RECENT TRENDS IN SMOKING PREVALENCE IN SOUTH AFRICA – SOME EVIDENCE FROM AMPS DATA

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Objective. To estimate trends in smoking prevalence among different demographic and income segments for the period 1993 - 2000.

Methodology. Annual data were obtained from a commercially generated database focusing on product usage. Using regression techniques, trends in smoking prevalence were estimated.

Results. Since 1993 aggregate cigarette consumption has decreased by 26%. Smoking prevalence has decreased from 32% to 27% of the adult population. This is ascribed mainly to the sharp increase in cigarette prices. Sixty per cent of the decrease in per capita cigarette consumption is explained by a reduction in average consumption of smokers. The other 40% is explained by a reduction in smoking prevalence.

Smoking prevalence has been decreasing for most demographic and socio-economic groups. The most significant decreases have been recorded for males, blacks, young adults, and low-income households. Groups that have not experienced significant decreases in smoking prevalence include coloureds, whites, females, and high-income households.

Conclusion. Rapidly increasing excise taxes are a powerful policy tool in reducing cigarette consumption. Because poor people spend a larger proportion of their income on cigarettes, their relative tax burden is higher than the more affluent sections of society. Cigarette excise taxes are therefore regressive. However, since the poor tend to reduce their consumption by a greater percentage than the rich in response to price increases, excise increases are likely to reduce the regressiveness of the tax. Nevertheless, in view of the low quitting rates, a strong case exists for the government to subsidise cessation and nicotine replacement therapies, especially among the poor.

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Between 1990 and 1999 per capita cigarette consumption in South Africa decreased by approximately 40%.[1,2] The decrease is ascribed mainly to large increases in the real (i.e. inflation-adjusted) retail price of cigarettes, the passing of antismoking legislation, and greater public awareness of the health impact of smoking.[3] Compared with the rapid increases in cigarette consumption during the 1970s and 1980s, it represents a significant trend change.

An issue of considerable importance is to determine which sections of the population have achieved reductions in smoking prevalence and which have not. To answer these questions, numerous studies aimed at measuring smoking prevalence have been conducted internationally and locally.[4,5] The aim of this study was to investigate trends in smoking prevalence based on a commercially generated database, the All Media and Products Survey (AMPS), compiled by the South African Advertising Research Foundation.[6]

METHODOLOGY

The AMPS database is based on 6-monthly surveys of between 14 000 and 30 000 respondents and covers the period 1993 - 2000. The data are weighted to represent the South African population, based on the 1991 census and Unisa's Bureau for Market Research 1996 population estimates. The data exclude people under the age of 16 years. All statistics refer to the weighted data.

An analysis of overall smoking prevalence and consumption patterns is presented below. In subsequent sections the focus is on smoking prevalence by demographic and income groups. For any demographic or income category, the smoking prevalence percentage is defined as the number of respondents who declare cigarette usage, expressed as a percentage of the population in that category.

Because of sampling and measurement error, the data are subject to random short-term variations. Given that this paper focuses primarily on trends in smoking prevalence, the variations were suppressed using regression techniques. Because the observed trend in the smoking prevalence percentage is linear for most socio-economic and demographic categories, the following model was employed: $Y_t = a + bt + e_t$, where Y_t = smoking prevalence percentage of the socio-economic indicator under surveillance; a = constant, equal to the regressed value of the smoking prevalence percentage for the relevant socio-economic indicator in the base year (1993, unless otherwise stated); b = trend coefficient, i.e. the average annual increase in the smoking prevalence percentage; t = trend variable, equal to 1 in the first year, 2 in the second, etc.; and e_t = error term.

In each case the statistical significance of the trend coefficient was calculated.

RESULTS

Overall smoking prevalence

Annual data for some of the most important aggregate measures of smoking prevalence are shown in Table I. Recorded aggregate cigarette consumption decreased by 26% between 1993 and 2000. In econometric analyses the sharp price increase was found to explain most of the decrease in aggregate cigarette consumption.[3,7] Since 1993 the nominal price of cigarettes has increased by 215%, while the real price has increased by 93%.

The relationship between smoking prevalence (the percentage of people who smoke) and smoking intensity (the average number of cigarettes smoked by smokers) has been the focus of a large number of international studies.[8] There seems to be consensus that, especially for youth smoking, price increases impact mainly on smoking prevalence, and to a lesser extent on smoking intensity.

