Excise Tax Policy +
Administration
in Southern African Countries

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Chapter 3

Principles of Cigarette Taxation
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3.1 Introduction

Throughout much of the world, cigarettes are among the most heavily taxed consumer goods. Tax rates are particularly high in Southern African countries, where cigarette tax levels are close to 100% of the pre-retail price.

The desirability of taxing cigarettes and, in particular, setting these taxes at high levels depend on a variety of competing concerns. On the positive side of the ledger, taxes serve as a device to raise revenue. Taxes may also serve a constructive purpose in discouraging risky consumer choices. Whether discouraging cigarette smoking is a beneficial or adverse effect of taxes hinges on a variety of economic factors, not the least of which is the role of consumer sovereignty.

For Southern African countries the high tax levels have pushed to the forefront negative consequences that loom larger than in countries with lower tax rates. The substantial disparity between the pre-tax cost of cigarettes and their market price has led to cigarette smuggling and the bootlegging of counterfeit brand name cigarettes. Contraband activities produce a loss in tax revenue so that higher tax rates boost the percentage of potential tax revenue not collected. Moreover, the contraband activity generates attendant costs of criminal behaviour.

Assessing the appropriate level of cigarette taxes leads to an examination of a wide range of smoking-related policy issues as well. Because higher cigarette prices will discourage cigarette consumption, advocates of cigarette taxes have espoused many policy rationales for cigarette taxes. For example, some policy makers have suggested that cigarette taxes be used to discourage youth smoking. Others have proposed that cigarette
taxes be used to address the financial costs cigarettes are believed to impose on the rest of society as well as the harm caused by environmental tobacco smoke. This chapter examines these and other rationales for cigarette taxes and assesses their merits.

In most instances, the existence of a rationale for a tax is not linked to an analysis of the level of the tax. Thus, the potential role for cigarette taxes from a policy standpoint does not necessarily imply that taxes are warranted at the high rates prevailing in Southern African countries.

If higher cigarette taxes are always good, why then is the socially optimal cigarette tax not infinite, thus driving the product from the market? There are several reasons why the level of cigarette taxes should be limited. One reason is that from the standpoint of maximising tax revenues, higher tax rates do not necessarily boost tax revenues, because the quantity purchased will decline and illegal cigarette sales will increase. A second reason is that taxes are not always the sole policy instrument or even the best policy instrument for dealing with the different policy objectives society may have with respect to cigarettes. Third, higher cigarette taxes will impair the welfare of smokers, which entails an efficiency loss to the extent that consumer sovereignty is overridden. Fourth, cigarette taxes impose financial costs that are extremely regressive in most countries.

This chapter examines how cigarette taxes work from an economic standpoint as well as how one should frame cigarette taxes within the context of smoking policy and tax policy in Southern African countries. Much of the discussion is empirical in nature and draws on the experience in the United States of America (US) and other countries for which we have pertinent data. The results from the US are often instructive in formulating policies in other countries, particularly insofar as they illustrate how one should conceptualise cigarette taxation issues. The objective of this chapter is to establish the appropriate structure for thinking about cigarette taxes. However, because the results are empirical and may vary depending on country-specific factors, one should be cautious in making inferences to quite different economic contexts.

### 3.2 Cigarette Tax Rates

#### 3.2.1 The general structure of cigarette taxes

As with other commodity taxes, cigarette taxes can take two forms – unit taxes (or specific taxes) and ad valorem taxes. Unit taxes are in terms of a fixed tax amount, usually on a tax-per-pack basis. Premium- and lower-priced cigarettes, such a generic brands, will consequently attract the same
tax. In contrast, *ad valorem* taxes are proportional taxes with respect to the retail or manufacturer's price. Premium brands would attract a higher tax than lower-priced brands. Thus, *ad valorem* taxes will create incentives for consumers to divert their consumption towards the lower-priced brands, which tend to be inferior in quality. The various smoking policy objectives discussed below generate taxation rationales that are generally more strongly linked to the quantity of cigarettes rather than the amount spent on cigarettes, so that there is usually a stronger policy rationale for using unit taxes rather than *ad valorem* taxes. Indeed, *ad valorem* taxation of cigarettes may have adverse effects if cheaper brands pose greater risks. Lower-priced generic cigarettes in the US, for example, have higher tar contents than do premium brands. Whether the hazards of cigarette smoking are reduced for higher priced brands is a matter of debate.\(^1\)

The structure of taxes ideally should be able to accommodate technological innovations as well. Suppose that the rationale for cigarette taxes is tied strictly to concern with the health hazards of smoking. If companies were able to develop a risk-free cigarette, then the health-related component of the tax should be zero. Such innovative products would presumably be more expensive given the research and development costs involved. As a result, an *ad valorem* tax would discourage innovation more than would a unit tax or an ideally structured health risk tax linked to the product-specific hazards. If health is not a matter of concern, then the adverse innovation effect of *ad valorem* taxes is not with respect to risk but with respect to product quality, more broadly defined.

### 3.2.2 Cigarette tax rates

There are two available sources of information that can be used to assess the level and differences in taxes in Southern African countries. First, the British American Tobacco Company has compiled consistent tax and price data across countries for locally manufactured cigarettes. These data form the basis for Table 3.1. For comparability, all these data have been converted into South African currency (rand). In addition, the treasury departments of many of the countries themselves have provided summary tax information for the Conference on Excise Taxation, but unfortunately, these data are often incomplete or not comparable across countries. Nevertheless, the two sets of information provide considerable insight into the tax levels and structure.

Consider first the data in Table 3.1 for South Africa. The average recommended retail price was ZAR\(10.80\) (South African rand), of which
48.3% is taxes: 12.3% value-added tax (VAT)/sales tax and 36% excise tax. The most popular price class brand is Peter Stuyvesant cigarettes.

That brand is also the most popular price class in Botswana, Lesotho, Namibia and Swaziland. Interestingly, the retail price of cigarettes is very similar to the South African retail price, except in Swaziland, where the retail price is ZAR4.59. This lower price does not stem from lower excise taxes, as the total cigarette tax rate is 71%, which is higher than in South Africa. Rather, a different mix of lower-priced cigarettes among cigarettes sold in Swaziland apparently accounts for the difference.

Indeed, countries in which the principal cigarette sold is a locally manufactured brand or an off-brand often have much lower cigarette prices. For example, cigarette prices average ZAR3.95 in Uganda, where Safari cigarettes are representative of the most popular price class.

In terms of the different taxes, there are three principal tax rates of interest: VAT/sales taxes, cigarette excise taxes and total cigarette taxes. The level of the VAT/general sales tax ranges from zero in Swaziland and Zimbabwe to a high of 16.7% in Tanzania. Countries with low cigarette excise taxes of under 10% include Tanzania (3.3%) and Kenya (2.8%). At the high end with cigarette excise taxes above 40% are Swaziland (42.2%), Zimbabwe (41.4%), Mauritius (130.1%), Zambia (60.1%), Uganda (46.8%) and Mozambique (41.8%).

