits as a percentage of retail price by country

Country	WHO region	World Bank income classification	Beer	Wine	Spirits
Andorra	EURO	HI	5	5	19
Angola	AFRO	UMI	1	1	1
Argentina	AMRO	UMI	8	-	2
Armenia	EURO	LMI	3	1	5
Azerbaijan	EURO	UMI	8	15	8
Bahrain	EMRO	HI	4	6	6
Bhutan	SEARO	LMI	-	30	-
Botswana	AFRO	UMI	40	40	40
Brazil	AMRO	UMI	6	6	5
Burkina Faso	AFRO	LI	25	30	30
Cape Verde	AFRO	LMI	15	15	15
Cameroon	AFRO	LMI	25	25	25
Central African Republic	AFRO	LI	25	25	25
Chile	AMRO	HI	15	15	27
China	WPRO	UMI	-	1	2
Colombia	AMRO	UMI	16	35	35
Congo	AFRO	LMI	1	1	2
Cook Islands	WPRO	-	2	2	12
Cote d'Ivoire	AFRO	LMI	13	30	33
Dominica	AMRO	UMI	5	5	5
El Salvador	AMRO	LMI	8	8	8
Equatorial Guinea	AFRO	HI	25	40	50
Gambia	AFRO	LI	10	-	-
Ghana	AFRO	LMI	16	-	10
Guinea Bissau	AFRO	LI	81	81	-
Guyana	AMRO	LMI	4	4	4
Honduras	AMRO	LMI	22	-	-

¹ The WHO indicates clearly that this refers to the excise tax as a percentage of the retail price, not the total of all taxes as a percentage of the retail price. It is difficult to verify these numbers, but one set of numbers which can be verified are those of South Africa. South Africa’s Ministry of Finance follows a policy that the total tax burden on beer, wine and spirits should be 35%, 23% and 48% respectively. These are the numbers that the WHO quotes for the excise tax only. The numbers in Table 3 misrepresent the South African situation. Like with all summarised statistics, one should interpret the statistics in Table 3 with caution.

Japan	WPRO	HI	5	5	5
Kyrgyzstan	EURO	LMI	18	6	-
Lao People's Democratic Republic	WPRO	LMI	5	6	7
Malawi	AFRO	LI	9	10	10
Malaysia	WPRO	UMI	2	2	1
Mexico	AMRO	UMI	25	25	50
Mongolia	WPRO	LMI	3	22	37
Myanmar	SEARO	LI	4	4	4
Nepal	SEARO	LI	28	31	72
Nicaragua	AMRO	LMI	22	36	37
Niger	AFRO	LI	45	45	45
Nigeria	AFRO	LMI	2	2	2
Republic of Korea	WPRO	HI	72	30	72
Republic of Moldova	EURO	LMI	21	-	26
Rwanda	AFRO	LI	60	70	70
Saint Kitts & Nevis	AMRO	HI	6	6	5
Senegal	AFRO	LMI	4	4	-
Sierra Leone	AFRO	LI	30	30	35
South Africa	AFRO	UMI	35	23	48
Sri Lanka	SEARO	LMI	5.3	40	40
Sweden	EURO	HI	40	41	70
Switzerland	EURO	HI	10	-	51
Thailand	SEARO	UMI	50	50	50
The former Yugoslav Republic of Macedonia	EURO	UMI	18	18	18
Turkey	EURO	UMI	63	-	-
Uganda	AFRO	LI	60	-	60
United Kingdom	EURO	HI	26	59	68
United Republic of Tanzania	AFRO	LI	8	10	12
Uruguay	AMRO	HI	22	-	48
Venezuela (Bolivian Republic of)	AMRO	UMI	10	12	39
Viet Nam	WPRO	LMI	45	45	45
Zimbabwe	AFRO	LI	-	-	40

WHO regions: AFRO = African region; AMRO = Region of the Americas; EMRO = Eastern Mediterranean Region; EURO = European region; SEARO = South-East Asia region; WPRO = Western Pacific region; LI = Low-income; LMI = Lower-middle-income; UMI = Upper-middle-income; HI = High-income

Sources: WHO data from <http://apps.who.int/gho/data/node.main.A1182?lang=en>,
<http://data.worldbank.org/about/country-and-lending-groups>)

The average excise tax burdens, based on the data presented in Table 3, for the six WHO regions are shown in Table 4, while the average excise tax burdens for countries categorised by per capita income, as used by the World Bank, are shown in Table 5.

Table 4: Average excise tax burden on beer, wine and spirits by WHO region

WHO Region	Beer	Wine	Spirits
AFRO	25	26	30
AMRO	13	15	22
EMRO	4	6	6
EURO	23	23	35
SEARO	22	31	42
WPRO	19	14	23

WHO regions: AFRO = African region; AMRO = Region of the Americas; EMRO = Eastern Mediterranean Region; EURO = European region; SEARO = South-East Asia region; WPRO = Western Pacific region

Note: Calculations are based on 55, 49, and 51 countries for beer, wine and spirits respectively for which there is available data. Source: Own calculations based on WHO data (<http://apps.who.int/gho/data/node.main.A1182?lang=en>)

Table 5: Average excise tax burden on beer, wine and spirits by World Bank income classifications

World Bank classification	Beer	Wine	Spirits
Low-income (LI)	21	23	38
Lower-middle-income (LMI)	28	28	37
Upper-middle-income (UMI)	13	17	20
High-income (HI)	21	19	22

Note: Calculations are based on 53, 47 and 50 countries for beer, wine and spirits respectively for which there is available data. Own calculation based on World Bank income classifications (<http://data.worldbank.org/about/country-and-lending-groups>)

Unfortunately the list of countries in Table 3 does not cover many countries for which one would have expected data to be available, e.g. European countries, and thus the table might not be fully representative. However, within these data limitations, we can derive the following:

- There are large variations in the excise tax burden between countries.
- The Eastern Mediterranean region (EMRO) is represented by only one country (Bahrain) where the excise tax is particularly low. Other EMRO countries typically do not allow the sale of alcohol and are thus not included in the analysis. Other than the EMRO region, there are not huge differences in the average excise tax on alcoholic products in the other WHO regions.
- Similarly, there are not any consistent differences between the excise tax burden on alcohol between the various groups of countries as classified by the World Bank.
- Spirits, in general are taxed at a higher rate than wine and beer.
- The average excise tax on both beer and spirits in the 10 ECOWAS countries for which there is data is 24% of the retail price, but this hides substantial variation in the excise tax burdens between these countries.

