Tobacco taxes in WHO Member States

This report includes appendices containing information on the share of total and excise taxes in the price of the most widely sold brand of cigarettes, based on tax policy information collected from each country. This note contains information on the methodology used by WHO to estimate the share of total and tobacco excise taxes in the price of a pack of 20 cigarettes using country-reported data. It also provides information on additional data collected for this report in relation to tobacco taxation.

1. Data collection
All data were collected between June 2014 and January 2015 by WHO regional data collectors. The two main inputs into calculating the share of total and excise taxes were: (1) the price of the tax and (2) rates and structure. Prices were collected for the most widely sold brand of cigarettes, two other popular brands, the least-expensive brand and the brand Marlboro for July 2014.

2. Data analysis
The price of the most popular brand of cigarettes was considered in the calculation of the tax as a share of the retail price reported in Appendix table 2.1. In the case of countries where different levels of taxes are applied on cigarettes based on length of cigarette, quantity produced, or type (e.g., filter vs. non-filter), only the relevant rate that applied to the most sold brand was used in the calculation.

Certain other taxes, in particular direct taxes such as corporate taxes, can potentially impact tobacco prices to the extent that producers pass them on to final consumers. However, because of the practical difficulty of obtaining information on these taxes and the complexity in estimating their potential impact on price in a consistent manner across countries, they are not considered.

The table below describes the types of tax information collected.

1. Amount-specific excise taxes
An amount-specific excise tax is a tax on a selected good produced for sale within a country, or imported and sold in that country. In general, the tax is collected from the manufacturer/wholesaler or at the point of entry into the country by the importer, in addition to import duties. These taxes come in the form of an amount per stick, pack, or 1000 sticks, or per kilogram. Example: US$ 1.50 per pack of 20 cigarettes.

2. Ad valorem excise taxes
An ad valorem excise tax is a tax on a selected good produced for sale within a country, or imported and sold in that country. In general, the tax is collected from the manufacturer/wholesaler or at the point of entry into the country by the importer, in addition to import duties. These taxes come in the form of a percentage of the value of a transaction between two independent entities at some point of the production/distribution chain; ad valorem taxes are generally applied to the value of the transactions between the manufacturer and the retailer/wholesaler. Example 60% of the manufacturer's price.

3. Import duties
An import duty is a tax on a selected good imported into a country to be consumed in that country (i.e., the goods are not in transit to another country). In general, import duties are collected from the importer at the point of entry into the country. These taxes can be either amount-specific or ad valorem. Amount-specific import duties are applied in the same way as amount-specific excise taxes. Ad valorem import duties are generally applied to the CIF (cost, insurance, freight) value, i.e., the value of the unloaded consignment that includes the cost of the product itself, insurance and transport and unloading. Example: 50% import duty levied on CIF.

4. Value added taxes and sales taxes
The value added tax (VAT) is a “multi-stage” tax on all consumer goods and services applied proportionally to the price the consumer pays for a product. Although manufacturers and wholesalers also participate in the administration and payment of the tax along the manufacturing/distribution chain, they are all remitted through a tax credit system, so that the only entity who pays in the end is the final consumer. Most countries that impose a VAT do so on a base that includes any excise tax and customs duty. Example: VAT representing 10% of the retail price.

Some countries, however, impose sales taxes instead. Unlike VAT, sales taxes are levied at the point of retail on the total value of goods and services purchased. For the purposes of the report, care was taken to ensure the VAT and/or sales tax shares were computed in accordance with country-specific rules.

5. Other taxes
Information was also collected on any other tax that is not called an excise tax, import duty, VAT or sales tax, but that applies to either the quantity of tobacco or to the value of a transaction of a tobacco product, with as much detail as possible regarding what is taxed and how the base is defined.

### Calculation

The price of the most widely sold brand of cigarettes was considered in the calculation of the tax as a share of the retail price reported in Appendix table 2.1. In the case of countries where different levels of taxes are applied on cigarettes based on length of cigarette, quantity produced, or type (e.g., filter vs. non-filter), only the relevant rate that applied to the most sold brand was used in the calculation.

