Economic aspects of tobacco use and taxation policy

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Strong medical evidence about the adverse effects of tobacco use on health has been available for many decades,[1,2] and as many as 100 000 people probably die prematurely in Britain because of tobacco use.[3] This paper examines the influence of economic variables such as price and income on tobacco consumption and sets out some of the attributes on the supply side of the tobacco industry. Such information is an essential ingredient in the policy debate where the benefits of this trade—employment, satisfaction of consumers, and profits—have to be traded off against the costs—a reduced duration and quality of life for many users of tobacco. The paper also analyses the effects of various options for tax policy on consumption and the industry.

Demand for tobacco

TRENDS IN CONSUMPTION

During the past 30 years the consumption of tobacco has peaked and during the past decade especially it has declined steadily. Table I gives details of consumption for nine years between 1956 and 1986. Although the time trends differ across the five different consumption indexes, downward movements can be seen across all these measures of consumption.

ECONOMIC INFLUENCES ON TOBACCO CONSUMPTION

Many economic factors influence the consumption of tobacco. Emphasising the impact of price alone on consumption should be avoided because many other powerful influences are at work. Three are income (or purchasing power), advertising, and health education. Many of the studies reviewed below are based on series of data that end in the late 1970s. More recent results are reported which, among other things, show that tobacco consumption may be more responsive to price than was assumed previously.

Review of existing studies

The first report of the Royal College of Physicians[4] precipitated studies in which the factors that influence cigarette and tobacco use were investigated. The objective of many of the earlier studies[5-8] was to compare the merits of tax increases and health education policies as means of reducing tobacco consumption. In later studies[9,10] the effects of advertising on consumption were investigated. These last studies precipitated fierce controversy between the Advertising Association and the BMA about the empirical evidence.

In most of these studies multiple regression analysis of tobacco consumption per person over a variety of time periods was carried out. Table II compares the findings from different studies which show the effect of price on tobacco consumption. A price elasticity gives the predicted percentage change in consumption resulting from a 1% change in prices, with all other factors that influence behaviour held constant. The estimated price elasticities produced by previous studies vary from low values—for instance, in Atkinson and Skegg[6]—to much higher estimates of about −1 in McGuinness and Cowling.[9] Thus, for instance, the results sponsored by industry (Metra) show that in the long run a 10% increase in prices will reduce tobacco consumption by between 4·2 and 5·4%.[10]

Estimates of income elasticities show much less variation: Atkinson and Skegg 0·36[6]; Peto 0·14 to 0·49[8]; McGuinness and Cowling 0·31 short term and 0·33 long term[9]; Witt and Pass 0·13[11]; Radfar 0·12 short term and 0·19 long term[12]; and the Treasury 0·6.[13] For instance, using McGuinness and Cowling's results, in the long run a 10% increase in income increases consumption by 3·3% when all other influences are held constant.

Though it is common to estimate the effects of both income and price, in only a few studies was the impact of advertising on the consumption of tobacco considered. The empirical results on the size and significance of advertising have been mixed. For those studies in which an advertising variable is significant the advertising elasticity is usually about 0·1, so that if advertising was reduced by 10% then (other things being equal) consumption would be predicted to fall about 1%.[9,11,12] In a report commissioned by the industry,[10] however, no significant evidence of an association between advertising and cigarette consumption was found. The data used by Metra[10] are not available to independent researchers.

Since the first and subsequent reports by the Royal College of Physicians[3,4] the importance of health education on tobacco consumption has been recognised. Different researchers have, however, used different approaches to incorporate these effects in their models. Some treat the effects as being permanent,

TABLE I—*Yearly tobacco consumption per person for population aged 15 years and over for nine years between 1956 and 1986**

	1956	1960	1965	1970	1975	1980	1984	1985	1986
Pounds (lbs) of tobacco sold	6·3	6·8	6·2	5·9	5·9	5·5	4·5	4·4	4·3
Pounds (lbs) of cigarettes sold	5·5	5·9	5·4	5·2	5·1	4·9	4·0	3·9	3·8
Expenditure on tobacco at 1980 prices (£)	120	124	122	122	123	110	87	84	81
Expenditure on cigarettes at 1980 prices (£)	100	110	102	104	103	95	75	73	70
No of cigarettes sold	2550	2750	2700	3000	3100	2750	2200	2140	2080