Given this wide variation in taxes, total taxes on cigarettes display considerable variation as well, ranging from a low value of 16.6% in Kenya to a high of 143.2% in Mauritius. The median tax value is the 48.3% rate for South Africa, with 8 of the 13 countries having overall cigarette taxes ranging from 30% to 61.3%.

Tax harmonisation remains an important policy issue in Africa for two reasons. First, tax differences may create trade barriers if taxes fall disproportionately on higher-priced cigarettes, which are usually imported, or if there is a specific tax levied on imported cigarettes, as there is, for example, in Swaziland. Second, tax differences across countries may generate incentives for smuggling cigarettes across borders. However, it should be noted that the overall harmonisation objective with respect to smuggling should be in terms of harmonisation of prices for a given mix of cigarette brands. Suppose that firms set different prices across countries only for cost reasons such as differences in shipping and marketing costs, then harmonisation of taxes will be the pivotal concern. However, if firms set prices oligopolistically to price discriminate across different markets, then these pricing differences must be taken into account as well.
Table 3.1 Cigarette excise incidence*

<table>
<thead>
<tr>
<th>VALUE IN ZAR%</th>
<th>Botswana</th>
<th>Kenya</th>
<th>Lesotho</th>
<th>Malawi</th>
<th>Mauritius</th>
<th>Mozambique</th>
<th>Namibia</th>
<th>South Africa</th>
<th>Swaziland</th>
<th>Tanzania</th>
<th>Uganda</th>
<th>Zambia</th>
<th>Zimbabwe</th>
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<tbody>
<tr>
<td>VAT and share of retail price</td>
<td>0.95</td>
<td>0.87</td>
<td>0.98</td>
<td>1.04</td>
<td>2.02</td>
<td>0.64</td>
<td>1.41</td>
<td>1.33</td>
<td>-</td>
<td>0.92</td>
<td>0.57</td>
<td>0.81</td>
<td>-</td>
</tr>
<tr>
<td>Excise per pack</td>
<td>2.45</td>
<td>0.18</td>
<td>3.89</td>
<td>0.83</td>
<td>20.11</td>
<td>1.85</td>
<td>3.89</td>
<td>3.89</td>
<td>1.94</td>
<td>0.18</td>
<td>1.85</td>
<td>3.28</td>
<td>1.41</td>
</tr>
<tr>
<td>Price net of taxes</td>
<td>7.07</td>
<td>5.27</td>
<td>5.93</td>
<td>4.36</td>
<td>(6.67)</td>
<td>1.93</td>
<td>5.51</td>
<td>5.59</td>
<td>2.65</td>
<td>4.43</td>
<td>1.53</td>
<td>1.37</td>
<td>2.00</td>
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<tr>
<td>Total excise tax and VAT</td>
<td>3.41</td>
<td>1.05</td>
<td>4.87</td>
<td>1.87</td>
<td>22.12</td>
<td>2.49</td>
<td>5.29</td>
<td>5.21</td>
<td>1.94</td>
<td>1.10</td>
<td>2.42</td>
<td>4.10</td>
<td>1.41</td>
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<tr>
<td>Other taxes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.02</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total taxes</td>
<td>3.41</td>
<td>1.05</td>
<td>4.87</td>
<td>1.87</td>
<td>22.14</td>
<td>2.49</td>
<td>5.29</td>
<td>5.21</td>
<td>3.26</td>
<td>1.10</td>
<td>2.42</td>
<td>4.10</td>
<td>1.41</td>
</tr>
<tr>
<td>Most popular price class</td>
<td>Peter Sportsman</td>
<td>Peter Embassy</td>
<td>Matinee</td>
<td>Palmer KS</td>
<td>Peter Stuyvesant</td>
<td>Peter Stuyvesant</td>
<td>Peter Stuyvesant</td>
<td>Peter</td>
<td>Sweet</td>
<td>Safari</td>
<td>Consulate</td>
<td>Madison</td>
<td></td>
</tr>
<tr>
<td>Menthol</td>
<td>Menthol</td>
<td>Menthol</td>
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</tr>
<tr>
<td>Notes</td>
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<td>j</td>
<td>b</td>
<td>g</td>
<td>g, k</td>
<td>g</td>
<td>c</td>
<td>d, e</td>
<td>h</td>
<td>g</td>
<td>g</td>
<td>f, g</td>
<td></td>
</tr>
</tbody>
</table>

* The rand rate is simply converted based on the ZAR/US$ interbank exchange rate (19 June 2003).

a Specific rate of ZAR194.25 per thousand. Excise is calculated at 50% of RRP prior to the excise increase. Calculated per SACU agreement.
b Specific rate of M194.25 per thousand. Excise is calculated at 50% of RRP prior to the excise increase. Calculated per SACU agreement.
c Specific rate of N$194.25 per thousand. Excise is calculated at 50% of RRP prior to the excise increase. Calculated per SACU agreement.
d Specific rate of £194.25 per thousand. Excise is calculated at 50% of RRP prior to the excise increase. Calculated per SACU agreement.
e Sales tax computed on import value plus excise.
f Sales tax of 15% not applied to cigarettes.
g *Ad valorem* rate on ex-factory price.
h Specific excise rate with three tiers of US$9 and US$3.8 per thousand. Third tier is on imports and is US$16.
j Specific excise rate with four tiers at US$18, US$12, US$9, and US$6 per thousand.
k Import levy computed on MPPC (leaf tobacco)
The tax information provided by specific countries that participated in the conference is also instructive.² The data for South Africa is particularly extensive. In 2001/02, tobacco taxes raised ZAR4.0 billion, where the exchange rate between the ZAR and the American dollar (US$) was 10.5 in 2002. Tobacco taxes accounted for 41.3% of excise tax revenue, 1.7% of total tax revenue, and 0.44% of gross domestic product (GDP). Cigarettes were taxed then at 388.5 cent per pack. There are also taxes on cigarette tobacco, cigars and pipe tobacco, but for concreteness the discussion below focuses on cigarettes. It should be noted, however, that it is generally believed that throughout Southern Africa the tax structure for ‘roll-your-own’ tobacco is less onerous than for manufactured cigarettes, providing an incentive for individuals to roll their own cigarettes rather than purchase manufactured cigarettes.

The structure of taxes in various countries creates discrepancies across different cigarette brands. The tax rates in Mauritius set out in Table 3.1 understate the extent of variation in taxes by type of cigarette. The excise duty on domestically produced cigarettes containing tobacco was 210% of the factory price plus 210 rupees per thousand. The excise duty on imported cigarettes was 360% of the value at importation plus 360 rupees per thousand.³ In addition, imported cigarettes were subject to an 80% duty. The result is that there is a price discrepancy between locally produced brands such as Matinee, which sell at 54 rupees per pack, and imported cigarettes such as Dunhill, which sell at 85 rupees per pack. Similar disparities exist in several other countries as well. Rwanda also imposes a series of cigarette taxes that differ based on whether or not cigarettes are produced domestically. There is a 60% excise tax, a 30% import duty and a 15% VAT. The most popular cigarette is Impala, which sells for 330 Frws per pack, whereas the price of Marlboros was 1 000 Frws, or more than triple.⁴ The cigarette tax structure in Angola is simpler. Cigarette imports are taxed at 30% and exports at 2%. Malawi imposes an 80% ad valorem excise tax on tobacco products irrespective of whether they are imported or domestic products. There is also an import duty of 30% (non-most-favoured nation (MFN)), 25% (MFN), 0% (Common Market for Eastern and Southern Africa (COMESA)) and 25% (Southern African Development Community (SADC)). The Democratic Republic of the Congo (DRC) imposes a 20% import duty. There is a substantial price disparity between imported cigarettes, such as Marlboro, which sell for more than double the price of locally produced brands.