Comparing reported statutory ad valorem tax rates without taking into account the stage at which the tax is applied could therefore lead to biased results. A similar methodology was used to calculate the price and tax share of the most common type of smoked (other than cigarettes) and smokeless tobacco products, as reported by each country. The calculation was made for the price of a product for 20 grams for any smoked or smokeless tobacco product except for cigars, for which the price and tax were reported per piece. Price and tax for smoked tobacco products (including bids, cheroots, cigarettes, cigarillos, e-cigarettes, pipe tobacco, roll-your-own or waterpipe tobacco) was calculated for 65 countries, while the calculation for smokeless tobacco products (dipping tobacco, dry snuff, moist snuff or tobacco snus) was made for 25 countries (see table 9.6 in online Appendix IX).

### Share of import duties in the price of a pack of cigarettes

**Share of import duties in the price of a pack of cigarettes**

<table>
<thead>
<tr>
<th>Country A (US$)</th>
<th>Country B (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Share</td>
</tr>
<tr>
<td>Manufacturer’s price (same in both countries)</td>
<td>2.00</td>
</tr>
<tr>
<td>Country A: ad valorem tax on manufacturer’s price (20%) = 20% x A</td>
<td>0.40</td>
</tr>
<tr>
<td>Countries A and B: specific excise</td>
<td>2.00</td>
</tr>
<tr>
<td>Retailer’s and wholesaler’s profit margin (same in both countries)</td>
<td>0.20</td>
</tr>
<tr>
<td>Country B: ad valorem tax on retailer’s price (20%) = 20% x (B + (D - C))</td>
<td>-</td>
</tr>
<tr>
<td>Final price = P = [A + (C1 + (D1 - B1))]</td>
<td>4.60</td>
</tr>
</tbody>
</table>

### Share of import duties in the price of a pack of cigarettes

Comparing reported statutory ad valorem tax rates without taking into account the stage at which the tax is applied could therefore lead to biased results. A similar methodology was used to calculate the price and tax share of the most common type of smoked (other than cigarettes) and smokeless tobacco products, as reported by each country. The calculation was made for the price of a product for 20 grams for any smoked or smokeless tobacco product except for cigars, for which the price and tax were reported per piece. Price and tax for smoked tobacco products (including bids, cheroots, cigarettes, cigarillos, e-cigarettes, pipe tobacco, roll-your-own or waterpipe tobacco) was calculated for 65 countries, while the calculation for smokeless tobacco products (dipping tobacco, dry snuff, moist snuff or tobacco snus) was made for 25 countries (see table 9.6 in online Appendix IX).
\( T_r = \text{Amount-specific excise tax on a pack of 20 cigarettes;} \)

\( m = \text{Retailer's, wholesaler's and importer's profit per pack of 20 cigarettes (sometimes expressed as a mark-up);} \)

\( \text{VAT} = \text{Statutory rate of value added tax on VAT-exclusive price.} \)

Changes to this formula were made based on country-specific considerations such as the base for the ad valorem tax and excise tax, the existence or not of ad valorem and specific excise taxes, and whether the most popular brand was locally produced or imported. In many cases (particularly in low- and middle-income countries) the base for ad valorem excise tax was the manufacturer/distributor’s price.

Given knowledge of \( p \) and amount-specific excise tax \( T_r \), \( S_{ad} \) is easy to recover: \( S_{ad} = (1 + \text{VAT}) \cdot p \) where \( p \) is the price of a typical pack of cigarettes, assuming that the retailer’s/wholesaler’s profit (\( m \) is nil), therefore, does not penalize countries by underestimating their ad valorem taxes. In light of this it was decided that unless and until country-specific information was made available to WHO, the retailer’s or wholesaler’s margin would be assumed to be nil for domestically produced brands.