Ghana's excise tax on beer is estimated at 16% of the average retail price, while the excise tax on spirits is estimated at 10% of the average retail price. Relative to the ECOWAS average (24% tax burden for beer and 24% tax burden for spirits) and the averages for the AFRO region (25% tax burden for beer and 30% tax burden for spirits) and lower-middle income countries (28% tax burden for beer and 37% tax burden for spirits), the excise taxes on alcohol are low.

Within this context, we consider the excise tax structure on beer and spirits and present the results of some simulations that aim to quantify the impact, firstly, of raising the excise tax, and, second, of changing the excise tax structure.

i) Beer

A substantial quantity of beer is manufactured in Ghana, although there are modest quantities of imports as well. In December 2012 the excise tax structure on beer underwent significant change when a tiered system, based on the percentage of local content used in the production of the product, was introduced. The excise tax is levied as an ad valorem tax on the ex factory price at the following rates:

<u>Percentage of local content</u>	<u>Percentage tax</u>
0-29.99%	47.5%
30-49.99%	30%
50-69.99%	20%
70% +	10%

Before the introduction of the tax concessions on local content, the excise tax was levied at 47.5% on the ex factory price on all beer types. After the introduction of these local content concessions, the majority of beer is taxed at 30%.

In consultation with the officials of the Revenue Authority, the model assumes that the market can be subdivided into two price categories, namely a popular price category and a discounted price category. Together with the four categories of local content, these two price categories imply that there are eight segments of domestically produced beer. Each one of these segments is individually modelled. The working of the model and the assumptions that underlie the model are explained in Appendix B.

The producers of beer have to submit regular reports to the Revenue Authority where they show the breakdown of the retail price of beer. The ex factory price, which is the value on which the excise tax is levied, is typically between 40% and 60% of the retail price. In contrast to cigarettes, where the base on which the ad valorem tax is levied is less than 10%, the base amount on which the excise tax for beer is levied, is more substantial.

The differential excise tax rates based on local content were introduced at the request of domestic beer producers. Uganda also has local content rules, but the rules are much stricter than in Ghana. Uganda has only two tiers. Beer with less than 75% local content is taxed at the standard rate, while beer with more than 75% local content is taxed at the preferential or concessionary rate.

The system currently in place in Ghana is administratively cumbersome and open to abuse. Officials from the Revenue Authority report that producers sometimes report different local content bands for the same brand of beer from one month to the next. For example, in one month they may report that they used between 30% and 49.99% local content, while in the next month they report between 50%

and 69.99% local content. While this is completely possible, given the availability or non-availability of local content, it is difficult and expensive to monitor whether the beer producers are reporting the local content correctly.

While the differentiated tax rates were implemented to encourage local producers to use more local content and thus stimulate the local Ghanaian economy, the bar is not set very high. A firm that uses 30% local content can reduce the excise rate from 47.5% to 30% of the ex factory price. It is presumably not particularly difficult to reach 30% local content, and, according to officials from the Revenue Authority, nearly all domestically produced beer is eligible for the 30% excise tax. As such, the local content concessions should be seen as cleverly-negotiated tax breaks, rather than a reward for using local content.

It has had a significant impact on government revenues. Based on data supplied by the Ministry of Finance and Economic Planning, revenues from “domestic alcohol” decreased for 574 million GHS (4.1% of total government revenue and 0.77% of GDP) in 2012 to 295 million GHS (1.9% of total government revenue and 0.32% of GDP) in 2013 (Oppong, email correspondence).²

It should not be automatic (or near-automatic) for producers to qualify for a lower excise tax rate. The lower excise tax represents an opportunity cost for the Ghanaian government and, by extrapolation, Ghanaian society. Tax concessions should not be granted to beer producers who are operating their business as usual. Beer producers would presumably have to incur additional costs if they wish to reap the benefit of the lower excise tax. The bar should be set much higher than is currently the case. Thus, it is suggested that the current system of four local content excise tax tiers, be reduced to two tiers, similar to the system in Uganda.

In Scenario 1A of the model we show the results of a change in the excise tax from the current levels to 60% on the ex factory price for beer with a local content of less than 70% and 25% on the ex factory price for beer with a local content of more than 70%. The summarised results are shown in column (2) of Table 6. In Scenario 1B we show the results of a change in the excise tax from the current levels to 80% on the ex factory price for beer with a local content of less than 70% and 30% on the ex factory price for beer with a local content of more than 70%. The summarised results are shown in column (3) of Table 6.

² It is not clear whether these taxes refer only to excise taxes or whether they include other taxes as well. It is presumably the latter because data from the Revenue Authority indicate that excise tax on beer and spirits in 2013 totalled 158 million GHS.

