CHAPTER 6

DO TAX INCREASES ON TOBACCO HURT THE POOR?[1]

6.1   Introduction

It is clear from chapters 3 and 4 that large annual increases in tobacco excise taxes are an appropriate strategy to reduce tobacco consumption. However, some economists have expressed concern that tax increases may have a disproportionately detrimental impact on poor smokers (see studies cited in Jha and Chaloupka, 2000). The argument runs as follows: (1) in most countries, smoking prevalence is higher among lower socio-economic groups,[2] and (2) poorer smokers tend to spend a greater proportion of their income on tobacco than richer smokers. If this is true, cigarette taxes are regressive. Given that regressive taxes are undesirable from a social equity perspective, such a finding might be used as a socio-economic argument against further increases in the level of real cigarette excise tax.

Until recently few studies have empirically investigated the regressivity of the cigarette excise taxes, and specifically the impact of changes in cigarette taxes and prices on the distribution of the burden of the tax (some earlier studies include Townsend, 1987, Townsend et al., 1994, and Sayginsoy et al., 2000). However, as was pointed out in chapter 3, in 2002 and 2003 a large number of studies on the determinants of the demand for cigarettes in developing countries, particularly in South East Asia, have been published under the auspices of the World Bank. A number of these studies have investigated the demand for cigarettes for various income groups, and generally concluded that smoking prevalence is higher among the poor, and that poorer households spend a larger proportion of their disposable income on cigarettes, relative to more affluent households. This supports the hypothesis that the excise tax is regressive.

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1.   An earlier version of this paper, based on the Income and Expenditure Surveys (IES) of 1990 and 1995, was published in the South African Journal of Economics (Van Walbeek, 2002b). The original paper was financially supported by Research for International Tobacco Control (RITC), based at the International Development Research Centre in Ottawa, and the World Bank. Subsequently the analysis was updated with the IES of 2000 with financial assistance of the International Tobacco Evidence Network (ITEN). The comments and insights of the following people are gratefully acknowledged: Murray Leibbrandt, Joy de Beyer, Frank Chaloupka, Hana Ross and two anonymous referees from ITEN.

2.   There is much empirical support for this comment. Bobak et al. (2000) concluded that 65 out of 74 studies they reviewed found that smoking prevalence was higher among the poor than among the rich. Furthermore, they found that "in total, the studies reveal that differences in smoking prevalence between poor and rich groups are greater in low-income countries than those in high-income countries" (Bobak et al., 2000: 44-45)

While agreeing that tobacco taxes are regressive, tobacco control economists are of the opinion that the government should not reduce the excise tax in order to lessen the burden of the tax (World Bank, 1999: 74 and Chaloupka et al., 2000a: 259). In fact, they argue that *increases* in the excise tax are likely to reduce the excise tax's regressivity. This is based on the premise that the poor are likely to be more sensitive to price changes, and would thus reduce their cigarette consumption by a greater percentage than the rich in response to an excise tax-induced increase in cigarette prices. It is argued that the *relative* tax burden on the poor, vis-à-vis the rich, is likely to decrease as the excise tax is increased. Recent empirical studies confirm this hypothesis: it is found that the absolute value of the price elasticity of demand varies inversely with income (see, for instance, Onder, 2002, Arunatilate and Opatha, 2003, Kyaing, 2003, and Sarntisart, 2003).

In chapter 2, changes in smoking prevalence in South Africa were considered. However, because of limitations in the data set, it was impossible to investigate the potential regressivity of tobacco excise taxes. This chapter aims to address some of the shortcomings of chapter 2, particularly regarding changes in the regressivity of the tobacco excise tax. It is an extension of Van Walbeek (2002b), in which changes in the regressivity of cigarette excise taxes in South Africa between 1990 and 1995 were considered. This chapter builds on the methodology by Pechman and Okner (1974) and Pechman (1985). Two interrelated aspects will be explored: (1) the relative importance of tobacco in South African households' expenditure patterns; and (2) changes in the regressivity of cigarette taxes between 1990 and 2000.

6.2   Data issues

6.2.1   Finding appropriate surveys

An analysis aimed at investigating household consumption patterns of different income groups requires a cross-sectional approach. In South Africa, a number of cross-sectional household survey data sets exist.[3] In many countries cigarette prices differ across space[4] and because of quality differences, market segmentation, different mark-up percentages, variable tax rates on imported cigarettes, etc. (see Guindon et al., 2002). In South Africa, however, prices do not differ significantly across space and the price variation among different brands

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3.   Some of the major cross-section data sets include the following: the University of Cape Town's 1993 SALDRU survey; the University of Natal's 1998 KwaZulu-Natal Income Dynamics Survey; Statistics South Africa's 1990, 1995 and 2000 Income and Expenditure Surveys; and the annual All Media and Product Survey (AMPS) performed by AC Nielsen.
4.   This is particularly true of cigarette prices in the US, where the individual states have the power to impose excise taxes on cigarettes. According to the Surgeon-General, other than a federal excise tax of 34 cents/packet, state excise taxes in 2000 varied between 2.5 cents/packet in tobacco-growing Virginia to $1.11/packet in anti-smoking New York State (USDHHS, 2000:340). Since 2000 the range of state excise taxes have increased even further (Joy de Beyer, personal communication, 2005).

is much lower than in most other countries.[5] Thus, while an individual survey is useful to determine certain relationships at that point in time, it cannot be used to investigate a household's reaction to price *changes*, because the price is essentially the same for everyone. Furthermore, since respondents were asked the total amount that they spent on cigarettes – not the price they paid per pack, nor the number of cigarettes smoked - it is impossible to determine the impact of differences in cigarette prices on people's consumption patterns from only one survey.

At least two comparable survey data sets taken at different periods are required, so that one can track the impact of changes in cigarette prices over time. Two data sets fulfil these criteria: the Income and Expenditure surveys (IES) of 1990, 1995 and 2000, and the 1993 Southern African Labour and Development Research Unit (SALDRU) survey, in conjunction with the 1998 KwaZulu-Natal Income Dynamics Survey (KIDS). The SALDRU and KIDS data form a panel, in that the same households are tracked over time. However, it is limited to only one of the nine provinces (KwaZulu-Natal) and, within this province, it only covers African and Indian households. Given its limited scope, the SALDRU/KIDS data set was not used in this study. This chapter is based on results derived from the three Income and Expenditure surveys.[6] The Income and Expenditure surveys are performed by Statistics South Africa, primarily to determine the base weights for the Consumer Price Index.