For countries where the most popular brand is imported, the import duty is applied on CIF values, and the consequent excise taxes are typically applied on a base that includes the CIF value and the import duty, but not the importer’s profit. For domestically produced cigarettes, the producer’s price includes its own profit so it is automatically included in \( M \). In practice, however, the importer’s profit can be relatively significant and setting it to zero (as in the case of domestically manufactured cigarettes) would substantially overestimate \( M \) and thereby overestimate the share of ad valorem tax in final price. For this reason, \( M \) had to be estimated differently for imported products: \( M^* \) (or the CIF value) was calculated either based on information reported by countries or using secondary sources (data from the United Nations Comtrade database). \( M^* \) was normally calculated as the import price of cigarettes in a country (value of cigarette imports divided by the quantity of cigarette imports for the importing country). However, in exceptional cases where no such data were available (Iraq and Namibia), the export price was considered instead (in the case of Iraq the FOB was considered too low so the CIF value was approximated as the export price plus USD 10). The ad valorem and other taxes were then calculated in the same way as for local cigarettes, using \( M^* \) rather than \( M \) as the base, where applicable.

In the case of VAT, in most of the cases the base was \( p \) excluding the VAT (or similarly, the manufacturer/distributor’s price plus all excise taxes). In other words:

\[ S_{VAT} = \left( 1 + \frac{\text{VAT}}{100}\right) \cdot p \]

So in sum, the tax rates are calculated this way:

\[ T_{ad} = S_{ad} = \left( \frac{T_r}{1 + \text{VAT}} \right) + \left( \frac{m}{1 + \text{VAT}} \right) \]

\[ S_{ad} = (1 + \text{VAT}) \cdot p \]

\[ T_{vAT} = \left( \frac{T_{vAT}}{1 + \text{VAT}} \right) + \left( \frac{m}{1 + \text{VAT}} \right) \]

\[ S_{VAT} = \left( 1 + \frac{\text{VAT}}{100}\right) \cdot p \]

Primary collection of price data in this and previous reports involved surveying retail outlets. In order to improve the quality of the prices collected this year, similar to 2012, price data was collected in the following manner:

- In addition to the most sold brand reported in previous years, taxes of two additional popular brands were requested.
- For each brand, prices were required from three different types of retail outlets.

Questionnaires sent to data collectors were populated with the names of the three highest selling brands in each country. The three popular brands were identified using data collected from the 2012 questionnaires, from secondary data (Eurostat) and through WHO’s close collaboration with ministries of finance. For the countries where such data were not available, data collectors were asked to indicate the names of the popular brands and provide their prices.

Where brand market shares were available, calculations of average prices and taxes were also done (details in Section 7 below). The three types of retail outlets were defined as follows:

1. Supermarket/hypermarket: chain or supermarket, kiosk, newsagent/tobacconist or independent retail outlet with a selling space of over 2500 square metres and a primary focus on selling food/beverages/tobacco and other groceries. Hypermarkets also sell a range of non-grocery merchandise.

2. Kiosk/newsagent/tobacconist/Independent foodstore: small convenient stores, retail outlets selling predominantly food, beverages and tobacco or a combination of these (e.g. kiosk, newsagent or tobacconist) or a wide range of predominantly grocery products (independent food stores or independent small grocers).

3. Street vendors: sell goods in small amounts to consumers but not from a fixed location (not applicable to all countries).

Most sold brands have been used consistently over time to gain a better reflection of the change in prices. However, in some cases where the market share of the brand initially used was considered to have changed substantially, a change was made to the new, more prevalent brand. In 2014, there were changes in the brand were made for Bahrain, Kiribati, Marshall Islands, Mongolia, Saint Lucia, Saint Vincent and the Grenadines and Tuvalu. In all those countries the price of the new brand was lower, except for Mongolia where the shift was made to a more expensive brand. In the case of China, the most sold brand reported changed between 2010 and 2012 to a higher priced brand; this new brand continued to be reported as the most sold brand in 2014.