Table 6: Simulation results for increasing the excise tax on beer

	Base	Scenario 1A Increase A.V. tax to 60%*	Scenario 1B Increase A.V. tax to 80%**	Scenario 2 Impose specific tax at 3.00 GHS per litre***
	(1)	(2)	(3)	(4)
Total beer consumption (million litres)	152.0	127.0	117.8	113.0
Average beer price (GHS per litre)	5.18	6.68	7.31	8.27
Average excise tax burden (excise tax as a percentage of the retail price)	16.0	24.6	29.8	36.2
Average tax burden (total tax as percentage of price)	32.0	40.7	46.0	51.4
Total excise tax revenue (million GHS) (Percentage of GDP in parentheses)	126.3 (0.135%)	208.3 (0.222%)	256.5 (0.274%)	338.1 (0.362%)
Total government revenue (excise, VAT and levies, million GHS) (Percentage of GDP in parentheses)	252.0 (0.270%)	345.5 (0.370%)	395.2 (0.423%)	484.9 (0.519%)
Total expenditure on beer (million GHS) (Percentage of GDP in parentheses)	787.9 (0.843%)	848.1 (0.907%)	861.0 (0.921%)	934.4 (1.000%)
Percentage change in:				
Total beer consumption (million litres)		-16.4	-22.5	-25.7
Average beer price (GHS per pack)		28.8	41.0	59.5
Total excise tax revenue (million GHS)		65.0	103.1	167.7
Total government revenue (excise, VAT and levies, million GHS)		37.1	56.8	92.4
Total expenditure on beer (million GHS)		7.6	9.3	18.6

* 60% on all beer with local content of less than 70%; 25% on beer with local content of more than 70%.

** 80% on all beer with local content of less than 70%; 30% on beer with local content of more than 70%.

*** 4.50 GHS per litre on imported beer; 3.00 GHS per litre on all domestically produced beer with local content of less than 70%; 1.00 GHS on beer with local content of more than 70%.

Increasing the excise tax to 60% for all bands below 70% content, would increase the average retail price of beer by nearly 30%. Beer that previously enjoyed large rebates (e.g. local content of 30-49.99% and especially 50-69.99%) would experience a larger increase in the retail price than beer that was subject to 47.5% excise tax at the outset. The excise tax burden would increase from 16% of the average retail price to 25% of the retail price. The average total tax burden would be expected to increase from 32% of the retail price to 41% of the retail price.

The predictable result of these large increases in the retail price is that beer consumption would decrease by about 16%. However, total excise tax revenue would be expected to increase by 65% from 126 million GHS to 208 million GHS (i.e. from 0.135% of GDP to 0.222% of GDP). Total government revenue (i.e. also VAT and import duties and levies) would be expected to increase by 45% from 252 million GHS to 346 million GHS (i.e. from 0.270% of GDP to 0.370% of GDP). Total expenditure on beer would be expected to increase by 8%.

The default assumptions are provided in Appendix B. Amongst others, it is assumed that the beer industry increases the margin by 20%, in order to protect its overall profitability. The model indicates that the combination of the tax changes and the industry's pricing strategy would result in an increase

in the industry's total margin of nearly 5% (not shown in Table 3, see Excel file, sheet "Intermediate outputs").

A similar, but from a fiscal perspective, more beneficial, picture emerges when the excise tax is increased to 80% of the ex factory price for beer with local content of less than 70% and 30% of the ex factory price of beer with local content of more than 70%. In this scenario, indicated as Scenario 1B in Table 6, the average retail price increases by 41%, total beer consumption decreases by 23%, total excise tax revenue increases by 103% and total government revenue from beer (i.e. including VAT and import duties and levies) increases by 57% (from 252 million GHS (0.270% of GDP) in the base scenario to 395 million GHS (0.423% of GDP) in the simulation).

In scenario 2 it is assumed that the ad valorem tax is replaced by a specific tax of 4.50 GHS per litre on imported beer and 3.00 GHS per litre of beer with local content of less than 70% and with 1.00 GHS per litre of beer with a local content of more than 70%. Like in the other scenarios, it is assumed that the beer industry increases the margin by 20%. The results of this simulation exercise are shown in column 4 of Table 6. The average retail price increases by 60%, total beer consumption decreases by 26%, total excise tax revenue increases by 168% and total government revenue from beer (i.e. including VAT and import duties and levies) increases by 92% (from 252 million GHS (0.270% of GDP) in the base scenario to 485 million GHS (0.519% of GDP) in the simulation).

While a similar result as Scenario 2 could be achieved simply by raising the ad valorem rate further than 80% (as is assumed in scenario 1B), the advantage of using a specific tax is that it is easier to administer and monitor. The greater the ad valorem percentage, the greater is the incentive for beer producers to under-report the ex factory price in order to reduce the tax liability. If the excise tax is levied as a specific tax, this incentive disappears.

Given that beer is a much greater source of government revenue than cigarettes, a sizable change to the excise tax on beer will have a much greater absolute effect on Ghana's fiscal position than a similar, or even greater, percentage increase in the excise tax on cigarettes.

ii) Spirits

Gin is the spirits of choice in Ghana, and, from the information received, is sold very cheaply. It is typically manufactured from diluted ethanol, with added flavourings. The alcohol content is standard, i.e. between 37% and 43%. The excise tax is 25% of the ex factory price. This is lower than the excise tax imposed on beer. The international norm is that spirits are taxed at a substantially higher rate than beer (National Treasury, 2014). This was also borne out in Tables 4-6, where the excise tax burden on spirits was about 10 percentage points higher than the excise tax burden on beer, although there are substantial variations between countries.

From the information provided, nearly all spirits (i.e. gin) consumed in Ghana is produced in Ghana. The model allows for an imported segment and a single segment for domestically produced spirits.

In 2013 a total of 88 million litres of spirits were consumed in Ghana. Total revenues from spirits in that year were 30.3 million GHS. We assumed that 99% of this quantity was produced domestically. The imported component is very marginal, and is thus not the focus of the discussion, even though the model does apply the full cost chain to the imported spirits.

The model assumes that, at the outset, the price of domestically-produced spirits averages 3.60 GHS per litre. Based on information provided by the industry to the Revenue Authority, the ex factory price on which the excise tax is based is assumed to average 1.60 GHS per litre, or nearly 45% of the VAT-included retail price. These assumptions of the retail price and ex factory price were chosen such that the total excise revenue calculated by the model in the base scenario broadly corresponds to the total excise revenue received from spirits in 2013.