6.2.2 How good are the data?

The data are obtained using a two-stage stratified sampling methodology. For example, for both the 1995 and 2000 IES, approximately 3 000 of the 30 000 enumerator areas (EAs) in the country are chosen in the first stage of the process, where the probability of an EA being chosen is proportional to the number of households in that EA. In the second stage ten households are randomly selected from the chosen EAs. The resulting observations are weighted, with weights proportional to the number of households in the EA from which the sample was drawn. The sample was stratified by race, province, and urban and non-urban

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5.   According to British American Tobacco's recommended retail price lists, super premium brands (e.g. Cartier and Courtleigh) were selling at R13.50 per packet in August 2004, premium brands, (e.g. Dunhill, Gauloises and Camel) were selling at R13.00 per packet, popular brands (e.g. Peter Stuyvesant, Rothmans and Chesterfield) at R12.30 per packet, while mid- and low price cigarettes (e.g. Royals and Embassy) were selling at R10.40 per packet (Simon Millson, Director, Corporate and Regulatory Affairs, BAT South Africa, personal communication: 2004). More than 70 per cent of BAT's sales were in the popular price category. While some cigarettes are sold for less than R10 per packet, BAT believes that these are likely to be illicit sales. When the Altria Group introduced Marlboro into South Africa in April 2004, the brand was, rather surprisingly, positioned in the popular rather than the premium price category. In most countries Marlboro is marketed as a premium brand.
6.   Unfortunately the AMPS database could not be used, since it simply investigates whether people smoke or not; it does not investigate how much they spend on cigarettes. However, as was pointed out in chapter 2, AMPS did investigate the quantities that people smoked in 2002 in an ad hoc survey, but as has been pointed out above, one survey is not sufficient to investigate the impact of price changes on people's smoking behaviour.

areas (Hirschowitz, 1997). The 1990 IES focused only on metropolitan households, while the 1995 and 2000 surveys included rural and other urban households as well.

Given the differences in coverage, the surveys are not comparable in their current format. For comparative purposes it was decided to perform the main analysis on *urban* households for 1990, 1995 and 2000.[7,8]

In Table 6.1 some salient features of *all* households, covered in the three surveys, are shown. As discussed, the 1995 and 2000 data sets are comparable, but the 1990 data set is not, given that the latter does not consider rural households. Unfortunately, a number of data inconsistencies, particularly regarding the 2000 IES data, are evident.

- According to the 2000 IES data, nominal per capita income has increased by only 1.8 per cent per year between 1995 and 2000. Given moderate inflation (of between 5 and 8 per cent per year) during this period and a steady, albeit unspectacular economic performance, nominal per capita income should have increased by much more than 1.8 per cent per year.

- A comparison of the IES's weighted aggregated household income with current income, as measured on a macroeconomic level by the South African Reserve Bank (SARB), reveals that the IES tends to underestimate the SARB's estimate of household income. The underestimation varies significantly between 1995 and 2000: the 1995 IES accounted for 96.1 per cent of the SARB's estimate of current income for 1995, while the 2000 IES accounted for only 66.4 per cent of the SARB's estimate of current income in 2000. Clearly, household income is badly underreported in the 2000 IES.

- A similar picture emerges for households' expenditure on cigarettes. In principle, South Africa's aggregate cigarette expenditure is equal to the product of average cigarette expenditure for each smoking household, and the weighted number of smoking households included in the survey. From Table 6.1 it is clear that the implied aggregate cigarette expenditure, based on the IES data, is much smaller than the Treasury's estimate of cigarette consumption (which is based on cigarette excise tax revenue). While some

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7.   An analysis of all (i.e. urban and rural) households for the years 1995 and 2000 indicated that the conclusions were qualitatively the same as those of the urban households only. To prevent an unnecessary proliferation of tables in the text, the paper's focus is solely on urban households.

8.   The 1990 survey was based on 14 332 households located in South Africa's twelve metropolitan areas. These were the (1) Cape Peninsula, (2) Port Elizabeth-Uitenhage, (3) East London, (4) Kimberley, (5) Bloemfontein, (6) Free State Goldfields (Welkom-Virginia-Odendaalsrus), (7) Durban-Pinetown, (8) Pietermaritzburg, (9) Pretoria-Centurion-Akasia, (10) Witwatersrand, (11) Vaal Triangle (Vereeniging-Van der Bijl Park-Sasolburg) and (12) Klerksdorp-Stilfontein-Orkney. The 1995 survey was based on 29 595 households, of which 16 903 households (57.1 per cent) were from metropolitan areas. To obtain the metropolitan households, all observations with a "Description of settlement" field number of 30 or more were excluded because they represented rural areas. A closer matching of areas was not possible. In the 2000 IES, 26 263 households were interviewed, of which 15 972 (60.8 per cent) were defined as "urban households".

underreporting is to be expected (since people might be embarrassed about their smoking behaviour, or about the amount of money they spend on cigarettes, or simply because they get the calculations wrong), the degree of underreporting is significant. In 1995, for example, 48.8 per cent of "true" cigarette consumption is reported, while in 2000 only 36.1 per cent is reported.[9] For the 1990 IES, only 22 per cent of "true" national cigarette expenditure is reported, but given the limited scope of the 1990 survey, it is impossible to say precisely what the degree of underreporting was.

Table 6.1: Characteristics of the three Income and Expenditure Survey data sets

	IES 1990 (only urban households were surveyed)	IES 1995 (urban and rural households)	IES 2000 (urban and rural households)
Number of observations on which the survey is based	14 332	29 595	26 263
Number of households that the survey purports to represent (weighted data)	2 063 400	9 477 040	11 027 777
Average declared household income per household (Rand per year)	41 414	40 784	39 596
Average household size (number)	3.69	3.92	3.48
Average declared per capita income (Rand per year)	11 223	10 404	11 378
Total declared household income (weighted data) (R millions)	85 500	386 512	436 656
Current income of households (SARB data) (R millions)	206 016	402 311	657 687
Total income as obtained in IES, as percentage of SARB current income	41.5	96.1	66.4
Number of households that spend money on cigarettes (weighted data)	1 004 403	3 618 315	3 779 138
Average expenditure on cigarettes per smoking household (Rand per year)	676	801	1023
Total expenditure per year on cigarettes based on IES data (R million)	679	2 898	3 867
Aggregate "official" expenditure on cigarettes based on the Treasury data (R million)	3 082	5 944	10 704
Total expenditure on cigarettes as percentage of "official" aggregate expenditure	22.0	48.8	36.1

Sources: IES data (1990, 1995 and 2000); SARB Quarterly Bulletins.

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9.   A sizeable literature exists on how to conduct household surveys aimed at measuring living standards (see, for instance, Grosh and Glewwe, 2000 and Deaton, 1997). This literature points out that the time period for which respondents are requested to estimate their expenditure (the recall period), has a major impact on the results. For items that are frequently bought, like tobacco, reported expenditures fell sharply as the recall period was extended, say from one week to one month (Deaton and Grosh, 2000: 110). Given that the Income and Expenditure surveys used a one month recall period for tobacco, these findings would suggest that the reported expenditure on tobacco would be significantly underreported, compared to, for instance, a recall period of one week or less.