Clearly these countries differ in their tax structure, with different degrees of emphasis on import duties, excise taxes and VAT. The overall level of
taxes across countries is quite different. The subsequent difference in prices creates an incentive for smuggling cigarettes across borders. The high levels of taxes create incentives for contraband production. Illegal behaviour like this, and foregone tax revenues and profits consequently contribute to high cigarette taxes.

3.2.3 United States cigarette taxes

Cigarette taxes in the US include unit taxes imposed by the Federal government, state governments and local governments, as well as proportional sales taxes that are set by state and local governments. The ad valorem sales taxes are, however, imposed on all products, not simply cigarettes. Such sales taxes are much more modest than are VATs in Europe, and are often in the 5% range for all products. As a consequence, these sales taxes do not alter the relative prices of cigarettes compared to other commodities. For that reason, I place great emphasis on the cigarette excise taxes. However, note that Cnossen and Smart (2004) suggest that the total tax is relevant in determining if taxes cover the total social cost of tobacco use. Total taxes are also more relevant in Europe than in the US because of the tax-on-tax effect of the VAT imposed on other cigarette taxes.

US taxes for the fiscal year ending 30 June 2002 consisted of a US$0.39 per pack Federal tax as well as state taxes that ranged from US$0.025 per pack to US$1.50 per pack, or a weighted average of US$0.482 per pack. Federal tax revenues were US$7.5 billion, while total tax revenues from cigarettes were US$16.2 billion, or about US$57 per capita. Overall, Federal and state excise taxes in 2002 comprised 27% of the retail price. The states responsible for the highest level of tobacco production – North Carolina, Virginia, and Kentucky – all impose very low excise taxes.

More recently, several states and localities have raised their taxes. Indeed, the price of cigarettes in New York City now exceeds US$7.00 per pack, more than double the national average of between US$3.00 and US$4.00 per pack. Moreover, this tax structure created enormous price discrepancies between New York City and adjacent parts of New York State as well as the adjacent states of Connecticut and New Jersey.

3.2.4 European Union cigarette taxes

The experience in the European Union countries examined by Cnossen and Smart (2004) is much more diverse in terms of the structure of the taxes. In particular, there has been an effort to foster harmonisation of
cigarette tax rates so as to eliminate the use of tax rates as protectionist trade barriers. The structure of taxes has become the object of policy debate, as ad valorem taxes tend to affect higher-priced brands to a greater extent, thus putting American cigarettes and other high-quality tobaccos at a disadvantage relative to lower cost brands. Current directives now establish tax guidelines of a 57% minimum total excise tax burden, which cannot be less than €60 per 1000 cigarettes.

Despite these efforts at harmonisation, considerable differences remain in the tax structure, particularly with respect to the reliance on specific excise taxes as opposed to ad valorem taxes.\textsuperscript{7} The total tax burden ranges from 69% of the retail price in Luxembourg to 86% of the retail price in Denmark. There are greater differences in the structure giving rise to these tax rates, which average about 76%. Countries such as the United Kingdom (UK) emphasise specific excise taxes, with excise tax rates of 3.09 per pack, an ad valorem excise tax of 22%, and a VAT of 14.89%.\textsuperscript{8} At the other extreme, Spain has a specific excise tax of 0.08 per pack, an ad valorem excise tax of 54% and a VAT of 13.79%.

Choice of tax structure varies geographically. Northern European countries rely more on per-pack excise taxes. As Cnossen and Smart (2004) observe, Southern European countries have different financial incentives with respect to the structure of taxes. Southern European countries, which tend to have more local tobacco growing, place greater reliance on ad valorem taxes, which will fall primarily on imported high-quality tobaccos rather than tobacco grown domestically.

3.2.5 Cigarette smuggling

Estimates throughout the world indicate that there is a substantial problem due to smuggling and sales of contraband cigarettes.\textsuperscript{9} In the UK such activities equal the value of 42% of all tax-paid sales of cigarettes. In Poland, smuggling accounts for 20% of the market. Contraband cigarettes account for 20% of cigarettes sold in the Philippines and over 20% of the market in Malaysia. One-third of all cigarettes consumed in Hong Kong is smuggled. The potential costs of smuggling go beyond the foregone tax revenues and losses to producers and retailers. There are also costs of associated criminal activity.

Contraband and smuggled cigarettes have emerged as problems associated with cigarette taxation. South African revenue authorities shut down two illegal manufacturing operations in June 2002. There is also evidence of increasing rates of cigarette smuggling in Zimbabwe. Malawi tax officials
estimate that contraband production and smuggling of tobacco products account for 50% of the total market. Interestingly, the conference discussion of pressing policy problems raised by cigarettes focused more on the role of smuggling and other forms of tax evasion rather than on the use of taxes to deter external costs of cigarettes or to deter smoking behaviours.

In the US, differences in tax rates across jurisdictions have led to evasive behaviour to avoid paying the tax. Consumers frequently travel to nearby states with lower taxes to stockpile cigarette supplies. Substantial differences in tax rates have also stimulated illegal smuggling behaviour by private parties, not the industry. Such smuggling has led to illegal street sales of cigarettes not unlike sales of illegal drugs. Indeed, econometric studies of US cigarette demand routinely make provision for 'border effects' arising from tax rate discrepancies. Counterfeit cigarettes have also become a matter of concern. Indeed, many of the same kinds of smuggling problems and counterfeit cigarettes that have become salient policy concerns among Southern African nations have also become prominent US policy issues. The difference is that tax and price differences across countries in Africa create the incentives for smuggling, whereas in the US it is the tax differences across states that are instrumental. Higher levels of taxes that lead to higher retail prices create incentives for selling counterfeit cigarettes.

3.3 Commodity Tax Basics

In terms of how the tax affects economic behaviour, it does not matter whether the tax rate on a particular product is a unit tax or an ad valorem tax, provided that it leads to the same tax per pack for all cigarettes. However, in practice, the total tax will differ across brands if unit taxes are not employed. As noted above, however, ad valorem taxes will impose higher total taxes on higher priced cigarettes so that the per-pack cigarette taxes will not be the same, and consumers will have an incentive to divert their consumption towards the lower-priced cigarettes, given such differential taxation. The manner in which these taxes affect incentives for substitution will vary with the overall price level associated with the brands. Unit taxes on cigarettes will decrease the relative price differences between the higher priced and lower-priced brands. In contrast, ad valorem taxes will increase the absolute price differences between the high-priced and low-priced brands. Greater reliance on ad valorem taxes will discourage consumption of premium brands and diminish incentives for innovation with respect to higher-quality cigarettes.
How the tax is positioned is also irrelevant from an economic standpoint. Thus, the tax could be a tax imposed on the product and paid by consumers, or it could be a per-pack tax that the producer or retailer would pay. While these situations may differ symbolically, as a practical matter the distinction is irrelevant because the ultimate price paid by consumers will be identical in either case. Moreover, the sharing of the tax between the consumers and the sellers of the product will be unaffected as well.