Under these assumptions, the excise tax burden on spirits is just more than 10% of the retail price. This percentage is low in any comparative context. The average excise tax burden on spirits in ten ECOWAS countries on which the WHO produces data is 24%; the average for 23 AFRO countries is 30%, and the average for 19 lower-middle income countries is 37%.

Column 2 of Table 7 shows the summarised results of the impact of increasing the ad valorem excise tax from 25% to 60% of the ex factory price, assuming that the industry increases the ex factory price by 10% and its margin by 20%. Given the assumptions, this increase in the excise tax would increase the retail price of spirits by 33% and it would increase the excise tax burden from 10% of the retail price to 21% of the retail price. The total tax burden is expected to increase from 25% to 36% of the retail price. Total excise tax revenue would be expected to increase by 125% from a simulated 33 million GHS in the base scenario to 75 million GHS. Total government revenue (i.e. including VAT and import duties on the modest import volumes) would increase by 58% from 82 million GHS (0.087% of GDP) to 129 million GHS (0.138% of GDP).

In column 3 of Table 7 an alternative scenario is presented, i.e. to replace the 25% ad valorem tax on the ex factory price of spirits with a specific tax of 3.00 GHS per litre. Like in the previous scenario, the industry is assumed to increase the ex factory price by 10% and the margin by 20%. The result is a significantly larger increase in the retail price of spirits, compared to the first scenario. The retail price is expected to increase by 97%, and spirits consumption is expected to decrease by 38%. The excise tax burden would be expected to increase to 42% of the retail price and the total tax burden would be expected to increase to 57% of the retail price, which is broadly in line with the international norm for spirits (National Treasury, 2014). Excise tax revenue would be expected to increase by 394% from 33.3 million GHS (0.036% of GDP) to 164.5 million GHS (0.176% of GDP), while total government revenue (i.e. including VAT and import taxes) would be expected to increase by 174% from 81.7 million GHS (0.087% of GDP) to 223.7 million GHS (0.239% of GDP).

Currently the excise tax on spirits is levied as an ad valorem tax. The base amount on which the tax is levied is not so small as to make it meaningless as the base for a tax (as is the case for cigarettes). However, it can be manipulated by the industry in order to reduce the industry's tax liability. We recommend that the government of Ghana move to a specific tax on spirits. A recent report indicates that the trend internationally is to move to simpler tax structures, and in particular uniform specific taxes (National Treasury, 2014).

Table 7: Simulation results for increasing the excise tax on spirits

	Base scenario	Scenario 1 Increase A.V. tax	Scenario 2 Impose specific tax
	(1)	(2)	(3)
Total spirits consumption (million litres)	88.0	74.9	54.8
Average spirits price (GHS per litre)	3.64	4.83	7.19
Average tax burden (total tax as percentage of price)	25.4	35.7	56.8
Total excise tax revenue (million GHS)	33.3	74.9	164.5
(Percentage of GDP in parentheses)	(0.036%)	(0.080%)	(0.176%)
Total government revenue (excise, VAT and levies, million GHS)	81.7	129.3	223.7
(Percentage of GDP in parentheses)	(0.087%)	(0.138%)	(0.239%)
Total expenditure on spirits (million GHS)	320.7	362.1	394.5
(Percentage of GDP in parentheses)	(0.343%)	(0.387%)	(0.422%)
Percentage change in:			
Total spirits consumption (million litres)		-14.9	-37.7
Average spirits price (GHS per pack)		32.6	97.4
Total excise tax revenue (million GHS)		124.7	393.6
Total government revenue (excise, VAT and levies, million GHS)		58.4	174.0
Total expenditure on spirits (million GHS)		12.9	23.0

4. Conclusion

This research report presents the results of a number of simulation models, aimed at quantifying the impact of changing the excise tax percentage and/or the excise tax structure on cigarettes and alcohol. The models are mathematical constructions, based on business intuition (specifically the decomposition of the retail price into its cost and tax components) and economic logic (the relationship between price and consumption), and have to be populated by the user. We have endeavoured to populate these models with input parameters and variables that reflect the reality in Ghana as best as possible. Officials from the Revenue Authority and the Ministry of Finance have been particularly helpful in this regard. However, to the extent that the inputs do not reflect reality, the model will be wrong in its predictions.

The underlying assumption of this exercise is that the primary objective is to increase government revenue, given the fiscal challenges facing Ghana. By raising the excise tax, one can raise more revenue. However, a “side product” of increasing the excise tax, is a reduction in the consumption of these two products. In the case of cigarettes, this will certainly improve public health, and, in the case of alcohol, this will nearly certainly improve public health and reduce the detrimental acute consequences associated with excessive alcohol use.

In modelling the excise tax on cigarettes (and, to a lesser extent, alcohol) it was found that the *structure* of the excise tax is not optimal. Even though the excise tax on cigarettes is levied at a rate of 150% (which sounds high), the base on which the tax is levied is so small that the effective tax burden and the amount of revenue generated, is miniscule. An increase in the ad valorem excise tax rate will increase the tax burden and revenues, but the political cost will probably not justify the very modest increases in revenue.

If the government of Ghana wishes to substantially raise revenues from cigarette excise taxes (and from spirits and beer as well), it should consider a complete overhaul of the tax regime by replacing the current ad valorem tax rate system with a specific tax. International best practice in tobacco and alcohol taxation indicates that the best excise tax structure is a simple, uniform, specific tax. Such a change in the structure of the excise tax is recommended, especially, for tobacco taxation, and also for the taxation of spirits. For beer, it would also be a good idea to implement a specific tax, but in terms of relative importance, the need is somewhat less pressing than for cigarettes and spirits.