Underreporting of income and cigarette consumption is a significant problem, and casts doubt about the quality and usefulness of the data set as a whole.[10] Within any one survey, it could easily bias the results if the degree of underreporting is not the same among all households, or cohorts of households. However, more problematic is the fact that the degree of underreporting differs so significantly from one survey to another, resulting in incomparable surveys over time. This is unfortunate, but this is currently the best data available.

One option, if one wishes still to use the survey sets, is to assume that individual surveys are meaningful and consistent in themselves, but that the surveys are not comparable over time. An alternative option is to re-scale the three surveys to make them comparable. The principle is to balance the aggregate income and cigarette expenditure amounts in the three surveys with corresponding macroeconomic data, obtained from sources that use consistent data collecting methods. This was the chosen option. The procedure for upscaling household income and cigarette expenditure was as follows:

1. For the 1995 and 2000 surveys, aggregate household income, based on the respective IESs, was calculated by multiplying the number of weighted households by the average household income, for the respective years.

2. Current household income, as published in the SARB's Quarterly Bulletin, was assumed to be the correct measure of income. For 1995 and 2000 the scaling factor was calculated as the SARB's estimate of current income divided by the IES's estimate of aggregate household income. The scaling factor for 1995 was 1.0406 (= 1/0.961) and for 2000 it was 1.5060 (= 1/0.664).

3. The relevant scaling factor was applied to each household's income in the respective years. Using this transformation, aggregate household income derived from the Income and Expenditure surveys balances with the current income published in the SARB's Quarterly Bulletin.

4. Using the same principle, scaling factors were calculated for cigarette expenditure for 1995 and 2000. The "true" expenditure on cigarettes was derived from excise tax revenue data obtained from the National Treasury (see ETCSA, 2003: 121-125). The scaling factors were calculated as 2.0492 for 1995 and 2.7701 for 2000. The scaling factors were subsequently applied to each household's cigarette expenditure in the respective years.

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10. The problems in the 2000 IES are regarded as so serious that the survey has been referred to the South African Statistical Council for comment. According to Van der Berg and Louw (2003) "those working on the 2000 IES have found it to be an exceedingly poor data set, with evidence of sloppy work both in the gathering and in the management of data. For instance, grain expenditure is double counted in total food expenditure and in total expenditure. About 25 per cent of records are useless for many purposes, for instance because recorded food expenditure is zero, or because total expenditure and total income differ (after allowing for savings and dissaving) by more than 30 per cent."

5. For the 1990 IES a different process had to be followed, because the coverage of the survey was limited to twelve metropolitan areas. Towns and rural areas were excluded from the survey. Between 1990 and 1995 the number of metropolitan households increased dramatically, mainly as a result of rapid urbanisation. During this period the demographic and socio-economic structure of these metropolitan areas underwent major changes. Determining an appropriate scaling factor for these households' income proved very problematic, and it was decided to keep the 1990 IES income data unchanged. The assumption is that the published data most accurately reflects the true situation in 1990; it is believed that no transformation of the data will result in "better" or more comparable data.[11]

6. Cigarette expenditure in the 1990 IES is clearly underreported. According to the SARB's estimate of current income and the Treasury's estimate of cigarette expenditure, cigarettes comprised 1.477 per cent of aggregate household current income in 1990. If one applies this percentage to the 1990 IES's aggregate household income, total expenditure on cigarettes in the chosen sample of households should be equal to R1 263 million (= R85 500 x 0.01477), which is much higher than the published total of R679.3 million. Thus the scaling factor for cigarette expenditure is calculated as 1.8590 (= 1 263/679.3).

For the 1995 and 2000 IES it is assumed that the income and cigarette expenditure of each household is underreported equally (i.e. that there is no systematic income bias in under-reporting), and that a blanket transformation, as applied, would solve the problem. This is a strong assumption, but not materially different from the (incorrect) assumption that income and cigarette consumption are correctly measured in the first place. The transformation does not and cannot correct measurement errors for individual households, but it does ensure that the aggregate of the IES's income and cigarette expenditure data balances with data from reputable sources. As a result of this transformation the absolute differences in income (and cigarette expenditure) between households are increased, but the relative differences remain unaffected. The transformation impacts quite significantly on some results, while others remain unaffected. Where appropriate, the impact of the transformation on the results is indicated in a footnote. Importantly, the transformation has made the three surveys comparable, something that was not possible before.

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11. Using the 1990 income data in unadjusted form, and applying a scaling factor to the 1995 income data implies that average household income in constant prices in urban areas has decreased by 17 per cent between 1990 and 1995. According to the national accounts, real per capita household income increased by 5 per cent in the same period. This sounds like a contradiction. The explanation lies in the rapid urbanisation of this period, with large numbers of poor people migrating to the cities, thus reducing the average household income in metropolitan areas. It is quite possible that, as a result of this migration, the average income of urban households would have been reduced by *more* than 17 per cent. However, on the assumption that people generally do not overstate their income (Deaton and Grosh, 2000), and also because no other estimate of household income was available, it was decided not to downscale the 1990 figures. Nevertheless, given the dramatic socio-economic impact of the rapid urbanisation of that period, it must be pointed out that the 1990 income figures might be biased upwards.

Unless explicitly stated otherwise, the analysis is based on the transformed data. Also, all the data are weighted by the weights determined by the statistical authorities, as discussed earlier in this section.

6.2.3   *Defining appropriate income quartiles*

After the income adjustments were made, the data were divided into four income quartiles, for each year under consideration. Each income quartile includes 25 per cent of households.[12] The quartiles were defined in terms of *per capita* income. In a previous study (Van Walbeek, 2002b) the quartiles were defined in terms of overall household income, but, in retrospect, this was incorrect because it does not take the size of the household into account.[13]

The results for urban households, the subject of this study, are shown in Table 6.2.[14] The table highlights well-known facts about income distribution in South Africa, i.e., that it is highly unequal and largely split along racial lines. The poorest two income quartiles (Q1 and Q2) are comprised primarily of Africans. On the other hand, whites are more than proportionally represented in the highest income quartile (Q4), but other population groups have been rapidly increasing their presence in this income quartile in recent years. In all years, for urban areas and for the country as a whole, the median income of the highest income quartile is more than eight times larger than the median income of the lowest income quartile. The widespread poverty and large income inequalities are (and should be) a source of concern. However, while poverty and inequality issues are important, this chapter will not focus on income differences among the different races *per se*, but rather on the tobacco consumption patterns of households in the various racial and income groups.

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12.   In practice small deviations can occur, because households with the same reported income are categorised into one income quartile. It does not make sense to randomly allocate households with the same income into two income quartiles, simply because the twenty-fifth, fiftieth or seventy-fifth percentile goes through that income level. However, as is clear from Table 2, the differences in the number of households included in the four income quartiles are negligible.