Regardless of who is formally responsible for paying the tax, who actually pays it will hinge on the respective elasticities of supply and demand. The elasticity of demand (supply) for cigarettes is the percentage change in the quantity of cigarettes demanded (supplied) divided by the percentage change in the price. Most discussions of tax shifting focus on results that would be observed in competitive markets. In that situation, increases in the elasticity of demand reduce the share of the tax borne by consumers and increases in the elasticity of supply reduce the share of the tax borne by producers. It is generally believed that cigarette supply is much more elastic than is the demand for cigarettes, so that any tax on cigarettes will be shifted primarily to consumers irrespective of how the tax is labelled. However, the market for cigarettes in Southern African countries tends to be highly oligopolistic, with few firms controlling a substantial share of the market in each country. In this situation firms have substantial control over the price, and how the tax will affect prices depends in part on the market dynamics among the affected firms.10

Taxes discourage people from buying products, leading to an efficiency loss. For illustrative purposes, suppose that cigarette supply is perfectly elastic, so that firms are willing to supply an unlimited amount of the product at the current price. Imposition of a tax will impose an efficiency loss on consumers, some of whom will no longer buy the product. One component of the excess burden of the tax is the loss in consumer surplus, that is, the spread between the maximum amount people are willing to spend on cigarettes and the pre-tax market price, for all consumers who no longer buy cigarettes once the tax is imposed. The extent of the excess burden increases with the elasticity of demand for cigarettes, because more people are altering their consumption decisions as the elasticity increases.11

There is an additional component of the excess burden apart from the distortion of consumer decisions. Higher tax rates foster greater cigarette smuggling and bootlegging of cigarettes. These illegal behaviours impose social costs associated with criminal activity as well as additional enforcement costs directed at preventing these illegal acts.
To set taxes for products in a way that creates the least economic distortion, the total excess burden should be minimised. An early methodology for achieving the ideal efficient tax stimulus is known as the Ramsey rule. The optimal taxes should be inversely related to the product's elasticity of demand. More recent analyses, such as that by Atkinson and Stiglitz (1976), show that Ramsey-style results depend on the constraints on income taxation. But if a decision is made to raise tax revenues by excise taxes on products, the price elasticity of demand remains a pertinent consideration.

The broader implications of these results have interesting consequences for cigarette policy. From the standpoint of traditional tax theory, a low elasticity of demand is consistent with higher optimal taxes if one is raising tax revenue through excise taxes. However, if taxes are to be an effective policy instrument in discouraging smoking, a high elasticity is desirable. The difference in perspectives arises because traditional product tax theory is based on an assumption that products purchased are the result of fully rational decisions that do not impose external costs on others and, as a result, discouraging these decisions creates efficiency losses. In contrast, the advocates of higher cigarette taxes often question these assumptions and view taxes as a mechanism for aligning the incentives facing smokers so that they will make more efficient decisions.

3.4 The Elasticity of Cigarette Demand

The key parameter for determining the effect of cigarette tax policies on cigarette consumption is the elasticity of demand. The price responsiveness of smokers is pertinent to several policy concerns. If demand is highly elastic, the revenues yielded by very high cigarette taxes may be less than the total tax revenues produced by a lower tax rate. The ability of taxes to reduce smoking rates, which may be a health policy objective, also hinges on the demand elasticity.

There have been several approaches to estimating the effect of cigarette prices on the demand for cigarettes. These have included cross-section estimates, time series estimates, studies using pooled time series and cross-section data, and analysis of individual data. While most studies have used aggregate legal sales data, some recent studies use reported individual consumption data, which would include legal and illegal sales.

Viscusi (1992) provides a review of forty-one of these studies. Thirteen-one of them are for the US, for which the estimated elasticities of demand are clustered in the range from -0.4 to -1.0. While these studies typically use aggregate legal sales data, US estimates based on individual consumption
data are similar. Hersch (2000) found that men and women exhibited
elasticities of -0.4 to -0.6 for both the quantity of cigarettes sold as well as
their participation elasticity. Nine of the studies are for the UK, where the
estimated elasticity range is from -0.1 to -0.8, but most studies yield
estimates around -0.5 or -0.6. The one study from Switzerland found an
elasticity of -1.0, which is at the relatively high end of the range of
estimates found elsewhere. Evidence for South Africa reported by van
Walbeek (2002) indicates a price elasticity of -0.6. Cigarettes are price-
responsive, but most studies indicate that there is less than a proportional
reduction in the quantity purchased in response to an increase in price.

Table 3.2 Representative product elasticities of demand

<table>
<thead>
<tr>
<th>Product</th>
<th>Elasticity of demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco products</td>
<td>-0.46 (short run) -1.89 (long run)</td>
</tr>
<tr>
<td>Toilet articles and preparations</td>
<td>-0.20 (short run) -3.04 (long run)</td>
</tr>
<tr>
<td>Kitchen/other household appliances</td>
<td>-0.63</td>
</tr>
<tr>
<td>Stationery</td>
<td>-0.47 (short run) -0.56 (long run)</td>
</tr>
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<td>Water</td>
<td>-0.20 (short run) -0.14 (long run)</td>
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<tr>
<td>Legal services</td>
<td>-0.37</td>
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<tr>
<td>Automobile repair</td>
<td>-0.40 (short run) -0.38 (long run)</td>
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<td>Taxicabs</td>
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<td>Newspapers and magazines</td>
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<td>Theatre and opera</td>
<td>-0.18 (short run) -0.31 (long run)</td>
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<td>Bananas</td>
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</tr>
<tr>
<td>Carrots</td>
<td>-0.53</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>-0.46</td>
</tr>
<tr>
<td>Peanuts</td>
<td>-0.17</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>-0.62</td>
</tr>
</tbody>
</table>

* SOURCE: The non-food items from tobacco through theatre and opera are from
projections*. 2nd ed. Cambridge, MA: Harvard University Press. The food items from beef through
the end of the table are from Kuo S. Huang, 1996. Nutrient elasticities in a complete food
Many discussions of tobacco policy suggest that cigarette sales have an aberrationally low responsiveness to prices. To see whether this comparative claim is in fact true, Table 3.2 summarises price elasticity estimates for a wide range of products. The tobacco product demand elasticity shown in Table 3.2 is from a single study, but is consistent with the range of estimates in the literature. The tobacco price elasticity is not unlike the similar estimate for stationery, legal services, automobile repairs, newspapers and magazines, as well as a wide variety of food products, ranging from chicken to bananas.

What this cigarette price responsiveness suggests is that if the object of tax policy is to tax the products with the lowest elasticities of demand in order to minimise the excess burden of taxes, cigarettes would not be at the top of the list to be taxed. If cigarettes are taxed, people will in fact reduce their cigarette purchases. Whether one views such a reduction as beneficial or not will depend on the level of the tax as well as a wide range of issues discussed below.