As in 2012, the price used for each of the 28 countries of the European Union (EU) was the most sold brand collected by WHO. Prior to 2012, price and tax information were taken entirely from the EU’s Taxation and Customs Union website for the current report. The price used by the EU in the past to calculate tax rates was the most popular price category (MPPC), which was assumed to be similar to the most sold brand price category collected in this report. However, since 2011, the EU calculates and reports tax rates based on the Weighted Average Price (WAP) and therefore information on the MPFC is no longer readily available for EU countries. Consequently, in order to be consistent with past years’ estimates and to ensure comparability with other countries, WHO decided in 2012 to collect first hand prices of the most sold brand (the brand was determined based on brand market shares reported from secondary sources) to calculate tax rates. Excise and VAT rates are still collected from the EU published tables. This means, however, that tax shares as computed and reported in this report will not necessarily be similar to the rates published by the EU. This is mainly due to the calculation of the specific excise tax rates as a percentage of the retail price, which will vary depending on the price.

See details of the difference in price and tax share for the EU countries in the table below.

5. Considerations in interpreting price share changes

It is important to note that changes in tax as a share of price are not only dependent on tax changes but also on price changes. Therefore, despite an increase in tax, the tax share could remain the same or go down; similarly, sometimes a tax share can even increase if there is no change/increase in the tax.

In the current database, there are cases where taxes increased between 2012 and 2014 but the share of tax as a percentage of the price went down. This is mainly due to the fact that, in absolute terms, the price increase was larger than the tax increase (in particular in the case of specific excise tax increases). For example, in Cook Islands, the specific excise tax increased from 372 NZD per 1000 cigarettes in 2012 to 494 NZD per 1000 cigarettes in 2014 (a 33% increase) while the price of the most sold brand increased from 12 to 19 NZD per pack (a 58% increase). In terms of tax share the excise represented 62% of the price.
in 2012 while it represented 52% of the price in 2014. This is because prices rose more than taxes.

On the other hand, there are cases where prices increased (decreased) in tax as a share of price were mitigated by factors not directly related to tax rates. In the current database, this was attributable to one or more of the following reasons:

- In some instances, the price increased without a tax change, leading to a decrease in the tax share for a specific or mixed excise structure (e.g. Argentina, Ethiopia, Nigeria, Tunisia, Turkmenistan and Viet Nam). In other cases, prices increased above tax increases, leading to a decrease in tax share (e.g. Cook Islands, Costa Rica, Latvia, Montenegro, Nepal and Serbia).
- In the case of imported products, the CIF value is an external variable that also influences the calculation of tax share. This has implications in countries where ad valorem is based on the CIF value, when import duties are applicable on the CIF value or when the VAT is calculated on the base of CIF value = excise rather than VAT exclusive retail price. For example, if the CIF value increases, the base for the application of the tax is higher, leading to a higher tax percentage if nothing else changes.
- Additionally, as indicated above, for some countries CIF values had to be estimated using secondary data. Those values are provided in US$ and converted to the local currency, making the exchange rate an additional factor indirectly influencing tax shares. Some examples of countries where these factors influence tax share include: Malawi (increase in CIF value combined with increase in tax but increase in price is larger, leading to a reduction in overall tax share); Cameroon (decrease in exchange rate leading to decrease in tax share); or Liberia (increase in exchange rate but larger increase in price, leading to overall reduction in tax share).

Additionally, care should be taken in relation to countries where the most sold brand changed between 2012 and 2014. This has also had an impact on the tax proportion of the affected countries. In the case of Bahrain, Marshall Islands and St Vincent and the Grenadines, the tax proportion increased despite no tax change, because of the apparent reduction in prices due to the new, cheaper brand reported as the most sold brand. In the case of Kiribati and St Lucia, while taxes have increased, the tax proportion increased even more because the new brand reported was cheaper. In the case of Mongolia, the tax increased but the tax proportion went down because the new price reported was much higher. Finally, in the case of Tuvalu, the CIF relevant to the new, cheaper price reported was much lower than before, leading to a reduction in the tax proportion.

Finally, when new, improved information was provided in terms of taxation and prices for some countries, corrections were made in the calculations of tax rates for 2008, 2010 and 2012 estimates, as needed.