13.   As an example, a household earning R90 000 in 2000 would be classified in the richest quartile (Q4) if it consisted of one or two people, in quartile Q3 if it consisted of between three and six people, in quartile Q2 if it consisted of between seven and fifteen people, and in the poorest quartile (Q1) if it consisted of sixteen or more people. Per capita income, rather than household income, is a better indicator of the standard of living in a heterogeneous mix of households that display large variations in the number of household members

14.   The quartile splits were done on the per capita income of *weighted* households, not on the number of observations in the sample. It is clear that in all three years poorer households (quartiles Q1 and Q2) are more than proportionally represented in the sample. This implies that the weights for poorer households are relatively lower than those of the richer households. Also note that the data transformation, discussed in section 6.2.2, does not affect the compilation of the income quartiles in any way.

Table 6.2: Number of weighted households (in thousands) and observations (in parentheses), by income quartile, urban households only

	Q1	Q2	Q3	Q4	Total
1990					
Africans	399.5	272.5	136.8	15.7	824.5
	(4568)	(2145)	(547)	(70)	(7330)
Coloureds	77.4	88.3	27.2	6.4	199.3
	(442)	(495)	(157)	(31)	(1125)
Indians	33.2	52.9	16.9	2.1	105.1
	(244)	(511)	(243)	(31)	(1029)
Whites	6.5	101.8	334.6	491.6	934.5
	(49)	(743)	(1975)	(2081)	(4848)
Total	516.5	515.5	515.6	515.8	2063.4
	(5303)	(3894)	(2922)	(2213)	(14332)
Percentage of total households (observations)	25.03	24.98	24.99	25.00	100.0
	(37.00)	(27.17)	(20.39)	(15.44)	(100.0)
Median annual household income*	8400	16032	36000	81612	21816
Mean annual household income*	9411	18558	38341	99374	41414
Median household size	5	3	3	2	3
Mean household size	5.75	3.52	2.89	2.58	3.69
1995					
Africans	1068.8	860.1	579.3	241.5	2749.6
	(3657)	(2496)	(1541)	(639)	(8333)
Coloureds	218.4	236.2	128.7	48.1	631.5
	(1119)	(1022)	(575)	(212)	(2928)
Indians	19.8	74.8	91.7	53.1	239.4
	(74)	(280)	(368)	(243)	(965)
Whites	17.4	156.9	521.3	980.5	1676.1
	(54)	(521)	(1608)	(2494)	(4677)
Total	1324.4	1328.0	1321.0	1323.2	5296.5
	(4904)	(4319)	(4092)	(3588)	(16903)
Percentage of total households (observations)	25.01	25.07	24.94	24.98	100.0
	(29.01)	(25.55)	(24.21)	(21.23)	(100.0)
Median annual household income**	11363	26062	49948	108013	33190
Mean annual household income**	12893	28450	53206	134783	57298
Median household size	5	4	3	2	4
Mean household size	5.49	4.17	3.32	2.71	3.92
2000					
Africans	1618.8	1482.8	1256.2	716.2	5074.0
	(4000)	(3266)	(2571)	(1625)	(11462)
Coloureds	163.7	235.5	228.7	138.8	766.8
	(558)	(662)	(572)	(318)	(2110)
Indians	15.8	61.3	108.4	74.0	259.5
	(28)	(112)	(210)	(157)	(507)
Whites	25.1	45.0	225.8	883.7	1179.6
	(33)	(78)	(400)	(1342)	(1853)
Total	1826.4	1827.6	1825.4	1826.1	7305.5
	(4625)	(4122)	(3765)	(3460)	(15972)
Percentage of total households (observations)	25.00	25.02	24.99	24.99	100.0
	(28.96)	(25.81)	(23.57)	(21.66)	(100.0)
Median annual household income***	12289	27108	50843	151807	36145
Mean annual household income***	15084	31299	61953	197833	76533
Median household size	5	3	2	2	3
Mean household size	5.02	3.64	2.87	2.41	3.48

Sources: IES (1990, 1995 and 2000)

Note: The following transformations were applied to balance aggregate weighted income in the survey with SARB's estimate of current income in the relevant year.

*   1990 income data: Original data was left unchanged.
**   1995 income data: Original data was upscaled by 1.0406
***   2000 income data: Original data was upscaled by 1.5060

6.3   Investigating possible product substitution

In the Income and Expenditure surveys four tobacco products are identified: (1) cigarettes; (2) cigars and cigarillos; (3) pipe and other tobacco (used for roll-your-own cigarettes)[15]; and (4) smoking requisites. Cigarettes are by far the most important category. Of the other three categories, only roll-your-own (RYO) tobacco is a realistic substitute to cigarettes. Smoking requisites (e.g. lighters and ashtrays) are complements to cigarettes. Cigars may be a substitute to cigarettes in a biochemical sense, but not in an economic sense. Thus, if people find that cigarettes become too expensive, they generally would not switch to even more expensive cigars.

As was highlighted in chapters 3 and 4, the empirical literature clearly indicates that an increase in the price of cigarettes decreases the quantity demanded. However, a predictable consequence of cigarette price increases is that some people will switch to cheaper substitutes, like RYO tobacco. From a public health perspective, this substitution effect is problematic. While a reduction in cigarette smoking has positive health benefits, the benefit would be partially eroded by the large increase in the consumption of hand-rolled cigarettes.

According to a representative of the tobacco industry (Andre van Pletzen, Manager: Corporate and Regulatory Affairs, BAT South Africa, personal communication, 2003), the market for RYO tobacco has been growing rapidly in South Africa in recent years. Even though the focus of this chapter is primarily on the regressivity of *cigarette* excise taxation, one cannot ignore the potential substitution effect, since this could bias the conclusions quite significantly. This is particularly true if the substitution effect is not the same for all income quartiles. Households that have switched from cigarettes to RYO tobacco would thus pay less *cigarette* excise tax, but more tax on RYO tobacco than households that did not switch. If a significant substitution effect were found, one would have to account for this in the analysis.

In Table 6.3 the total expenditure on tobacco products is divided into three categories for the various income quartiles: (1) cigarettes, (2) RYO tobacco, and (3) other tobacco products (consisting of cigars, cigarillos, smoking requisites and unspecified smoked products). To prevent any systematic bias in the relative shares of these categories, the same scaling factors that were applied to cigarettes were applied to the two non-cigarette tobacco categories. As is to be expected, cigarettes are by far the most important tobacco category, comprising more than 90 per cent of all tobacco expenditure for most income groups. However, between 1990 and 2000 the share of RYO tobacco in total tobacco consumption increased from 2.5 per cent to 4.1 per cent. The increase among the poorest income quartile is pronounced, increasing from 5.1 per cent of total tobacco expenditure in 1990 to 18.7 per cent in 2000. This clearly indicates that a sizeable proportion of poor people have substituted relatively cheaper RYO tobacco for more expensive cigarettes. Even among the second poorest income quartile (Q2)

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15.   In this section "roll-your-own tobacco", "pipe and other tobacco" and "hand-rolled cigarettes" are used as synonyms.

there is evidence that some substitution has taken place, albeit at a more modest scale.[16] For richer households (Q3 and Q4) the share of RYO tobacco has not changed significantly in the past decade, suggesting no major substitution effect between cigarettes and RYO tobacco.