To test the relative contributions of these two factors for South Africa, the following identity is considered: PCcons = SPP × Acons, where PCcons = per capita cigarette consumption of the population aged 15+ years; SPP= smoking prevalence percentage among people aged 15+ years; and Acons = average cigarette consumption of smokers.

By transforming this equation into natural logarithms and differentiating the resultant equation with regard to time, the relative contribution of each component to the change in per capita consumption (PCcons) can be estimated. Using this method, 60% of the decrease in per capita cigarette consumption is explained by a reduction in the average consumption of smokers, whereas a reduction in the smoking prevalence percentage accounts for the other 40%.*

Demographic characteristics

Gender

Internationally, smoking prevalence is much higher among males than females. Table II indicates that approximately 51.4% of South African males smoked in 1993, decreasing to 43.8% in 2000. Smoking prevalence among females was only 12.9% in 1993 but, unlike male smoking prevalence, did not experience a statistically significant downward trend. Between 1993 and 2000 the 'prevalence gap' between males and females decreased from about 38% to 32%. The narrowing of the 'gender prevalence gap' is consistent with international experience.

Ethnicity

Coloured people have the highest smoking prevalence percentage (at about 49%), followed by whites and Indians (37% and 28% in 2000, respectively). With the possible exception of Indians, smoking prevalence among these groups has not decreased significantly in recent years. Smoking prevalence among blacks is much lower, decreasing from 28.1% in 1993 to 22.7% in 2000. The relatively low level and sharp decrease in smoking prevalence suggests that the tobacco industry has been unable to expand the black market.

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*Using the logarithmic form of the equation, one calculates the differences between 1993 and 2000 as follows: $(\ln(PCcons_{00}) - \ln(PCcons_{93})) = (\ln(SPP_{00}) - \ln(SPP_{93})) + (\ln(Acons_{00}) - \ln(Acons_{93}))$. This equation provides an indication of the growth rates of each element. In order to estimate the relative contribution of the change in SPP and the change in Acons to the change in PCcons, the right-hand side elements in this equation are divided by $(\ln(PCcons_{00}) - \ln(PCcons_{93}))$. The sum of these two contributions will, by definition, equal 100%.

Table I. Trends in cigarette consumption, prevalence and prices

Year	Aggregate cigarette consumption (million packs)	Population aged 15+ years (millions)	Per capita consumption, population aged 15+ years (packs per annum)	Estimated smoking prevalence (%)	Estimated number of smokers (millions)	Average consumption of smokers (packs per annum)	Nominal retail price of cigarettes (Rand/packs)	Real retail price of cigarettes (Rand/pack in 1995 prices)
1993	1 802	24.83	72.6	32.6	8.09	223	2.55	3.02
1994	1 769	25.42	69.6	28.8	7.32	242	2.84	3.09
1995	1 708	26.03	65.6	30.2	7.86	217	3.48	3.48
1996	1 690	26.66	63.4	30.3	8.08	209	3.87	3.60
1997	1 577	27.30	57.8	28.4	7.75	203	4.97	4.26
1998	1 495	27.95	53.5	28.5	7.97	188	6.08	4.87
1999	1 422	28.63	49.7	27.9	7.99	178	7.30	5.58
2000	1 333	29.20*	45.7	27.1	7.91	169	8.03	5.82
Percentage change 1993 - 2000	−26.0	17.6	−37.1	−16.9	−2.2	−24.2	214.9	92.7

Sources: Auditor-General, Statistics South Africa, AMPS.
* Assumed 2% population growth.

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Table II. Smoking prevalence percentages by demographic characteristics

Description	Proportion of population	Prevalence in 1993	Annual trend (% change)	t-statistic	R²-value	Prevalence in 2000 (%)
Sex						
Male	48.0	51.4	-1.09	-5.58*	0.838	43.8
Female	52.0	12.9	-0.17	-1.39	0.244	11.7
Ethnicity						
White	15.7	35.6	0.14	0.51	0.042	36.6
Black	73.2	28.1	-0.78	-4.51*	0.772	22.7
Coloured	8.5	49.3	-0.09	-0.49	0.039	48.7
Indian	2.6	32.3	-0.59	-1.78	0.346	28.2
Age group (yrs)						
16 - 24	28.0	24.0	-0.76	-3.89*	0.717	18.7
25 - 34	25.7	38.7	-0.97	-8.33*	0.920	31.9
35 - 49	25.5	38.5	-0.47	-2.15†	0.435	35.2
50+	20.8	23.4	-0.13	-0.70	0.076	22.5

Source: AMPS.
* Significant at 1% level.
† Significant at 10% level (all tests are two-sided).