### 6. Supplementary tax information (see table 2.3, Appendix II)

An important consideration highlighted in this report is that many aspects of tobacco taxation need to be taken into account in order to assess if a tax policy is well designed. Tax as a proportion of price does not tell the whole story about the effectiveness of a tax policy. To explore other dimensions of tax policy, the current report collected additional information in relation to tobacco taxation and compiled it into data that can inform researchers and policy-makers further on tax policy in different countries.

The information was compiled and classified according to three main themes: tax structure/level; affordability and price dispersion; and tax administration. Information was also collected in relation to countries that earmark tobacco taxes to fund health programmes and/or tobacco control activities. The different sets of data/indicators reported under each of the themes were developed and are justified based on evidence provided in the background chapter on tax structure and tax administration.

- **I. Tax structure/level**
  - a. Excise tax proportion of price: higher tax rates and greater reliance on excise is better, particularly when the excise tax is > 70% of retail price.
  - b. Uniform vs. tiered excise tax system: a uniform excise is easier to administer than a tiered system where variable rates apply based on selected criteria within one tobacco product (not applicable in countries where no excise tax is implemented).
  - c. Whether a country applies a specific excise or a mixed system relying more on the specific tax component (>50% of total excise is specific): specific excises typically lead to higher prices and a smaller price gap between different brands, so it is better (not applicable in countries where only ad valorem excise is applicable or where no excise tax is implemented).
  - d. Base of the ad valorem tax in countries that apply an ad valorem or a mixed excise system. Ad valorem taxes applied to the retail price or the retail price excluding VAT are administratively simpler. The retail price is easier to determine than producer price or CIF value, and therefore there is less risk of under- or over-invoicing (not applicable in countries where only specific excise is applicable, or where no excise tax is implemented).

Finally, when new, improved information was provided in terms of taxation and prices for some countries, corrections were made in the calculations of tax rates for 2008, 2010 and 2012 estimates, as needed.

### 7. Average price and tax estimates (see table 9.7, online Appendix IX)

Data on the most sold brand prices tend to be more readily available across countries; this underlines the decision to use the most sold brand in successive editions of this report. However, an estimation of tax share that best reflects the tax burden within a market would ideally be based on the average price and taxes levied on all brands sold in that market.

As in 2012, in addition to collecting and reporting most sold brand prices and tax shares, WHO attempted to estimate country-level average estimates of the tax share based on an estimate of the average price of a pack of cigarettes. This exercise was more complex because of the additional data required on brands, prices and market shares.

#### Data sources

1. For each country, the three most popular brands were identified, and whenever possible, questionnaires were pre-populated with secondary sources or data reported in 2012. The sources were Euromonitor; feedback from the questionnaires and WHO’s internal data.
2. Brand market share weights used to calculate the average were taken from the same sources.
3. The prices of the three brands from the three different types of retail outlets were collected by WHO through regional and country data collection (more prices in total for each country).
4. Euromonitor provides information on the distribution of cigarettes in 26 different types of outlets. For countries that had Euromonitor data, we selected 10 of these types of outlet, and consolidated them into three groups of retail outlets, as defined in Section 4 of this Technical Note. In the few countries where brand market shares were available but the share of cigarette sales by type of retail outlet were not available, an approximation was made using the tax retail distribution of a country with similar attributes (e.g. region, types of products consumed, belonging to the same economic bloc etc.).

#### Calculation

**I. Average price:**

First, averages were calculated for each brand weighted by the outlet distribution. In many cases, the outlet share data collected and categorized in the three brand groups did not add up to 100%, reflecting the fact that there are other retail outlet types. So, based on their proportional weight, they were first re-normalized to total 100%. When prices were the same across different stores for any brand in any particular country, equal weights (33.33%) were inputted to all three types of stores. The retail outlet distribution weights were then used to calculate the average price for each brand.