In order to calculate the relative regressivity of the tobacco tax, the results of Table 6.3 clearly indicate that one cannot focus only on cigarettes, because this will understate the tax burden of the poor vis-à-vis the rich, especially in 2000. Thus, in the following analysis the results are generally shown for two tobacco categories: firstly, for cigarettes separately and, secondly, for all tobacco products combined (including cigars and smoking requisites).

Table 6.3: Decomposition of tobacco expenditure, by income quartile

	Cigarettes	Pipe and other tobacco	Other tobacco products
Income quartile Q1			
1990	92.5	5.1	2.4
1995	88.4	9.3	2.3
2000	77.9	18.7	3.4
Income quartile Q2			
1990	94.5	2.4	3.1
1995	95.0	3.4	1.6
2000	91.1	7.1	1.8
Income quartile Q3			
1990	95.5	1.6	2.9
1995	96.4	1.1	2.5
2000	96.4	2.1	1.5
Income quartile Q4			
1990	94.8	1.9	3.3
1995	95.8	1.1	3.1
2000	95.0	0.9	4.1
Total			
1990	94.5	2.5	3.0
1995	94.8	2.7	2.5
2000	93.0	4.1	2.9

Sources: IES (1990, 1995 and 2000)

6.4 Smoking households and tobacco expenditure patterns

The data in the Income and Expenditure surveys refer to household expenditure, rather than individual expenditure. A smoking household is defined as a household that buys tobacco products. Since it would not usually be the case that all household members smoke, the percentage of smoking households should not be equated to the smoking prevalence percentage. Smoking prevalence is defined in terms of individuals, while smoking households

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16.   Can the substitution effect be effectively countered? Between 1994 and 2002 the nominal excise tax on RYO cigarette tobacco increased by a compounded rate of 38 per cent per year, compared to a compounded annual rate for cigarettes of 25 per cent (Van Walbeek, 2003). Unfortunately data on the retail price of RYO tobacco are not available, but the tax data suggests that the retail price of RYO tobacco is probably increasing more rapidly than the retail price of cigarettes. However, despite this gradual convergence in prices (in relative, but not necessarily in absolute terms), hand-rolled cigarettes are still much cheaper than manufactured cigarettes. As the price of manufactured cigarettes increase, people (and especially poor people) will have an incentive to switch to cheaper alternatives. If the government wishes to discourage this switching behaviour it should continue with its policy of increasing the tax on RYO tobacco by a greater percentage than that of manufactured cigarettes, since this would cause further convergence in the prices of these two products.

are defined in terms of households. Nevertheless, one would expect a fairly close correlation between the percentage of smoking households and the smoking prevalence percentage over time.

While cigarette smoking may be more prevalent among lower socio-economic groups in many countries (Bobak et al., 2000), this does not appear to be the case in South Africa. It is evident from Table 6.4 that the poorest urban households (quartile Q1) have the lowest percentage of *cigarette* smoking households and, together with quartile Q2, have also experienced the largest decreases in the percentage of smoking households in the past decade. Cigarette smoking among the poorest urban households (income quartile Q1) has decreased from 46 per cent to 22 per cent of households. Cigarette smoking in the second poorest income quartile (Q2) has decreased by 23 percentage points (from 54 to 31 per cent), and in the third quartile by 17 percentage points (from 51 to 34 per cent). The percentage of urban cigarette smoking households among the richest income quartile (Q4) decreased by only 9 percentage points (from 43 to 34 per cent) in the same period. As was shown in chapter 4, the decrease in aggregate cigarette consumption in South Africa during the 1990s was driven primarily by an increase in the real price of cigarettes. Table 6.4 suggests that poorer households are more likely to give up cigarette smoking than richer households when faced with higher cigarette prices. Qualitatively, the results of Table 6.4 are consistent with the conclusions of chapter 2, i.e. (1) that overall smoking prevalence has decreased rapidly during the 1990s, (2) that smoking prevalence among the poor has decreased more sharply than among the rich and (3) that, between 1995 and 2000, smoking prevalence has decreased most sharply among Africans, followed by coloureds, Indians and whites, in that order.[17]

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17. While smoking household and smoking prevalence percentages are not directly comparable, there does appear to be a *quantitative* discrepancy between the results presented here and those of chapter 2. Even if one accounts for the fact that the time periods do not overlap completely, the decrease in the percentage of smoking households in the 1995-2000 period seems too pronounced, compared to the more modest decreases in smoking prevalence indicated in chapter 2. The implication is that the absolute value of the decreases in the percentage of smoking households should thus be seen as upper limits.

Table 6.4: *Percentage of urban households spending money on tobacco products, 1990, 1995 and 2000*[18]

	Percentage of households			Change in percentage	
	1990	1995	2000	1990-1995	1995-2000
Cigarettes					
Q1	46	42	22	-4	-20
Q2	54	46	31	-8	-15
Q3	51	45	34	-6	-11
Q4	43	44	34	+1	-10
African	48	41	25	-7	-16
Coloured	66	58	47	-8	-11
Indian	61	50	40	-11	-10
White	44	44	38	0	-6
Total	49	44	30	-5	-14
All tobacco					
Q1	48	52	34	+4	-18
Q2	56	49	37	-7	-12
Q3	52	47	36	-5	-11
Q4	44	45	36	+1	-9
African	50	46	32	-4	-14
Coloured	67	67	56	0	-11
Indian	62	50	40	-12	-10
White	45	46	39	+1	-7
Total	50	48	36	-2	-12

Sources: IES (1990, 1995 and 2000)

However, if one considers *all tobacco* (i.e. not only cigarettes), the decrease in the percentage of smoking households is less pronounced. Nevertheless, between 1990 and 2000 the percentage of households that consume tobacco has decreased significantly, by 14, 19, 16 and 8 percentage points for income quartiles Q1 to Q4, respectively.

Among Africans (with 18 percentage points) and Indians (with 22 percentage points) the decrease in the percentage of tobacco-consuming households was much greater than among coloureds (11 percentage points) and whites (6 percentage points). Among coloureds, more than any other population group, hand rolling is far more prevalent, and Table 6.4 indicates that many coloureds switched from cigarettes to RYO tobacco during the 1990s. Among whites the decrease in the proportion of tobacco consuming households has been modest, primarily because the average income level of this group is so much higher than other groups, and the tobacco tax and price increases have not affected them as strongly.

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18.   This table is *not* affected by the upscaling of the data. Of course, should a significant proportion of households falsely declare that they do not buy tobacco, while in fact they do, then these percentages would be too low. However, this cannot be resolved by applying a blanket transformation to the data.