Cigarette demand elasticities also play a critical role in determining the revenue-maximising tax. As the tax rate is increased, tax revenues rise from people who continue to purchase cigarettes, but if demand is elastic the quantity purchased will decline as taxes rise, reducing tax revenues. Van Walbeek (2002), using a cigarette demand elasticity estimated for South Africa at -0.6, estimates that the revenue-maximising cigarette tax in South Africa is 55% of the retail price, about one-third higher than current tax rates. The revenue-maximising tax would raise revenues from cigarettes by 10 to 15%, excluding possible offsets such as smuggling. Thus, a tax increase would further an objective of revenue maximisation.

Raising revenue is surely a major objective of cigarette taxes as well as other taxes. But there are other factors that enter as well. The costs of raising taxes include the dead-weight loss to consumers who are making informed decisions, costs associated with smuggling and contraband activities, and possible adverse trade effects. Additional possible benefits of taxes include deterring smoking behaviour and the associated harms to the individual and society – issues that are examined in detail below.

### 3.5 Financial Externalities of Cigarettes

A standard justification for taxing commodities is present when these goods impose external costs on other members of society. Pigouvian taxes, in which the tax on a commodity is set equal to the marginal harm inflicted by the good will lead to efficient levels of consumption of the
product. Such taxes discourage consumption to the level that would occur if consumers took full account of the harm their consumption caused, but the taxes will not compensate those who are harmed unless specific provision is made for compensation.

For roughly a decade there has been considerable debate about the financial costs smokers impose on others. Before addressing the cost calculations, the set of effects to be considered need to be defined. The matter of concern here is the financial externalities smokers impose. If smokers are worse off either in terms of their health or their own financial well-being, then that effect is not included. Similarly, if smokers die prematurely and do not contribute their income taxes after they are dead, that effect is excluded as well. For example, people are not penalised for not fulfilling their full earnings potential by, for example, choosing a lower-paying public interest job. However, the calculations below will include contributions smokers do not make to pension and social insurance efforts due to their premature mortality.

Let me emphasise that these calculations do not place a value on smokers’ lives. The mortality risks of smoking are surely grave, but they constitute a private cost borne by smokers. The focus here is on the financial external costs to society. This framing of the calculations in no way implies that the risks to smokers are unimportant. Rather, it simply defines the character of the study.

That smokers die sooner than non-smokers is not a good thing. However, the driving force behind calculations purporting to show that smokers impose external costs on society is that smoking harms smokers’ health, consequently imposing medical costs. If this relationship is recognised, then one should consider the effect of this risk on all cost calculations, whether doing so raises or lowers the cost tally. Properly formulated, the economic task is to calculate the net financial costs of smoking. It is not appropriate to include cost increases without recognising cost decreases. On balance, what would the smokers’ costs have been on a lifetime basis but for the smoking behaviour? As with all such calculations that go over a long period, the appropriate approach converts the cost stream into its present value, which is done here using a 3% real rate of interest.

Considering costs at any specific moment will provide a misleading estimate of the costs of smoking. While smokers are alive, they do incur health costs sooner and at a higher rate than do non-smokers. However, their trajectory of costs is shorter because of the life expectancy effects of smoking. Some non-economists have labelled taking into account the life
expectancy effects a death credit. That characterisation is certainly incorrect. The approach I advocate here simply acknowledges the costs that actually occur, not the costs that would have occurred if smokers lived longer. Failure to acknowledge the life expectancy effect of smoking will lead the calculations to attribute to smokers costs that have never been incurred because the smokers are deceased. Thus, smokers are being charged for costs that never in fact occurred if there is no appropriate life expectancy adjustment.

In assessing the costs associated with smoking, one will obtain a misleading estimate of these costs by comparing a typical smoker to a typical non-smoker. The average non-smoker is usually better educated and has fewer other risky health habits and risk exposures. As a result, the accepted approach in the literature is to construct the profile of a ‘non-smoking smoker’, that is, a person who is identical to a smoker apart from smoking behaviour. The cost associated with smoking is the additional cost generated when a ‘non-smoking smoker’ takes on the additional health characteristic of smoking.

Table 3.3 United States: Financial externalities of cigarettes

<table>
<thead>
<tr>
<th>Cost per pack (US$)</th>
<th>Total</th>
<th>Federal government</th>
<th>State governments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total medical care</td>
<td>0.580</td>
<td>0.236</td>
<td>0.033</td>
</tr>
<tr>
<td>Sick leave</td>
<td>0.013</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Group life insurance</td>
<td>0.144</td>
<td>0.004</td>
<td>0.005</td>
</tr>
<tr>
<td>Nursing home care</td>
<td>0.239</td>
<td>0.145</td>
<td>0.078</td>
</tr>
<tr>
<td>Retirement and pension</td>
<td>−1.259</td>
<td>−0.847</td>
<td>−0.078</td>
</tr>
<tr>
<td>Fires</td>
<td>0.017</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Taxes on earnings</td>
<td>0.425</td>
<td>0.221</td>
<td>0.027</td>
</tr>
<tr>
<td>Total net costs</td>
<td>−0.319</td>
<td>−0.530</td>
<td>−0.090</td>
</tr>
</tbody>
</table>

SOURCE: Data are from Viscusi (2002, 73, 94).

NOTE: All figures are discounted using a 3% rate of interest.

Table 3.3 reports the estimated financial costs of smoking in the US on a per-pack basis. The first column of total costs includes costs to the Federal government, costs to the state government and cross-subsidies from non-smokers to smokers covered by private insurance. The second column summarises the costs to the Federal government, while the third
column presents the costs to state government entities. For concreteness, let us focus on the column of total costs. Overall, smokers generate a cost savings of US$0.32 per pack excluding taxes paid on cigarettes.

There are five categories of expenses that represent cost increases due to smoking: medical care, sick leave, group life insurance, fire and taxes on earnings. The most important of these is medical care, which involves a cost increase of US$0.58 per pack. These costs pertain only to publicly borne medical costs. Private costs do not enter the calculation. Because Southern African nations provide less publicly subsidised health care than the US, one would expect this number to be smaller, as might other components correlated with the level of social insurance. Next in importance is the US$0.43 per pack that smokers do not contribute to social insurance programmes due to their premature mortality.

On the positive side of the ledger are the savings in nursing home care costs of US$0.24 per pack and the savings in retirement and pension costs of US$1.30 per pack. That smokers die sooner and spend less time in nursing homes and reap fewer retirement benefits is not desirable. However, given the reality that smoking is very dangerous, any proper calculation of costs must acknowledge that these risks have fundamental cost ramifications.

Given these estimates indicating cost savings associated with cigarettes, how is it that cigarette litigation in the US generated a substantial settlement? The reason is that the focus of these lawsuits was on a particular medical care cost component, Medicaid, which did in fact have positive smoking-related costs. As is indicated in Table 3.3, smokers do have higher medical expenses on a present value basis.