The one major drawback of a specific excise tax structure is that it can be eroded by inflation. Inflation in Ghana is well above the (already quite high) target of 9% plus/minus 2%. Should the excise tax be imposed as a specific tax, it would very quickly be eroded by inflation if the tax is not adjusted on a regular basis. In fact, with current inflation rates, the real value of the excise tax would be halved in the space of five years, should the tax not be adjusted. We strongly recommend that the excise tax be adjusted on an annual basis, by at least the inflation rate. Furthermore, if the government wants to ensure that the products are not becoming more affordable, it should increase the excise tax by the sum of the inflation rate and the economic growth rate.

To summarise the results of the simulation exercises, should the government of Ghana change the *level* of the excise tax without changing the *structure* of the excise tax, the likely consequences are shown in Table 8. In this table, we performed the simulation on the following assumptions:

- The excise tax on cigarettes increases from 150% of the CIF value to 300% of the CIF value;
- The excise tax on beer increases from a four-tier ad valorem system (0-29.99% local content = 47.5%; 30-49.99% local content= 30%; 50-69.99% local content= 20% and 70% + local content = 10%), where the base is the ex factory value to a two-tier ad valorem system (0-69.99% local content= 60% and 70% + local content = 25%);
- The excise tax on spirits increases from 25% of the ex factory price to 60% of the ex factory price.

These numbers correspond to the outputs of the model, denoted as Scenario 1, in previous tables.

Table 8: Summary of impact of tax changes (Scenario 1)

	Cigarettes	Beer	Spirits	Total
Excise tax revenue at the outset (million GHS)	9	126	33	168
Excise tax revenue after the tax change (million GHS)	16	208	75	299
Increase in excise tax revenue (million GHS)	7	82	42	131
(Percentage of GDP in parentheses)	(0.007%)	(0.088%)	(0.045%)	(0.140%)
Increase in excise tax revenue (percentage)	78	65	125	78
Total government revenue (excise, VAT and levies) at the outset (million GHS)	26	252	82	360
Total government revenue after the tax change (million GHS)	36	346	129	511
Increase in total government revenue (million GHS)	10	96	47	151
(Percentage of GDP in parentheses)	(0.011%)	(0.103%)	(0.050%)	(0.162%)
Increase in total government revenue (percentage)	40	37	58	42
Percentage change in:				
Excise tax per unit	100.4	97.4	163.9	
Average retail price	15.8	28.8	32.6	
Consumption	-3.5	-16.4	-14.9	

An increase in the excise tax without changing its structure, according to the magnitudes set out above, would yield an estimated 131 million GHS in additional revenue (0.14% of GDP). Nearly two thirds of the additional revenue would come from the excise tax on beer. The average retail prices of cigarettes would increase by about 15% while the average retail price of alcohol would increase by about 30%. There would be modest decreases in consumption, ranging from about 4% for cigarettes to 15% for spirits.

Should the tax structure be changed from an ad valorem to a specific tax for all three products under investigation and set at substantially higher values than currently implied by the ad valorem taxes, the likely consequences of such a strategy are summarised in Table 9. In particular, Table 9 is based on the following assumptions:

- The excise tax on cigarettes is set as a specific tax at 1.50 GHS per pack;
- The excise tax on beer is set as a two-tiered specific tax for domestically produced beer: 3.00 GHS per litre for beer with local content of less than 70% and 1.00 GHS per litre for beer with local content of more than 70%. Imported beer is taxed at 4.50 GHS per litre;
- The excise tax on spirits is set at 3.00 GHS per litre.

These numbers correspond to the outputs of the model, denoted as Scenario 2, in previous tables.

Table 9: Summary of impact of tax changes (Scenario 2)

	Cigarettes	Beer	Spirits	Total
Excise tax revenue at the outset (million GHS)	9	126	33	168
Excise tax revenue after the tax change (million GHS)	49	338	165	552
Increase in revenue (million GHS)	40	212	132	384
(Percentage of GDP in parentheses)	(0.043%)	(0.227%)	(0.141%)	(0.411%)
Increase in excise tax revenue (percentage)	344	168	400	229
Total government revenue (excise, VAT and levies) at the outset (million GHS)	26	252	82	360
Total government revenue after the tax change (million GHS)	69	485	224	777
Increase in total government revenue (million GHS)	43	233	142	417
(Percentage of GDP in parentheses)	(0.046%)	(0.249%)	(0.152%)	(0.447%)
Increase in total government revenue (percentage)	166	92	174	116
Percentage change in:				
Excise tax per unit	807.0	260.1	692.1	
Average retail price	104.4	59.5	97.4	
Consumption	-40.5	-25.7	-37.7	

These changes would have very sizable effects in terms of all the variables of interest. The excise tax per unit would increase by 260% for beer and by 700% or more for cigarettes and spirits. The impact of the excise tax increases on the average retail price would be substantial, but not unrealistically so. The average price of beer would be expected to increase by 60%, while the average price of cigarettes and spirits would be expected to double. As a result, one would expect consumption of these products to decrease by between 25% and 40%.

The fiscal impact of these large increases in the excise tax is substantial. Total excise tax revenue would be expected to increase by more than 200%. The additional revenue to the fiscus from excise taxes would be more than 400 million GHS, or 0.45% of GDP.

Can this proposal be practically implemented? Are the proposed changes in the excise tax not too large? These should be seen as medium-term (4-6 years) proposals. It would probably not be economically prudent or politically feasible to implement these changes within the space of one or two years. However, experience from many countries has shown that one can impose progressively higher taxes on alcohol, and especially on tobacco, that would not have seemed reasonable or feasible at the outset.