The results from Table 6.4 support the hypothesis that the demand for cigarettes is generally more price elastic for poor households and less price elastic for richer households. As indicated in chapter 4, between 1990 and 2000 the real retail price of cigarettes increased by more than 100 per cent, and at the same time total consumption of cigarettes decreased by nearly 30 per cent. The analysis presented here clearly suggests that the decrease in aggregate cigarette consumption was driven largely by poorer households quitting (or not starting) cigarette smoking. While some households' switch from cigarettes to RYO tobacco has diminished this effect to some degree, the net effect is that, in the period 1990 to 2000, there has been a pronounced decrease in smoking among the poor.

Even though the percentage of cigarette smoking households is lowest in the poorest income quartile, it is frequently argued that the poor generally spend a greater proportion of their income on cigarettes than the rich. In the top half of Table 6.5 the percentage of households that spend more than a certain (arbitrarily chosen) threshold percentage of their total income on cigarettes is shown.[19] Thus, in 1990, 29 per cent of urban households in the poorest income quartile spent more than 5 per cent of their total income on cigarettes, and 14 per cent spent more than 10 per cent of their income on cigarettes. At the other extreme, only 5 per cent of the richest households (quartile Q4) spent more than 5 per cent of their income on cigarettes in 1990, and only 1 per cent spent more than 10 per cent of their income on cigarettes. For 1990 and 1995 there is clear evidence that as income levels increase, the proportion of households spending above the threshold percentage decreases quite significantly. Between 1990 and 1995 the proportion of households spending more than the threshold percentage on cigarettes decreased slightly for all income quartiles, other than Q4.

Between 1995 and 2000 the overall picture, and especially the relative position of the rich versus the poor, changed dramatically. The proportion of very poor urban households (quartile Q1) spending more than 5 per cent of their income on cigarettes decreased from 26 per cent in 1995 to 15 per cent in 2000. Similarly, the proportion of very poor urban households (quartile Q1) spending more than 10 per cent of their income on cigarettes decreased from 12 to 9 per cent. On the other hand, the proportion of more affluent households (quartiles 3 and 4) spending more than 5 per cent of their income on cigarettes increased substantially, from 16 per cent to 19 per cent for quartile Q3 and from 7 per cent to 12 per cent for quartile Q4. The evidence suggests a major structural shift in the cigarette market in the 1995-2000 period. Household expenditure on cigarettes has decreased sharply among the poor, while it has increased among the rich.

The fact that the proportion of households spending in excess of some threshold percentage has decreased is consistent with the fact that poor people have a relatively high price elasticity

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19.   These percentages are much higher than those published in Van Walbeek (2002b). The reason is that the data in the present analysis has been weighted and upscaled to balance with aggregate income and cigarette expenditure figures, whereas the data used in the 2002 study were not upscaled, nor weighted. A change in the scaling parameters has a pronounced effect on the results presented in Table 6.5.

of demand, and, given their limited income, a stronger incentive to quit smoking cigarettes in the face of cigarette price increases. At the same time, the evidence in Table 6.5 is consistent with the hypothesis that rich people are less likely to change their consumption volumes and are less inclined to quit smoking in reaction to price changes. Thus, an increase in the real price of cigarettes will increase their real expenditure on cigarettes, and will thus cause their cigarette expenditure, as a proportion of income, to increase.

If one considers all tobacco – not only cigarettes – the conclusions are qualitatively similar, but not quite as pronounced as for cigarettes separately. The proportion of poorer households (quartiles Q1 and Q2) that spend more than the threshold percentage on tobacco products has remained more or less constant between 1995 and 2000.[20] For richer households (quartiles Q3 and Q4) the proportion has increased quite sharply between 1995 and 2000. Thus, even though the position of the poor has not changed significantly in absolute terms, the proportion of poorer households spending more than the threshold percentages on tobacco products, *relative to more affluent households*, has decreased.

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20.   While a sizeable percentage of poorer households have quitted tobacco altogether (see Table 6.4), many poor households have switched to RYO tobacco. This substitution effect explains why the percentage of poor households that spend more than the threshold percentage on cigarettes has decreased, while the equivalent percentage for all tobacco products has remained approximately constant between 1995 and 2000.

Table 6.5: *Percentage of moderate and heavy smoking households, by income quartile*[21]

	Percentage of households spending more than X per cent of total household income on cigarettes						Absolute change in the percentage			
	5 %	10 %	5 %	10 %	5 %	10 %	5 %	10 %	5 %	10 %
	1990		1995		2000		1990-1995		1995-2000	
Cigarettes										
Q1	29	14	26	12	15	9	-3	-2	-11	-3
Q2	28	14	20	7	20	10	-8	-7	0	+3
Q3	17	5	16	5	19	10	-1	0	+3	+5
Q4	5	1	7	2	12	4	+2	+1	+5	+2
African	27	13	17	7	15	8	-10	-6	-2	+1
Coloured	32	13	26	11	27	15	-6	-2	+1	+4
Indian	24	8	14	4	19	7	-10	-4	+5	+3
White	10	3	14	5	14	6	+4	+2	0	+1
Total	20	8	17	6	16	8	-3	-2	-1	+2
All tobacco										
Q1	31	15	30	13	22	13	-1	-2	-8	0
Q2	30	15	21	8	23	12	-9	-7	+2	+4
Q3	18	5	17	5	21	11	-1	0	+4	+6
Q4	6	1	8	2	12	4	+2	+1	+4	+2
African	29	15	19	8	18	10	-10	-7	-1	+2
Coloured	33	14	29	12	34	18	-4	-2	+5	+6
Indian	25	9	15	4	19	7	-10	-5	+4	+3
White	11	3	15	5	15	6	+4	+2	0	+1
Total	21	9	19	7	19	10	-2	-2	0	+3

Sources: IES (1990, 1995 and 2000)

6.5　　The regressivity of the cigarette excise tax

It is generally accepted that an equitable tax (or set of taxes) must be progressive, i.e. that the tax, as a percentage of income, increases as people's level of income increases. A regressive tax, on the other hand, is one that falls disproportionately heavily on the poor. The tobacco industry has argued that cigarette excise tax increases are misdirected as a tool for reducing cigarette consumption, because, amongst other things, they are regressive (Viscusi, 2003).[22] As pointed out in section 6.1, tobacco control economists accept that cigarette excise taxes are often regressive but that increases in the excise tax are likely to reduce the regressivity of the tax, because the poor's demand for cigarettes is generally more price sensitive than that of the rich.

21.　The numbers in this table are influenced to a large extent by the data transformation discussed in section 6.2.2. Should it be found that the upscaling of the data was excessive, these figures would be too high. However, even if that were the case, it would not change the basic message that, in any year, as household income increases, the proportion of households spending more than a threshold percentage on tobacco would decrease.

22.　Viscusi (2003: 22) claims that in the US people earning $50 000 or more per year pay 0.08 per cent of their income in cigarette taxes, while people earning less than $10 000 pay 1.62 per cent of their income in cigarette taxes.