Do the cost estimates in Table 3.3 generalise to other countries? Whether they do or not depends on the structure of the private and social insurance efforts. Barendregt, Bonneux and Vandermaas (1997) found a surprising result for the Netherlands, which is that even if the calculations are restricted to the health insurance component alone, cigarettes are self-financing. A more comprehensive cost study in Czechoslovakia, focusing on programmes in addition to medical care, was prepared for Phillip Morris and found that on balance cigarettes are self-financing. An important caveat is that, as with the calculations in this chapter, it should be emphasised that these results in no way imply that the risks of cigarettes are socially desirable. The estimates only reflect the financial costs imposed by smokers, which have become a frequent concern in smoking policy debates.
The main message of these and similar calculations is twofold. First, it is important to conceptualise the cost effects correctly, focusing on the present value of net lifetime costs. Costs observed at a specific moment will give an incorrect cost perspective. Second, whether the costs on balance are positive or negative cannot be answered without examining the particular situation within that country and the insurance programmes involved. If such costs are a matter of concern for African nations, the estimates must be redone, taking into account the country-specific insurance and pension structures. If the US had only medical insurance, the overall tally in Table 3.3, for example, would be quite different. However, to the extent that smoking imposes costs, the brunt of this cost is borne by smokers themselves. Moreover, the methodology used for the US analysis establishes the sound principles on which other analyses can be formulated.

3.6 Smoking as a Risky Decision

Smoking is a very hazardous consumer activity. If people are cognisant of the risks, they can balance the perceived benefits and expected costs of the activity and choose to smoke if doing so enhances their welfare. Such consumer decisions are potentially efficient, as are choices to buy other dangerous products, whether they are automobiles or prescription drugs. However, a principal requirement for those decisions to be sound is that consumers be cognisant of the associated risks.

Suppose the state of the world was one in which consumers had no knowledge of the hazards of smoking. What policy instruments could be used to deter consumers from smoking to the same extent as would accurate risk beliefs? Two approaches to this would be (1) the use of focused risk communication efforts and (2) taxes to discourage smoking.

Consider first the role of hazard communication policies to lead consumers to have accurate risk beliefs. In the US, there have been a series of government reports on the dangers of smoking since 1964. Since 1966 there have been ‘on-product’ warnings. The current series of rotating warnings that was begun in 1984 alerts consumers to a series of health risks (i.e., lung cancer, heart disease, emphysema and the risks to pregnancy), risks of birth defects, the benefits of quitting and the presence of carbon monoxide in cigarette smoke. The risks of smoking have received widespread media coverage for at least 50 years and other policies such as advertising restrictions have been in place.
The result of this strong informational environment is that the public’s risk beliefs with respect to smoking exceed the actual risks as estimated by the US Surgeon-General and the scientific literature. Table 3.4 provides a comparison of the risk beliefs and actual risk levels for several major categories of risk. Overall, about 10 smokers out of 100 are estimated to die from lung cancer because they smoke. The public, however, estimates this risk to be 48 out of 100 smokers are killed. The scientific estimate of the total mortality risk from smoking is likewise below people’s assessed risk of 54 deaths per 100 smokers, but to a lesser extent than the lung cancer overestimation. Finally, both men and women overestimate the life expectancy loss from smoking, which is six to eight years.

Table 3.4 United States: Summary of smoking risk perceptions, 1997

<table>
<thead>
<tr>
<th>Perception</th>
<th>Scientific estimates</th>
<th>Public perception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer fatality risk</td>
<td>0.06–0.13</td>
<td>0.48</td>
</tr>
<tr>
<td>Overall mortality risk</td>
<td>0.18–0.36</td>
<td>0.54</td>
</tr>
<tr>
<td>Life expectancy loss</td>
<td>6–8 years</td>
<td>10.1 years (males)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.9 years (females)</td>
</tr>
</tbody>
</table>

The author found similar results for Spain. The informational environment in Spain also parallels that in the US. Spain adopted a four rotating warnings policy, which was approved in 1988 and modified in 1993. These warnings address the risks of cancer and heart disease, health risks generally, risks of birth defects and environmental tobacco smoke. The survey in Spain was similar in character but in some respects more comprehensive in that it also included risk perceptions with respect to heart disease, lung disease and other risk outcomes. The risk beliefs in Spain were not unlike those in the US, as people perceived a lung cancer risk of 0.50, a heart disease risk of 0.45 and a loss of life expectancy due to smoking of 10.9 years.

Warnings and other informational policies may not be present in all countries and may not be effective in every country even if they are adopted. Countries differ, for example, in media coverage of health risk information, education levels and other determinants of the efficacy of risk communication efforts. Tax policies can potentially substitute for risk information in such circumstances. From an economic standpoint, higher risk beliefs have an important consequence in that they deter product purchases. The higher the risk belief, the less attractive cigarettes will be.
In the same vein, it is possible to impose cigarette taxes that will deter smoking behaviour just as would perception of smoking risks.

The author developed such estimates of the risk belief equivalent of cigarette taxes for lung cancer risk beliefs in a previous study. The excise tax on cigarettes was 30.8% of the retail price in the US time period that was examined. Assessing the effect of such taxes depends on the elasticity of product demand. If demand is relatively inelastic with a demand elasticity of -0.4, such excise taxes will reduce smoking to the same degree as would lung cancer risk beliefs of 0.17. If the demand elasticity is -0.7, the lung cancer risk equivalent of excise taxes is 0.27. Finally, for a unitary demand elasticity of -1.0, the excise tax is tantamount to having a lung cancer risk belief of 0.38. Using excise taxes to discourage cigarette consumption to achieve the same deterrent effect as would higher risk beliefs is most effective when the elasticity of demand for cigarettes is large.

Medical experts beginning with the 1988 report of the US Surgeon-General now label cigarette smoking as an addiction rather than a habituation. An addiction to a product is not simply of medical interest, as it has economic consequences as well. The author prefers to view cigarette addiction as a property of cigarettes rather than a risk of cigarettes. For many people quitting smoking is difficult. Moreover, smoking now may increase the desire to smoke more in the future.

Because these issues are examined in detail elsewhere, a summary of the two principal points of view in the economics literature with respect to cigarette addiction is provided here. The rational addiction model hypotheses that people could freely choose to buy an addictive product. The fact that cigarettes are addictive does not necessarily imply that there is a market failure. For example, one makes many decisions that are hard to alter, whether it be the choice of an occupation or where one lives. The existence of transaction costs does not imply that the decisions are flawed. The main concern is whether there is anticipation of the future consequences of one’s addictive choices, and advocates of this point of view provide empirical evidence that there is such anticipation with respect to prices, risks and the difficulty of quitting.

Smokers also display consistent risk-taking behaviour across a wide variety of risky behaviours, which is in accordance with the rational addiction model. Smokers choose to work on more hazardous jobs and are willing to do so for less compensation per unit risk than are non-smokers. The rate of job injury is higher for smokers, even after taking into account the inherent riskiness of their jobs. Smokers are also less
likely to floss their teeth, are less likely to check their blood pressure and are more likely to be injured at home. Overall, there is a consistent pattern of risk-taking behaviour correlated with smoking status.