For example, in South Africa the excise tax on cigarettes in 1993 comprised 20% of the retail price and the total tax burden (i.e. including VAT) was 33% of the retail price. In 1994 the government announced that it wished to raise the excise tax such that the total tax burden would be 50% of the retail price. This was phased in over a number of years. By 2000 the government had increased the nominal excise tax by 391% and the real excise tax by 201% since 1993.³ As a result of these excise tax increases, and also because the tobacco industry had substantially increased their margins, the real

³ Between 2000 and 2012 the nominal excise tax increased by another 272% (the real excise tax increased by another 97%). Thus since 1994, the nominal excise tax had increased more than 17-fold and the real excise tax had increased by nearly 500%.

retail price of cigarettes increased by 92% between 1993 and 2000. Between 1993 and 2000 cigarette consumption in South Africa decreased by 28%. Smoking prevalence decreased from 33% in 1993 to 27% in 2000. During the same time period, real government excise tax revenue increased by 118%.

When South Africa embarked on this tobacco control strategy in 1994, the excise tax burden was substantially higher than it is in Ghana at present. It seemed implausible at the time that raising the excise tax on cigarettes would have such positive public health and fiscal consequences. Yet, the evidence has clearly shown that it has been remarkably successful. Within the space of six years South Africa was able to reap very substantial public health and fiscal benefits.

South Africa has not followed a similar strategy with respect to alcohol, but the international evidence indicates that there are many commonalities between alcohol and tobacco. There is a growing consensus that increasing excise taxes on alcohol reduce alcohol use and raise revenues for the government, in exactly the same way that increasing excise taxes on tobacco have reduced tobacco use and raised revenues.

The industries supplying these products will argue that such large increases in the excise tax are simply not feasible. However, the experience of South Africa clearly shows that it is possible to successfully implement very substantial increases in the excise tax. It requires strong political will.

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Appendix A: The tobacco taxation model

All cigarettes consumed in Ghana are imported, after BAT closed down their manufacturing plant in 2006. Cigarettes in Ghana are sold in one of three categories: low quality cigarettes (e.g. Pall Mall and Tasker), medium quality cigarettes (e.g. London) and premium cigarettes (e.g. Rothmans, Embassy and State Express 555). For each of these price/market segments, a different cost chain is included in the model. A weighted average cost chain is calculated, based on the relative market shares of the three segments. Based on 2012 data on import quantities, provided by the Ministry of Finance, the relative share of low quality cigarettes was approximated at 25%, medium quality cigarettes at 60% and premium cigarettes at 15%.

The starting point for the model is to break up the retail price into its various cost components. Some of these are obvious and easily calculable, while others have to be derived through a process of “backward engineering”. Some components are based on the user’s intuition and “feel” for the data (although none have a material impact on the main results of the model).

The retail selling price for each market segment is used as the starting point. The CIF value is determined by the user and is modelled to be a percentage of the retail price. Based on data received from the Ministry of Finance and inputs for Ministry officials, the CIF amount, expressed as a percentage of the retail price, was approximated at 17% for low quality cigarettes, 22% for medium quality cigarettes and 22% for premium cigarettes.

A number of costs are directly dependent on the CIF amount. These are the following: Import duty at 20%, excise tax at 150%, ECOWAS levy at 0.5%, Economic and Development Investment Fund levy at 0.5% and a processing fee at 1%.

Since January 2014 VAT is charged at 17.5%, compared to 15% previously. The model is programmed such that it adds the net VAT amount at each step (cost amount) of the cost chain. The first VAT amount is levied on the sum of the CIF amount and the import taxes and duties that are payable on the CIF amount, as listed in the previous paragraph.

Although it is not vital to the model, a number of costs incurred by the domestic importer/distributor (i.e. BAT Ghana) are included in the cost chain. These costs do not change the conclusions of the model in any significant way, but they do allow one to estimate the net profit of the domestic importer/distributor. Should the government of Ghana want to impose a “super-tax” on the domestic importer/distributor, this part of the model will be useful to determine the impact of changes in the excise tax and/or other cost components on the importer/distributor’s net profit.

Three importer/distributor costs are identified. The first is “marketing and distribution costs”. In the base scenario this cost component is set by the user as a percentage of the retail price. In the absence of industry data (and this data is likely to be sensitive and not freely available), this was set at 20% of the retail price for low and medium quality cigarettes and at 25% of the retail price for premium cigarettes.

The second importer/distributor cost category is “overheads”. Like marketing and distribution costs, this category is set at a percentage of the retail price. Again, this percentage is not freely available, so had to be “guessed” by the users of the model. It was set at 16% of the retail price for low quality cigarettes and at 12% of the retail price for medium quality and premium cigarettes.

The third importer/distributor related cost is the importer/distributor's profit margin. In the base situation this is calculated as the VAT-excluded retail price, less the sum of all other costs and the VAT amounts paid along the cost chain. It can also be regarded as the residual after all costs (including VAT) have been subtracted from the VAT-included retail price.

Two other costs included in the cost chain are the wholesaler's margin and the retailer's margin. The wholesaler typically sets its margin as a percentage of the cost of purchasing the product. In the default scenario we have set this wholesaler margin at 10%.

Similarly, the retailer's margin is typically set as a percentage of the cost to purchase the product. According to a 2010 ERC report the retailer's margin in Ghana is about 10%. This percentage was used in the model.

By its construction, VAT is levied at each point along the cost chain. In the model we calculate the VAT amounts on six different cost components, namely (1) the "out of port" cost (i.e. the sum of the CIF value and the various taxes and levies imposed on the CIF amount), (2) the marketing and distribution costs, (3) the importer/distributor's overhead costs, (4) the importer/distributor's profit margin, (5) the wholesale margin and (6) the retail margin. The sum of these six VAT amounts must equal 17.5% of the net-of-VAT retail price, which it does, thus validating the mathematical consistency of the model.

Once all these cost components have been calculated, aggregate amounts attributable to each of these costs are obtained by multiplying the costs per unit by the number of units. For the base scenario it was assumed that 1100 million cigarettes are sold in Ghana. This corresponds to a per capita consumption of approximately 44 cigarettes per year, which is the number quoted in the latest Tobacco Atlas (2012).