Age

Other than broad public health objectives, tobacco control policies aim to reduce youth smoking. Since most smokers start the habit while in their teens or early twenties, a programme that successfully reduces youth smoking is likely to yield good long-term public health benefits. The international literature has shown that increasing cigarette prices rapidly is particularly potent in the fight against youth smoking, since young people are more responsive to cigarette price increases than older people.[9-11]

As shown in Table I, cigarette prices have increased rapidly in South Africa, especially since 1997. At 18.7% in 2000, smoking prevalence among young adults (aged 16 - 24 years) was much lower than that of the older age groups. Smoking prevalence among young adults and in the 25 - 34-year age group has been decreasing at a rate of nearly one percentage point since 1993.

Income characteristics

Studies from the UK indicate that smoking prevalence in higher socio-economic groups has reduced significantly since the 1960s, whereas smoking prevalence in lower socio-economic groups has decreased only marginally.[12,13] Smoking prevalence, and smoking-related mortality, is becoming a low-income phenomenon in the UK.[13] Even though the AMPS database does not categorise product use among South Africans into socio-economic classes, it does categorise it into household income segments (Table III).

The available data do not suggest that smoking prevalence is shifting towards the lower income section of the population. Quite the contrary — the empirical evidence suggests that the level of smoking prevalence in 2000 was highest among the more affluent sections of the population.

Table III. Smoking prevalence percentages by household income segments (Rands per month)

	Proportion of population (%)	Prevalence in 1993 (%)	Annual trend (% change)	t-statistic	R²-value	Prevalence in 2000 (%)
R1 - R499	21.0	29.4	-0.84	-3.12†	0.618	23.5
R500 - R899	20.0	30.6	-1.06	-2.81†	0.567	23.2
R900 - R1 399	17.6	31.8	-0.87	-3.88*	0.715	25.7
R1 400 - R2 499	14.5	31.6	-0.26	-1.13	0.176	29.8
R2 500 - R3 999	9.0	34.2	-0.70	-2.06*	0.415	29.3
R4 000 - R6 999	9.2	35.2	-0.64	-3.67†	0.692	30.7
R7 000 - R11 999	5.8	33.0	0.30	0.76	0.088	35.1
R12 000+	2.9	28.1	0.41	0.89	0.115	31.0

Source: AMPS.
* Significant at 1% level.
† Significant at 5% level (all tests are two-sided).

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DISCUSSION

Over the past 7 years the South African government has followed a remarkably consistent tobacco control policy. The Tobacco Products Control Act of 1993 (Act 83 of 1993), followed by the Amendment Act of 1999 (Act 12 of 1999), clearly indicates the government's position on tobacco control. Furthermore, sharp excise tax increases since 1994 support the objectives of the legislation. As a result, aggregate cigarette consumption decreased by about 22% and smoking prevalence decreased from 32% to 28% of the adult population.

For different demographic groups the salient features are as follows. Firstly, smoking prevalence among blacks is relatively low and is decreasing at a significant rate. This suggests that the tobacco industry has been unsuccessful in penetrating this large and potentially lucrative market. Secondly, smoking prevalence among young adults (people aged 16 - 24 years) is significantly lower than the national average, and is also decreasing rapidly. This may suggest that tobacco is losing its appeal among adolescents. Thirdly, smoking prevalence among males, which was at a level of more than 50% in 1993, is decreasing at the rate of about one percentage point each year.

Regarding the relationship between socio-economic factors and smoking prevalence, the evidence is contrary to the experience in the UK and other highly developed countries. In these countries smoking prevalence among the rich has decreased rapidly over the past four decades and is currently significantly lower than the population average. The decrease among the more affluent is ascribed mainly to antismoking publicity.[12] The poorer sections of the UK population evidently did not respond to the increased publicity and awareness in the same way.

Given that smoking prevalence levels and trends by socio-economic class in South Africa differ so significantly from those in the UK, further analysis seems appropriate. Consider the UK first. Between 1960 and the late 1980s the real price of cigarettes did not experience significant trend changes. This changed dramatically in the 1990s, when the government raised the excise tax to more than 70% of the retail price. However, since the work of Townsend and associates[12,13] does not cover this period, the impact of the price increases of the 1990s are not discussed here. High per capita income and an excellent social security system in the UK means that nobody lives in absolute poverty. Even the very poor can afford to buy cigarettes, even when the real price is increasing moderately.