*One pound = 0·454 kg.
Sources: Lee PN, ed. *Statistics of smoking in the United Kingdom*. 7th ed. London: Tobacco Research Council, 1976.
Tobacco Advisory Council fact sheets 1977-1986.
Central Statistical Office, UK National Accounts. (CSO blue book). London: HMSO (annual).
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while others model a process in which, after an initial impact, consumption gradually returns to its previous levels. For examples of alternative approaches see Sumner,[5] Atkinson and Skegg,[6] McGuinness and Cowling,[9] and Witt and Pass.[11] Using the latter approach, Atkinson and Skegg[6] estimated that the 1962 report from the Royal College of Physicians,[1] the 1965 television ban on the advertising of cigarettes, and the 1971 report from the Royal College of Physicians[20] each reduced consumption by 5% but that this effect declined by 1% a year. In another approach health education is regarded as specifically offsetting the effectiveness of advertising.[9,12]

Few of the results obtained in these studies were calculated by means of data that were published after 1975. There have, however, been large decreases in consumption and substantial changes in tobacco prices and disposable income since 1975. In a 1986 working paper of the Addiction Research Centre, University of York, Godfrey used data for 1956-84 and employed a general model that included several models in published papers as special cases. Statistical tests were carried out to find the simplest model with assumptions that were consistent with the data. On the basis of this model Godfrey obtained an estimated price elasticity of −0·56, which is larger than some of the estimates shown in table II but close to the Treasury's estimate of −0·5. (The measure of consumption in Godfrey's study was the weight of tobacco in cigarettes per adult.)

TABLE II—*Estimates of price elasticity*

Study	Data	Elasticities
Russell (1973)[7]	1946-71 (yearly)	−0·5 to −0·66
Atkinson and Skegg (1973)[6]	1951-70 (yearly)	0·0 (men); −0·35 (women)
Sumner (1971)[5]	1955-68 (yearly and quarterly)	−0·8
Peto (1974)[8]	1951-70 (yearly)	−0·37 to −0·64 (men)
McGuinness and Cowling (1975)[9]	1957-68 (quarterly)	Short term −0·99 Long term −1·05
Witt and Pass (1981)[11]	1955-75 (yearly)	−0·32
Metra Consulting Group Ltd (1979)[10]	1958-78 (quarterly)	Short term −0·34 to −0·54 Long term −0·42 to −0·54
Radfar (1985)[12]	1965-80 (quarterly)	Short term −0·23 Long term −0·39
Treasury (1980)[13]	—	−0·5

Another result from this model is that rather than returning to previous levels of consumption after the effect of the first health shock in 1962 demand fell continually at a rate of 3% a year. These estimates are used below to predict the effects of alternative tax policies. In unpublished work Godfrey reported the results of estimations using other data—for example, different consumption measures like those set out in table I—and found results that were generally significant but varied in magnitude (from −0·4 to −1·5).

The conclusion to be derived from the above results is that tobacco consumption can be manipulated by the use of economic policies which increase the price, raise the price to compensate for the effects of increased purchasing power (income), reduce advertising expenditures, and increase health education activities.

LIMITATIONS OF THESE RESULTS

The scope for improving the analysis of the demand side of the tobacco market is considerable. The results reported in the previous section are for aggregate data, and the results of the few studies of disaggregated data[9,14] suggest that the effects of price and other variables may differ across subgroups. Thus it would be useful to know if price and advertising elasticities, for instance, varied among different age groups, social classes, and sexes. The lack of publicly available data is a constraint on this sort of work. While many of the relevant data are collected by the industry, they are not always available to researchers, and publicly available data—for instance, material collected biannually in the general household survey—cover only a few years.

Other issues need to be researched. For instance, smokers may respond differently to large price changes (publicly announced with health links emphasised) and such responses may, as Leu[15] found, be related to nominal rather than real (inflation adjusted) prices. Also, the effects of price and other variables on consumption can be explored using cohort or longitudinal data. Such work in the United States[14] suggests that teenagers may be more responsive to price changes than the general population, and similar work in the United Kingdom would be useful in informing policy debates.

SUMMARY

Different studies have given different estimates of the effects of price and other variables on tobacco consumption. These variations seem to arise from the ways in which models are specified and the type of data used. Clearly, the consumption of tobacco does respond to changes in price, income, advertising, and health education. Godfrey's preliminary, unpublished work on a general model suggests that tobacco consumption may be more sensitive to price (and tax) changes than was found in some of the earlier studies reported in table II. But even with the estimates available it is possible to predict only the effects of small changes in variables on consumption behaviour, and the impact of major shocks, such as banning advertising, are more difficult to predict.

Supply of tobacco

If the demand for tobacco is reduced further by the positive use of economic policies, especially pricing, the industry will alter greatly. These effects are often poorly understood by health lobbies and are shown up disproportionately by an industry that is inevitably seeking to maintain its activities and profits. We believe that although reduced expenditure on tobacco will cause unemployment in the tobacco industry, consumers will divert their spending to other sectors, so creating jobs elsewhere.