The aim of this section is to investigate empirically these competing claims, based on South Africa's experience during the 1990s. Given that (1) cigarette prices in South Africa do not vary greatly for different brands, and (2) the quantity of cigarettes consumed by any household is not known, but total expenditure is known, we assumed that the excise tax amount paid by a smoking household is proportional to the cigarette expenditure of that household.[23,24] Also, it is explicitly assumed that consumers pay the full burden of the excise tax. It was shown in chapter 5 that, given the high degree of concentration in South Africa's cigarette manufacturing industry, this is a realistic assumption to make. Following the methodology of Pechman (1985), the total excise tax amount is then expressed as a percentage of total household income. Averages of the relative excise tax burden were calculated (1) for urban smoking households in the respective years and (2) for all urban households that bought tobacco in 1990, but that subsequently quit smoking. The results of this analysis are presented in Tables 6.6 through 6.9.[25]

Table 6.6: Average percentage of household income spent on cigarette excise taxes, for urban smoking households only[26]

	Cigarettes			All tobacco products		
	1990	1995	2000	1990	1995	2000
Q1	1.71	1.79	3.17	1.74	1.68	2.87
Q2	1.54	1.29	2.84	1.57	1.29	2.71
Q3	0.96	1.06	2.61	0.99	1.06	2.57
Q4	0.49	0.66	1.53	0.51	0.66	1.55
African	1.62	1.28	2.77	1.65	1.27	2.57
Coloured	1.33	1.36	2.56	1.37	1.36	2.57
Indian	1.10	0.91	2.03	1.11	0.93	2.03
White	0.76	1.02	1.67	0.79	1.02	1.70
Total	1.19	1.19	2.52	1.22	1.19	2.44

Sources: IES (1990, 1995 and 2000)

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23.   As indicated in chapter 4, the excise tax component of total cigarette expenditure was 20.1 per cent in 1990, 21.6 per cent in 1995 and 31.7 per cent in 2000. These percentages were obtained by dividing the excise tax by the average retail price of cigarettes in the appropriate month. The impact of sales tax is excluded, since this indirect tax is applied equally on most non-essential products and services. For other tobacco products the same percentages were applied as those applied to cigarettes.

24.   Given that the excise tax is levied as a specific tax, rather than as a percentage of value, the tax burden on cheaper cigarettes is higher than more expensive cigarettes. Also, given that the poor are more likely to buy cheaper cigarettes, it is possible that the tax burden could be slightly higher than the figures shown below. However, without more precise data on the prices of cigarettes bought by the various income groups, one cannot investigate this effect further.

25.   In order not to distort the results by obvious outliers and data capturing errors, households that indicated that they spend 40 per cent or more of their income on cigarettes were excluded from the analysis. The number of observations excluded from the 1990, 1995 and 2000 data sets were 70, 3 and 27 respectively. In the rest of the chapter all these outliers are excluded from the analysis.

26.   Even though the *relative* tax burdens for the various income and population groups within any particular year are unaffected by the upscaling procedure that was described in section 6.2.2, the comparability of the results between the various years is crucially affected by the upscaling procedure. The same comment applies to Table 6.8.

From Table 6.6 it is evident that, during the 1990s, the burden of excise tax has increased significantly for smoking households. For those households average cigarette excise tax, as a percentage of average household income, increased from 1.2 per cent in 1990 and 1995 to 2.5 per cent in 2000. This rapid increase in the burden of the tax on smoking households is unsurprising, given the very sharp increases in the excise tax in the latter half of the 1990s. As the industry points out, the poor (quartile Q1) carry a disproportionately heavy burden of excise tax, and for those households that have been unable to quit smoking cigarettes, the burden has increased from 1.7 per cent of household income in 1990 to 3.2 per cent of household income in 2000. For households that consume any form of tobacco – not only cigarettes – the average tax burden among the poorest smoking households has increased from 1.7 per cent to 2.9 per cent of household income. For each of the three survey years, the burden of the tax (on cigarettes and all tobacco) decreases as the households' income level increases.

Regressivity can be measured as follows: for any specific year, the average cigarette excise tax burden for the average smoking household is set at 100, and the tax burden of any income and/or racial group is expressed as a percentage of the "average smoking household". The higher the "regressivity index", the greater the relative burden of the tax and vice versa. In Table 6.7 the *relative* regressivity of the cigarette excise tax is shown for all smoking households. For example, in 1990 the regressivity index of cigarette smoking households in the poorest income quartile was 144, implying that the tax burden was 44 per cent higher than that of the "average smoking household". In the same year, the regressivity index of the richest income quartile was only 41, implying a much lower than average excise tax burden.

What this table shows is that the excise tax on cigarettes, and tobacco products in general, is regressive, but has become less regressive over time. As noted before, the fact that cigarette excise taxes are regressive is frequently pointed out by the tobacco industry as a reason for the government not to increase the excise tax. Tobacco control economists acknowledge this, but they focus much more on the impact of tax and price *changes* on the regressivity of the excise tax (see Jha and Chaloupka, 2000). In Table 6.7 there is clear evidence that the relative burden of excise taxes on the poorest smoking households (quartile Q1) has decreased, while the burden has increased significantly for more affluent smoking households.

In 1990 the cigarette excise tax burden was 3.5 (= 144/41) times heavier on smoking households in the poorest income quartile, compared to the richest income quartile. By 2000 this ratio had decreased to 2.1. For tobacco as a whole the excise tax burden of the poorest smoking households compared to the richest smoking households had decreased from a ratio of 3.4 in 1990 to 1.9 in 2000. What this means is that the tobacco excise tax is still regressive, but the degree of regressivity has been substantially reduced.

Table 6.7: Relative burden of the excise tax, for urban smoking households only[27]

	Cigarettes			All tobacco products		
	1990	1995	2000	1990	1995	2000
Q1	144	150	126	142	141	118
Q2	129	108	113	128	108	111
Q3	80	89	104	81	89	106
Q4	41	55	61	42	55	63
African	136	108	110	135	106	105
Coloured	112	114	102	112	114	105
Indian	93	77	81	91	78	83
White	64	85	66	64	86	70
Total	100	100	100	100	100	100

Sources: IES (1990, 1995 and 2000)

The conclusion from Tables 6.6 and 6.7 is that although the *absolute* burden of excise tax on smoking households has increased for all income quartiles, the regressivity of the tax has been reduced. However, Tables 6.6 and 6.7 do not present the full picture, since they focus only on smoking households. As was pointed out in Table 6.4 and also in chapter 2, there is ample evidence that between 1990 and 2000 many people have quit smoking. A major contributing factor to people's decision to quit smoking is the increasing price of tobacco. In order to determine the relative regressivity of the excise tax, one should not only focus on smoking households, but also take cognisance of those households that have quit smoking tobacco over the relevant period.