In the next step the system is "shocked". In other words, the excise tax and other variables of interest are changed, and the effect of these changes on the retail price is calculated.

The model allows for two types of excise tax changes. The first type assumes no change to the excise tax *structure*, but simply allows for a change in the excise tax *rate*. In other words, the excise tax is still levied as an ad valorem tax on the CIF value, but at a rate different to the base case scenario of 150%. The second type assumes that the structure of the excise tax changes from an ad valorem tax to a specific tax. The excise tax is then levied as an amount per pack of cigarettes, irrespective of the CIF value. For this option, the model allows different specific rates for the three quality segments (i.e. low, medium and premium) of cigarettes. However, best practice in tobacco excise taxation indicates that a uniform specific tax is superior to a tiered specific tax regime (WHO, 2010).

The model also allows for a change in the industry margin. International experience has shown that the tobacco industry often increases the industry margin in response to a change in the excise tax. For example, should the excise tax increase, the industry would expect sales quantities to decrease. If it does not increase the profit margin per cigarette sold, its total profits (i.e. the product of profit per unit and quantity sold) would decrease. To protect its overall profitability, the tobacco industry would often increase the industry margin in response to the excise tax increase. To incorporate this feature into the model, the user can set the percentage by which he/she believes the tobacco industry will

change the industry margin. As a default, the model assumes that the industry margin will increase by 10%.

There is no reason to believe that the marketing and distribution costs and the overhead costs will change in response to a change in the excise tax structure or level. Thus, the absolute amount of these two cost components, as calculated in the base scenario, are assumed to apply after the system has been shocked by changing the excise tax.

The wholesale margin and the retail margin are typically set as a percentage of the input values that the wholesalers and retailers pay, respectively. An increase in the excise tax will typically not change the margin (in percentage terms), but because the value is higher, the absolute amount of the wholesale and retail margin will be higher as well.

Based on these changes in the cost components, the model then calculates a new retail price for each of the three quality segments. The VAT rate of 17.5% is assumed to stay the same and is levied on each stage of the production and distribution process, as was the case in the base scenario.

The next step is to estimate the impact of the change in the retail price on consumption. Consumers do not respond to changes in the excise tax or any other cost component, but they do respond to changes in the price that they have to pay, i.e. the retail price.

The crucial parameter here is the price elasticity of demand. The greater the price elasticity, the greater the decrease in the consumption of cigarettes in response to a given percentage change in the price. A very large literature has investigated the price elasticity of demand for cigarettes (see IARC, 2011). Most price elasticity estimates for tobacco for low- and middle-income countries are between -0.4 and -0.8. These estimates are clearly in the inelastic range. This coincides with economic intuition, given the addictiveness of nicotine.

The model allows for different price elasticity estimates for different market segments. In the absence of price elasticity estimates for Ghana, we had to use price elasticity values based on international experience and common sense. Poor quality and medium quality cigarettes are typically consumed by poorer consumers who are typically more price sensitive than less poor consumers. Thus for these two market segments we used a price elasticity of -0.8. Premium cigarettes, on the other hand are typically consumed by more well-to-do consumers. The demand for such cigarettes is expected to be less price elastic, and we used a price elasticity of -0.5.

For sizable changes in the price, the better formula to use is the midpoint or arc elasticity of demand, rather than the point elasticity. The formula for the price elasticity is $E_P = (Q_2 - Q_1) / (P_2 - P_1) \times (P_1 + P_2) / (Q_1 + Q_2)$, where subscript 1 refers the base situation and subscript 2 refers to the situation after the price has changed because of the excise tax change. The model solves for Q_2 . This is the quantity associated with P_2 , the price after the change in the excise tax.

The next step is to calculate the new aggregate values are calculated for each of the cost components, but crucially the quantity is Q_2 and not Q_1 , which was the quantity in the base scenario.

In the last step, the percentage changes in the appropriate variables between the simulated results and the base case are calculated. These variables are the following:

- Average retail price
- Cigarette consumption
- Total excise tax revenue from cigarettes
- Total government revenue from cigarettes (i.e. the sum of excise tax, VAT, import tax and import levies)
- Total expenditure on cigarettes

Additionally, the model calculates the total tax burden (i.e. the sum of all the taxes and levies, expressed as a percentage of the retail price) in the base case and after the change in the excise tax.

The model is easy to use. The Excel file “Simulation model tobacco May 2014” consists of three sheets. The first sheet is the “Cigarette input”. Only the yellow blocks can be changed by the user. The default values are as discussed in this appendix. The main calculations are done in the sheet “Intermediate outputs cigarettes”. All numbers in this sheet are driven by formulae and the user should not enter any data here. The sheet starts with a breakdown of the retail price into the cost and tax components as discussed above (lines 6-25). In order to get a better feel for the relative magnitudes of these cost and tax components, they are expressed as a percentage of the retail price in lines 54-74.

Total revenues received from taxes and levies, obtained by multiplying the appropriate per unit value by the total quantity (line 30) in the base case scenario, is shown in lines 32-39. The tobacco industry’s perspective is shown in lines 41-49.

The decomposition of the retail price after the ad valorem tax is increased, is shown in lines 80-100. This is called scenario 1. The new quantity, derived from a complicated-looking formula, is shown in line 104. The new total revenues received from taxes and levies, based on the new quantity and the changed excise tax per unit are shown in lines 105-113. The industry’s perspective is shown in lines 115 to 123. The growth rates in some important variables are shown in lines 125-132.

The exercise is repeated exactly for Scenario 2, where the ad valorem tax is assumed to be replaced by a specific tax. The same calculations, as done for Scenario 1, are shown for lines 140-192.

Appendix B: The alcohol taxation model

The alcohol taxation model works on broadly the same principle as the tobacco taxation model, and thus commonalities between the two models are not repeated here. Whereas all cigarettes consumed in Ghana are imported, most alcohol consumed in Ghana is domestically produced. A small proportion of beer, estimated at 5% of total consumption for the purposes of the model, is assumed to be imported. Imported beer is subject to the same import duties and levies as imported cigarettes, and these are handled by the model in the same way as imported cigarettes are.