The average retail price (AP), and standard deviation of the price (SDP), of a brand with outlet share weights (wij) are calculated as:

\[
\text{AP} = \sum_{j=1}^{3} \frac{p_j + S_{ij}}{100} 
\]

\[
\text{SDP} = \sqrt{\sum_{j=1}^{3} (p_j - \text{AP})^2 w_{ij}} 
\]

Where,

- **AP** = Estimated average outlet price of all brands in the country
- **SDP** = Estimated standard deviation of outlet price share type i
- **wij** = Reported or estimated outlet share of type i

**II. Average tax:**

The average tax share is calculated as:

\[
\text{AT} = \sum_{j=1}^{3} (\text{AP} - p_j) w_{ij} 
\]

Where,

- **AT** = Estimated average price of all brands
- **wij** = Reported or estimated outlet share of type i

Because of the apparent reduction in prices due to the new, cheaper brand reported as the most sold brand. In the case of Kiribati and St Lucia, while taxes have increased, the tax proportion increased even more because the new brand reported was cheaper. In the case of Mongolia, the tax increased but the tax proportion went down because the new price reported was much higher. Finally, in the case of Tuvalu, the CIF relevant to the new, cheaper price reported was much lower than before, leading to a reduction in the tax proportion.

Finally, when new, improved information was provided in terms of taxation and prices for some countries, corrections were made in the calculations of tax rates for 2008, 2010 and 2012 estimates, as needed.
such as China, the three most popular brands represent about 25% of market share. In all cases, the brand market shares of the three most popular brands were re-normalized in order to add up to 100% based on their proportional weight.

\[
B_S_i = \frac{b_i}{\sum b_i} \times 100%
\]

\[
AP = \sum \frac{AP_i \times BS_i}{BS_i}
\]

Where,

- \(B_S_i\) = Estimated market share of brand \(i\)
- \(b_i\) = Reported or estimated market share of brand \(i\) where \(\forall i = 1, 2, 3\)
- \(AP\) = Estimated average price of a cigarette pack in the country

II. Average tax share

The average tax share was calculated in two steps. First, the tax share of each brand was calculated separately. This helps account for specificities of each brand (e.g., if a different tax rate applies to different brands or if the brand is imported or not), the price used for each brand was the price weighted by the retail outlet distribution. The method used to calculate the tax share of each brand was the same as for the most sold brand. Then, the overall tax share in any country was obtained by taking the average of the three brands’ tax shares. The average tax share was weighted by each brand’s market share.

\[
etaxi,n = \phi \left(\text{taxi},n \times AP\right)
\]

\[
AT = \sum etaxi,n
\]

\[
AT = \frac{\sum AT_i \times BS_i}{\sum BS_i}
\]

Where,

- \(taxi,n\) = Reported tax data by type of tax \(n\) for brand \(i\), where \(\forall n = 1, ..., 5\) and \(\forall i = 1, 2, 3\) .
- The 5 types of tax \((n = 1, ..., 5)\) are: specific excise, ad valorem excise, import duty, value added or sales tax, and other taxes.
- \(etaxi,n\) = Estimated total rate of type \(n\) for brand \(i\); a function of average price \(AP\)
- \(AT_i\) = Estimated average total share of brand \(i\)
- \(AT\) = Overall average tax share estimated for any particular country.
- \(AP\) and \(BS_i\) defined in formulas (7) and (8) above.

1 This formula applies when the ad valorem tax is applied on the manufacturer/distributor’s price, the import duty is applied on the manufacturer/distributor’s price of the CIF value and the VAT is applied on the VAT-exclusive retail price. Other scenarios exist (e.g., ad valorem rate applies on the retail price) but they are not described here because they are usually more straightforward to calculate.

2 Import duties may vary depending on the country of origin in cases of preferential trade agreements. WHO tried to determine the origin of the pack and relevance of using such rates where possible.

3 “Free On Board” or “Freight On Board”: value of a product at export.

4 Or \((\text{Tax } \% \times M^*) - P\) if the ad valorem tax was applied only on the CIF value, not the CIF value + the import duty.

5 The brands are used for internal purposes for data validation and are not published in the report.