An alternative point of view, reflected in the work of Schelling (1984) and more recently by Gruber (2003), hypothesises that people are subject to intertemporal irrationality, or time inconsistency. When young, people may make decisions based on a high rate of time preference, and when older, they may have a lower rate of time preference. Experimental evidence often indicates time inconsistency in choices. Similarly, surveys of smokers often indicate a desire to quit smoking. Available evidence specifically for smokers is not, however, clear-cut. In the view of these proponents of intertemporal irrationality, cigarette taxes could potentially serve a constructive role by discouraging smoking behaviour. For much the same reason that taxes can substitute for lung cancer risk beliefs, taxes can also deter people from making mistaken addictive choices.

Unfortunately, data do not currently exist to make it possible to determine the level of taxes to promote consistent smoking choices. As a result, there have been attempts to extrapolate from rates of time preference in behavioural experiments unrelated to smoking. However, evidence of people’s rates of time preference in Viscusi and Chesson (2000) indicates that smokers may have lower rates of discount with respect to the future than do non-smokers, which is the opposite of what the intertemporal irrationality analysts hypothesise. The empirical evidence on these issues is still emerging. In the interim, if policy makers believe that there is merit to these concerns with addiction, cigarette taxes could serve a beneficial role and may already be fulfilling that function in countries where taxes exist.

3.7 Smoking Among the Youth

A frequent policy concern is the prevention of youth smoking. Although youths aged 16 to 21 have higher risk beliefs than do adults, and are consequently not making mistaken choices based on inadequate risk beliefs, the author has long supported restricting smoking to those aged 18 or older in the US. In some African countries there is an age limit of 16 on cigarette purchase. Legal requirements for the purchase of cigarettes are the most refined policy mechanism for addressing youth smoking, because they are targeted at the youth segment of the market.

Taxes could also play a role in discouraging youth smoking, but the efficacy of taxes depends on two critical parameters. First, what is the cigarette price elasticity of demand for youths? Some studies suggest that youths are more
responsive to prices than are adults, whereas other studies suggest that they are just as responsive to prices as are adults. These empirical magnitudes will vary across countries. The greater the price responsiveness of the youth compared to adults, the stronger the rationale will be for the use of taxes to deter young people from smoking. If there is greater relative responsiveness by the youth, then discouraging their smoking will not have the same welfare-reducing effects on adults for whom policy makers do not want to discourage smoking to the same extent.

The second critical empirical parameter for determining the appropriateness of taxes in deterring the youth from smoking is the share of youth smoking purchases in the retail market. If this share is small, as it is in the US where empirical estimates place this share to be on the order of about 3%, then cigarette taxes are a very blunt instrument for decreasing youth smoking. The overwhelming proportion of the anti-youth smoking tax will be borne by adults. In summary, unless smoking among the youth is highly price-sensitive and constitutes a large segment of the market, stringently enforced age restrictions on cigarette purchases would be a more highly focused remedy that would have fewer costs for the adult smoking population.

Teen smoking may also be responsive to other factors that are more instrumental. Whether the parents smoke in the home and permit teens to smoke in the home, for example, is an important factor.

3.8 Environmental Tobacco Smoke

Environmental tobacco smoke will also decline if cigarette taxes rise, because people will smoke less. In recent years, there has been considerable publicity regarding the potential health risks of environmental tobacco smoke, which the review in Viscusi (2002) indicates is not as compelling as the evidence on risks of primary tobacco smoke, which are among the most well-established health risks. Scientific studies have had difficulty in identifying environmental tobacco smoke risks that pass the usual tests of statistical significance. Similarly, the study by Moore and Zhu (2000) found that environmental tobacco smoke exposures did not significantly boost the health care costs of those exposed. Even if one were to adopt the high-end estimates of environmental tobacco smoke risks, the extent of the public fears of environmental tobacco smoke is out of line with any published scientific studies. For example, Spanish respondents believe that 25 of 100 people in the population will get lung cancer from environmental tobacco smoke exposures and that an equivalent number
will contract heart disease.\textsuperscript{25} Such fears dwarf any estimates of environmental tobacco smoke risks that have ever appeared in the scientific literature.

Wholly apart from real and imagined health risks, people quite legitimately may wish to avoid potential health risks that have not been firmly established as well as the smelly annoyance aspects of smoking, for which they may be incurring significant non-pecuniary losses. These effects represent real economic costs even though they may not be strictly financial in nature. There may also be particularly sensitive and vulnerable population groups, such as asthmatics, who will incur greater health risks from environmental tobacco smoke exposures.

Once again, taxes are not a well-suited policy instrument for dealing with such a focused problem. Cigarette taxes decrease all smoking, not just smoking that generates environmental tobacco smoke. A superior policy alternative is to impose smoking restrictions, whether it be establishing non-smoking areas in restaurants or outright bans on smoking in public buildings.

To reduce environmental tobacco smoke exposures in the home, other policy measures may prove effective. Spain has included warnings about the risks posed by environmental tobacco smoke as part of the on-pack warnings. Evidence in the US indicates that in California where there has been extensive publicity regarding the dangers of environmental tobacco smoke, there has been a dramatic decrease in the extent to which smokers expose other members of their household to environmental tobacco smoke.

### 3.9 Cigarette Tax Regressivity

Cigarette taxes fall principally on the poor to the extent that it is the lower-income groups in the country who smoke. For such countries, it is not the legislators who will bear the brunt of the tax, but rather, the janitors and the maintenance crew at these government offices who will be paying it.

The extent of US cigarette tax regressivity is quite remarkable.\textsuperscript{26} People earning US$50 000 or more per year pay 0.08% of their income in cigarette taxes, while those with income below US$10 000 pay 1.62% of their income in cigarette taxes. Poor smokers do not simply pay a higher share of the tax relative to their income, which is the standard measure of regressivity. Instead, the absolute level of the tax borne by the poor is greater as well.

The characterisation of the regressivity of cigarette taxes is likely to be somewhat less regressive if one takes a lifetime view of incidence. Because
younger age groups have higher smoking rates than older age groups, taxes will tend to be borne by people at the lower level of their lifetime earnings trajectory. If their income levels rise over time, which is likely to be most pertinent for better-educated workers, then the high tax rates that are paid by the young will overstate the degree to which taxes are paid by people with low lifetime income levels.

Data from 2000 provided by the South African Treasury also indicate that the incidence of tobacco taxes in South Africa is regressive, with the poor spending a higher percentage of their income on tobacco and tobacco taxes. The overall average expenditure on tobacco was ZAR1 114 out of an average income of ZAR39 082, or 2.8%. People with incomes ZAR0.00 to ZAR6 480 spent up to 17.2% of their income on tobacco products, as compared to 10% to 17.2% for incomes ZAR6 481 to ZAR11 090, 5.7% to 10% for incomes ZAR11 091 to ZAR19 440, 2.7% to 5.7% for incomes ZAR19 441 to ZAR41 484, and less than 2.6% for incomes ZAR41 485 and above. Cigarette taxes in South Africa tend to fall disproportionately on the poor, which is an unattractive characteristic of these excise taxes to the extent that income distribution is a matter of concern.