Total beer and stout consumption in Ghana is estimated at about 152 million litres in 2013, and this volume forms the starting point for the base scenario. Similarly, total consumption of spirits is estimated at 88 million litres in 2013, the starting point in the base scenario.

For beer, a complication is the recent introduction of differentiated excise tax rates for different tiers or percentages of local content. There are currently four tiers, as indicated in the main text. Together with the fact that there are two price categories (a popular price segment and a discounted price segment), this means that there are eight different segments for the purposes of levying excise tax. With the inputs of officials of the Revenue Authority, the market shares of the domestically produced beers categories were estimated/assumed to be the following:

	Popular brands	Discounted brands (e.g. Eagle, Chibuku, Ruut)
Local content 0-29.99%	7	1
Local content 30-49.99%	80	1
Local content 50-69.99%	5	2
Local content 70% +	1	3

By far the largest category of locally produced beer is the popular price category, with between 30% and 49.99% local content, attracting a 30% excise tax on the ex factory price. Brands that fall into this category are Guinness, Club, Star, and Stone.

The model requires the user to specify the retail price of the nine categories of beer on a *per litre basis*; one for imported beer and the other eight for the different price category-local content combinations. In practice there are effectively only three broad categories, namely imported beer (selling at an assumed average retail price of 10 GHS per litre), popular-price domestically produced beer (selling at an assumed average retail price of 5 GHS per litre), and discounted domestically produced beer (selling at an assumed average retail price of 4 GHS per litre).

The excise tax is based on the CIF value (for imported beer) and on the ex factory value on domestically produced beer. The model requires one to specify the CIF/ex factory value for each of the nine categories as mentioned in the previous paragraph. Based on information supplied by officials from the Revenue Authority, it is clear that the ex factory price is between 40% and 60% of the retail price, depending on the brand and the type and size of bottling or canning. We set the average ex factory value at 50% for each of these categories. Thus the assumed ex factory value for imported beer is 5 GHS per litre, for locally produced popular price beer 2.50 GHS per litre and for locally produced discounted beer 2 GHS per litre.

As a check to determine whether the model is broadly representative of reality, we calculated the total excise tax revenue for each of the nine segments and compared the sum of them against the total reported excise tax revenue for 2013. The total excise tax revenue according to the model, based on these assumptions is 126.3 million GHS, compared with the reported total excise tax revenue of 128 million GHS in 2013, suggesting that, at the aggregate, the base scenario corresponds very closely to the reality of 2013.

In contrast the cigarette model, we did not model the costs of marketing and distribution, overheads, wholesale and retail margins and the alcohol industry's profit. This is not necessary unless one has a particular interest in the alcohol industry's corporate profit (which was not identified as a need by the Revenue Authority's officials). The difference between the VAT-excluded retail price and the sum of the ex factory price and the excise tax is simply called the "industry margin", and the quantum of the margin is calculated by the model.

Following the same principle as with cigarettes, the model assumes that VAT is levied on the ex factory price plus the excise tax at the going VAT rate (17.5%). Similarly, the VAT is levied on the margin.

Once the retail price has been subdivided into the appropriate cost and tax components, aggregate amounts attributable to each of these costs are obtained by multiplying the costs per litre of beer by the quantity in each of the nine segments and adding over the segments.

In the following step the model is "shocked" in the same way as the cigarette model was "shocked". The user has control over the new ad valorem tax that he/she wishes to implement on the various local content categories. The results of the change in the ad valorem tax are indicated as Scenario 1. The model also allows for the implementation of a specific tax. This is indicated in the model as Scenario 2. The results of this are not discussed in the main text, because there is no particular need for this, given that the ad valorem tax on beer works fairly well.

Other than allowing for a change in the excise tax, the model allows for a simultaneous change in the CIF value of the imported beer and the ex factory price of locally-produced beer. The user has to specify the percentage with which he/she expects the industry to change the COF or ex factory price. The rate can be different for the popular-price category and for the discounted beer. As the default we assumed that the industry would increase the CIF/ex factory price by 10% for all three categories of beer.

Similarly, the user can specify the percentage with which he/she expects the margin to change coinciding with the change in the excise tax. The rate at which the margin is expected to change can be different for the imported beer, and locally produced popular-price brands and discounted brands. As the default, we assumed that the industry would increase the margin by 20% for all three categories of beer.

Once all these changes in the costs components have been inputted, the model calculates the new VAT-included retail price.

A crucial variable is the price elasticity of demand because the price elasticity quantifies by how much the quantity is expected to change in response to the change in the price. Many studies have investigated the price and income elasticities of alcoholic beverages and the overwhelming conclusion

is that the price elasticity falls in the inelastic range, but closer to -1 than zero, and the income elasticity tends to be unit elastic or somewhat more elastic.

The model allows one to specify a different price and income elasticity for each of the nine categories of beer. In practice, the price and income elasticities are unlikely to differ because of different local content percentages. As the default for the model, the price elasticity for imported beer is set at -1 and the price elasticity for both the popular-price brands and the discounted brands is set at -0.8. The default income elasticity for imported beer is set at 1.5, for domestically-produced popular priced beer it is set at 1.2 and for domestically-produced discounted beer it is set at 1.4.

Like for cigarettes, the model uses the midpoint formula of the price elasticity to estimate the new quantity for each of the nine market segments. Each new quantity is augmented by the impact of the change in income levels, approximated by the growth in the GDP. A GDP growth rate of 7% is assumed.

Once the new quantity is calculated for each market segment, aggregate values are calculated by multiplying the appropriate new cost with the new quantity, and then adding them over the nine segments. Lastly, percentage increases in the variables of interest are calculated in the traditional way.