The proportion of households that smoked in 1990 (see Table 6.4) was taken as the benchmark, and it was assumed that this benchmark proportion would have remained constant had it not been for the price increases of the 1990s.[28] Thus, to account for the changes in the proportion of smoking households, the tax burdens presented in Table 6.6 were adjusted by incorporating the effect of the change in the percentage of smoking households after 1990. In Table 6.8 the average excise tax burden on cigarettes and all tobacco (expressed as a percentage of household income) is calculated for the proportion of households that were consuming tobacco in 1990. In Table 6.9 the results are presented in index form.

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27. Because of the "normalisation" of the tax burdens, the results of this table are not affected at all by the upscaling procedure derived in section 6.2.2. The same comment applies to Table 6.9.
28. As was explained in chapter 1, South Africa has imposed strong legislative restrictions against cigarette advertising and indoor smoking. However, this legislation only became effective in 2001 and would not have had a material impact on people's smoking patterns before then.

Table 6.8: *Average percentage of household income spent on cigarette excise taxes, for the proportion of urban households that smoked in 1990*

	Cigarettes			All tobacco products		
	1990	1995	2000	1990	1995	2000
Q1	1.71	1.63	1.52	1.74	1.82	2.03
Q2	1.54	1.10	1.63	1.57	1.13	1.79
Q3	0.96	0.94	1.74	0.99	0.96	1.78
Q4	0.49	0.68	1.21	0.51	0.68	1.27
African	1.62	1.09	1.44	1.65	1.17	1.64
Coloured	1.33	1.20	1.82	1.37	1.36	2.15
Indian	1.10	0.75	1.33	1.11	0.75	1.31
White	0.76	1.02	1.44	0.79	1.04	1.47
Total	1.19	1.07	1.54	1.22	1.14	1.76

Sources: IES (1990, 1995 and 2000)

Table 6.8 indicates that the average burden of the cigarette excise tax on the proportion of households that smoked cigarettes in 1990 increased from 1.19 per cent of aggregate household income in 1990 to 1.54 per cent in 2000. For all tobacco the average excise tax burden increased from 1.22 per cent to 1.76 per cent of household income. What this means is that, although the tax burden has increased substantially for *smoking* households (as indicated in Table 6.6), the increase in the overall tax burden has been tempered by the fact that the proportion of smoking households has decreased sharply.

Interestingly, there has been a decrease in the *absolute* burden of the cigarette excise tax on the lowest income quartile (Q1). This is the result of a decrease in the average number of cigarettes smoked by smoking households and a sharp reduction in the percentage of very poor households that smoke. However, the absolute burden of *all tobacco* tax on the lowest income quartile has increased slightly, because a large proportion of poor households have switched to cigarette substitutes. The decrease in the cigarette excise tax burden of the poorest households (Q1) has been so sharp that their excise tax burden (1.52 per cent of household income) in 2000 was somewhat smaller than the "average household" (1.54 per cent of household income). For all tobacco, the tax burden on the poorest households (2.03 per cent of household income) was, however, slightly higher than the tobacco tax burden on the "average household" (1.76 per cent) in 2000.

The absolute cigarette tax burden has increased sharply for the other three income quartiles, especially between 1995 and 2000. The implication, also borne out in Table 6.9, is that the cigarette excise tax has changed from being obviously regressive in 1990 and 1995, to something closer to a proportional tax in 2000. The middle two income quartiles carry a heavier than average cigarette tax burden, while the poorest and richest income quartiles carry a below average cigarette tax burden. For all tobacco, the tax is still regressive, but much less than used to be the case in 1990 or 1995. Between 1990 and 2000 the relative tax tobacco burden of the richest income quartile (Q4) has increased by more than 70 per cent, primarily

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because the sharp increases in the excise tax did not result in a significant reduction in tobacco consumption, nor in a significant increase in quitting rates. Among households in income quartile Q3, the relative tobacco excise tax burden has increased by 25 per cent, while for income quartiles Q2 and Q1 it has decreased by approximately 20 per cent between 1990 and 2000.[29]

Table 6.9: Relative burden of the excise tax, for the proportion of urban households that were smoking in 1990

	Cigarettes			All tobacco products		
	1990	1995	2000	1990	1995	2000
Q1	144	153	98	143	159	116
Q2	129	103	106	129	99	102
Q3	81	88	113	81	84	101
Q4	41	63	78	42	59	72
African	136	102	94	135	102	94
Coloured	112	112	118	112	119	122
Indian	92	70	86	91	66	75
White	64	95	93	65	91	84
Total	100	100	100	100	100	100

Sources: IES (1990, 1995 and 2000)

6.6   Conclusion

The aim of this chapter was to investigate how changes in the excise tax on, and price of, cigarettes affect South African households' expenditure on tobacco products. The results are based on three household surveys, performed over a period in which there were large changes in the real price of cigarettes.

Analyses of household survey data are fraught with potential biases, errors, omissions and trade-offs in the data collection process, as is pointed out in detail by Deaton (1997) and Grosh and Glewwe (2000). Unfortunately the household survey data, on which this analysis is based, was also subject to errors that limited the comparability of the various surveys. In order to make the data more comparable, some transformations were applied across all households. These transformations have, in some instances, had a significant quantitative impact, but have not substantially changed the basic findings.[30]

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29.   Other than reducing their expenditures on tobacco and reducing their effective tax burden, there are clear health benefits from not smoking. Households that stop smoking (or do not start) reduce their risk of contracting potentially debilitating and fatal diseases, which carry a large, albeit difficult to quantify, cost.

30.   For example, because of the transformation the average tax burden has increased numerically for all households, i.e. the tax burden is higher for all households as a result of the data transformation. However, the transformation has not affected the central conclusion that the regressivity of the tax has decreased over time.

Despite these caveats, a number of conclusions can be drawn from this study. There is strong evidence that the proportion of cigarette smoking households has decreased sharply between 1990 and 2000. This is especially true for poorer households. This conclusion is qualitatively similar to those of chapter 2, where it was found that cigarette smoking prevalence has decreased sharply since 1993. However, there has been a significant increase in the use of RYO tobacco among poor households. The decrease in the proportion of poor households that smoke cigarettes has thus been tempered by the substitution effect. Overall, despite this substitution towards RYO tobacco, there has been a significant decrease in tobacco use among poor households.

The proportion of rich households that smoke has also decreased, but at a less pronounced rate than among poorer households.

Econometric evidence, presented in chapter 4, clearly indicates that the decrease in cigarette consumption in South Africa is primarily the result of the large increases in the real price of cigarettes, especially since 1994. Since poor and rich households react so differently to the tax-induced increases in the price of cigarettes, the excise tax has become less regressive. Relative to the rich, the cigarette excise tax burden on the poor has decreased. Even if one takes the cigarette/RYO substitution effect into account, the empirical evidence clearly indicates that the regressivity of the tobacco excise tax has decreased.

From a tobacco control perspective, this is a very positive finding. It confirms the view that although excise taxes on tobacco are regressive, increases in the excise tax reduce the regressivity of the tax (World Bank, 1999: 74). Despite the industry's rhetoric, this study shows that an increase in the tobacco excise tax does not place an unjustified economic burden on the poor.