Evidence on smoking trends in South Africa developed by van Walbeek (2003) also indicates that cigarette taxes in South Africa are quite regressive. As cigarette taxes have risen, smoking prevalence among those 15 and older has declined in South Africa from 32.6% in 1993 to 27.1% in 2000. The poor have cut back their smoking in response to higher prices, but cigarette taxes remain regressive. The percentage of household income spent on cigarette taxes declines steadily as one moves from the bottom income quartile (1.39%), to the second quartile (0.84%), the third quartile (0.56%) and the upper quartile (0.33%). Extreme tax regressivity such as this may create reluctance among policy makers to rely too heavily on cigarette taxes as a source of tax revenue.

A potential counter-argument is that taxes will be welfare enhancing because, according to this view, smoking decisions are flawed. Before overriding consumer sovereignty, there should in fact be a demonstration of a market failure that will be eliminated. Such shortcomings should presumably be based on a careful analysis of the nature and extent of inadequacies of private choices.

Whether cigarette tax regressivity will be a concern will vary across countries. Smoking was once more prevalent among the better-educated and upper income groups in the US. In Spain it is still the case that smokers have higher levels of education than non-smokers. The nature of
cigarette tax regressivity may vary substantially across countries, as may the extent to which the poor bear a disproportionate share of the tax. However, to the extent that equity is a concern, consideration of the distributional consequences of cigarette taxes may be more critical than in other areas of tax policy.

3.10 Conclusion

There are in fact general principles for cigarette taxation, but the application of these principles will vary by country. Cigarette taxes can serve as a simple revenue-raising device, but the resulting excess burden imposed by the tax will depend on the elasticity of demand. Whether there are in fact financial externalities from smoking will depend on the insurance structure in the country, but if there are such net financial externalities, cigarette taxes are well suited as a policy remedy. If there is evidence that people are making irrational cigarette choices, then higher taxes could discourage smoking and eliminate the market failures that might exist. Informational regulations might also address these shortcomings in individual decisions.

It is noteworthy that if one finds merit in the potential economic rationales for taxing smoking (i.e., financial externalities and irrational smoker decisions) then there are implications for the structure of optimal taxes as well. The harms to society and to the individual smoker are closely related to the quantity of cigarettes smoked and not the amount spent on cigarettes. Thus, a unit tax per pack is a more appropriate remedy than an ad valorem tax in such circumstances. A more finely tuned tax might link the tax to cigarette riskiness if a consensus measure of product risk levels emerged. To the extent that cheaper cigarettes pose greater risks, an ad valorem tax will have disproportionate effects on the comparatively safe cigarettes on the market.29

For other policy concerns, such as smoking among the youth and environmental tobacco smoke, cigarette taxes appear to be an excessively blunt policy instrument. Regulatory mechanisms, such as age restrictions on cigarette purchase and public smoking restrictions of various kinds, represent more targeted policy approaches that can be effective without causing broadly based penalties on smoking behaviour generally.

Although these nuances of using taxes as a policy lever are prominent in the academic literature, a more salient practical policy concern in Africa is the role of smuggling and contraband cigarettes. High taxes and tax differences across countries create incentives for a variety of forms of
illegal activities to evade taxes. The social costs include both foregone profits and foregone tax revenue, which can be considerable, but also the creation of crime-related externalities associated with these illegal efforts.

Two final caveats are worth noting. First, cigarette taxes may fall disproportionately on the poor so that consideration of tax regressivity should be an important part of the policy assessment process. If the poor tend to buy less-expensive cigarettes, reliance on an *ad valorem* tax rather than a unit tax may promote this objective. However, it is more likely that protectionist concerns may be the driving force leading to the adoption of *ad valorem* taxes rather than a concern with tax regressivity. Second, smoking decisions represent consumer choices that should be respected in the same way as are other product decisions, to the extent that they are based on a rational assessment of the consequences of the product for their welfare.

**Acknowledgement**

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**Notes**

1. In this article I will not delve into the medical debate as to whether lower-tar cigarettes are in fact safer for the smoker. The tar measure has been developed by US government public health officials as a summary index of the riskiness of cigarettes. Smokers of lower-tar cigarettes may smoke more cigarettes if they are engaging in compensating behaviour to maintain a nicotine level they had before switching to a lower-tar cigarette. There have also been suggestions that people may also smoke lower-tar cigarettes differently. The existence of compensatory behaviour does not necessarily imply complete compensation. Moreover, the compensatory behaviour model pertains only to switchers, not people who have only smoked low tar cigarettes. Mulolland (1991) provides a perceptive analysis of low tar cigarette decisions and their consequences.

2. The discussion below is based on the country report questionnaires returned by the participants from the different countries represented at the 2003 South African Conference on Excise Taxes.

3. In 2002, the exchange rate was 3.3 rupees per ZAR and 29.6 rupees per US$.

4. Note in 2003, 70.7 Frw = 1 ZAR and 524 Frw = 1 US$.

5. The data in this paragraph are from Orzechowski and Walker (2002).

6. An additional tax equivalent emerged from the 1998 Master Settlement Agreement between the cigarette industry and the states attorneys general. That
settlement was for a series of state lawsuits pertaining to the medical costs of smoking, which I described in considerable detail in Viscusi (2002). The settlement was for US$206 billion with 46 states and US$36.8 billion with four states, for a total of US$243 billion that would be paid over a twenty-five-year period. However, this amount was not to be paid in a lump sum by the industry but instead would be funded by a per-pack tax on cigarettes of about US$0.40 per pack. Thus, proper calculation of the tax on cigarettes would include both the explicit excise tax component as well as the penalty associated with the medical cost of cigarette litigation.

7. The data below are drawn from Table 2.3 of Cnossen and Smart (2004).

8. Note that for the EU tax rates, the VAT is included, whereas for the US general product sales taxes are not. Exclusion of the VAT would make the UK tax percentage still more than double the US tax rate excluding the costs of the Master Settlement Agreement.

9. Data in this paragraph are from the International Tax and Investment Center (2003).

10. For further discussion of the effects of oligopoly on cigarette tax shifting, see Cnossen and Smart (2004).

11. More specifically, the excess burden in this instance equals the following expression: $\frac{1}{2} \times \text{(pre-tax price of cigarettes)} \times \text{(pre-tax quantity of cigarettes)} \times \text{(tax rate)}^2 \times \text{(compensated price elasticity of demand for cigarettes)}, where the ‘compensated’ price elasticity adjusts for the fact that higher taxes in effect make the consumer poorer and focus solely on the pure substitution effect of taxes.

12. See pp. 102–104 of Viscusi (1992). Viscusi (2002) updates these studies to include several more recent articles, which yield similar findings.

13. These estimates, which were prepared for the National Bureau of Economic Research, are similar to other studies prepared for US government entities. See Manning et al. (1989) and Gravelle and Zimmerman (1994).


15. See Antonanzas et al. (2001), Rovira et al. (2000), and Viscusi et al. (2000).


20. However, as discussed in Viscusi (1992, 2002, 2003) interpreting what people mean by such statements is not straightforward.

22. Lewit, Coate and Grossman (1981) suggest that teens are more price responsive, but other studies, such as Wasserman et al. (1991) find no evidence of greater price responsiveness.


27. See van Walbeek (2003), 20.


29. Evans et al. (1999) examine the higher risks posed by cheaper cigarettes sold in the US.

References