Before the 1990s, therefore, the UK government did not use excise and price increases to deter smoking. The only tool used was an information campaign, but as has been pointed out in a number of studies,[14] these tend to be less effective in reducing smoking among the poor. However, the evidence indicates that information campaigns are more effective in reducing smoking among more affluent groups. Therefore, because of the relative stability of the cigarette price in the period before 1990, but

different reactions to antismoking publicity, smoking prevalence percentages in the UK diverged between rich and poor.

In South Africa the situation is very different. Because of the high incidence of absolute poverty, smoking prevalence in South Africa is much lower than in the UK. A much lower per capita income, an unequal distribution of income and a weak social security network, means that many people simply cannot afford to buy cigarettes. For them, dire financial circumstances do not allow them to consider smoking cigarettes. However, should their financial position improve above a certain threshold, they may consider taking up smoking. The fact that cigarette consumption in South Africa is more responsive to changes in income than in most countries, lends empirical support to this hypothesis.[3]

A different mechanism explains the changes in smoking prevalence among the different income groups. Compared with the more affluent sections of society, the poor spend a relatively large proportion of their income on tobacco. Increases in the price of cigarettes therefore have a proportionally bigger impact on the poor. Consequently, their incentive to quit or reduce their consumption is much stronger when cigarette prices increase. As illustrated in Fig. 1, the real price of cigarettes has increased dramatically since 1994. Smoking prevalence percentages in three income categories, together with linear trend lines, are also shown in Fig. 1. The rapid decrease in smoking prevalence among low-income households, *vis-à-vis* middle- and high-income households, is clearly demonstrated. This graph lends support to the widely held view that low-income earners, as opposed to high-income earners, are more sensitive to changes in price.
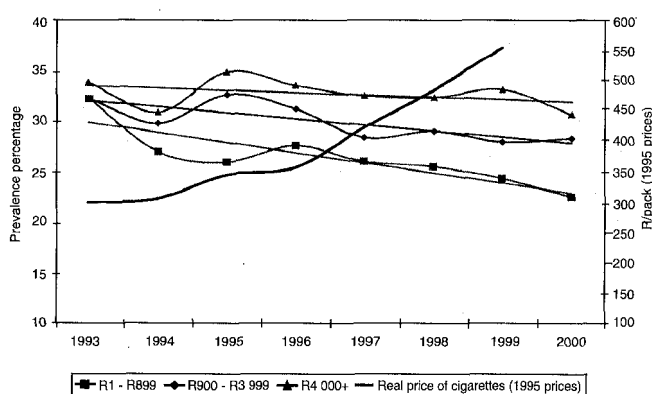
Source: AMPS, South African Statistics.

Fig. 1. Smoking prevalence by summarised income data.

Because of the fact that the poor spend a greater proportion of their income on cigarettes than the rich, tobacco excise tax comprises a relatively larger proportion of their income. A tax that places a relatively heavier burden on the poor is known as a regressive tax. From a social equity perspective, regressive taxes are undesirable.

However, it has been argued that increases in the excise tax may, in fact, reduce the tax's regressiveness, because the poor are more sensitive to price increases and would therefore reduce their consumption by a greater amount in reaction to a tax increase. Consequently, while the absolute tax burden may increase for both rich and poor, the increased tax burden on the rich would be relatively heavier.[15]

The South African empirical evidence supports this view. Low-income households have been able to reduce their cigarette consumption by significantly more than high-income households.

Even though the comment is made in the context of a group ('the poor'), one should differentiate between those people who quit smoking completely as a result of the price increase and those who merely reduce their consumption. For the first group, the price increase was the critical point that caused them to quit; as a result, their cigarette tax burden is reduced from some positive value to zero. The second group, unless they are able to reduce their cigarette consumption significantly, are saddled with a higher tax burden and would therefore be worse off as a result. Most smokers find themselves in the second group, since, as pointed out earlier, the main impact of cigarette price increases is to reduce average consumption, not to cause people to quit.

The policy implications of this paper are the following: if the government wants to reduce smoking prevalence and aggregate cigarette consumption, it should increase the tax rate. However, if the government wants to reduce smoking prevalence *and* improve the economic position of the poor, it should actively encourage smokers to quit, rather than simply to induce them to reduce their consumption. Should this become government policy, it would create a demand for smoking cessation and nicotine replacement therapies. Whether the government would be prepared to subsidise such therapies would depend on the relative weight it places on long-term public health *vis-à-vis* short-term excise tax revenue.

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