STRUCTURE OF THE INDUSTRY

In the UK three major producers control over 90% of the tobacco market. The leader is the Imperial Group, now owned by Hanson Trust, which has 44% of the market and includes W D and H O Wills and market brands such as Woodbine, Embassy, and John Player Special. Gallaghers, owned by the American company American Brands, had 32% of the market in 1984 and sell Benson and Hedges, Silk Cut, and Old Holborn. Rothmans have 15% of the market, sell Rothmans, Peter Stuyvesant, and Dunhill, and are jointly owned by Phillip Morris (US) and the South African Rembrandt Group. A fourth company, British American Tobacco, which is based in the UK, trades abroad, especially in the USA, Brazil, and Germany.

The overseas markets in which British American Tobacco trades are also dominated by large companies: Phillip Morris, R J Reynolds, the Loews Corporation, and Gulf and Western. Furthermore, the tobacco leaf used by all these companies is controlled by six international buyers. Thus not only do eight companies dominate world wide but there is also integration vertically from the stage of production and purchase of the leaf to its manufacture and retail sale.

In recent years these companies have diversified, buying interests in non-tobacco companies such as distribution, engineering, financial services, food, paper and packaging, printing, and retailing concerns, and some in the alcohol industry.

EMPLOYMENT

Employment in the tobacco industry has declined appreciably in the past 10 years (table III). By 1986, with only 16 900 employed in producing tobacco, it was a small (0·32%) part of the manufacturing sector in the UK. Further jobs, however, are created by the trade in tobacco outside the manufacturing sector—that is, in distributing and retailing the commodity.

TABLE III—*Employment in the British tobacco industry*

Year	Tobacco industry		% Of all manufacturing jobs	% Of all jobs
	No (thousands)	% Women		
1976	32·9	54	0·46	0·15
1977	31·5	54	0·44	0·14
1978	31·2	52	0·44	0·14
1979	30·4	51	0·43	0·14
1980	29·5	50	0·45	0·13
1981	27·1	49	0·46	0·13
1982*	28·5	47	0·49	0·14
1983	26·9	45	0·49	0·13
1984	22·0	46	0·41	0·11
1985	19·8	45	0·36	0·09
1986	16·9	45	0·32	0·08

*Introduction of 1980 Standard Industrial Classification with changes in the definitions of industry groups.
Source: Department of Employment. *Department of Employment Gazette*. London: HMSO (monthly). Figures for June in each year.

Mackay and Edwards[16] estimated that in all—manufacture, distribution, and retailing of tobacco—264 000 jobs were attributable to activities associated with the tobacco industry in the UK in 1980. This implies that for every direct job in the industry another 6·5 existed in other industries that were dependent on tobacco. While it is difficult to make such estimates this one appears to be high and unpublished work by Godfrey on employment in the alcohol and tobacco industries, using alternative assumptions and methods, yields estimates between 25 200 and 188 600 in 1984.

Thus the direct and indirect effects on employment of tobacco consumption have declined but remain appreciable. If, however, expenditure on tobacco falls consumers are left with money to spend elsewhere. Thus if antismoking policies reduce employment in the tobacco industry jobs will be created in other sectors as a result of switches in consumer spending. The net effects on employment of an antismoking policy may be small.

EXPORTS AND IMPORTS

Importation of cigarettes increased rapidly during the 1980s, and by 1986 nearly 14 million cigarettes were entering the market in the UK. Table IV shows the values of exports and imports for cigarettes and figures for the total tobacco trade. This shows a decline in imports of leaf (associated with reduced consumption) and high levels of exports in the 1980s as the UK companies sought profits from sales abroad.

TABLE IV—*Value of tobacco trade 1971-86 in current prices*

Year	Cigarettes only			Total tobacco trade manufactured and unmanufactured		
	Imports (£×10³)	Exports (£×10³)	Imports:exports	Imports (£×10³)	Exports (£×10³)	Imports:exports
1971	1 978	39 908	0·05:1	108 985	42 778	2·55:1
1972	2 169	42 134	0·05:1	121 576	47 982	2·53:1
1973	4 048	51 287	0·08:1	153 798	58 125	2·65:1
1974	4 277	60 602	0·07:1	185 431	68 882	2·69:1
1975	4 589	94 287	0·05:1	192 013	106 344	1·81:1
1976	8 209	117 247	0·07:1	236 590	133 784	1·77:1
1977	8 841	147 786	0·06:1	256 114	169 681	1·51:1
1978	13 525	170 667	0·08:1	453 430	278 930	1·63:1
1979	16 665	210 633	0·08:1	350 423	340 997	1·03:1
1980	26 806	284 016	0·09:1	235 014	307 992	0·76:1
1981	23 187	336 829	0·07:1	269 463	360 059	0·75:1
1982	40 747	359 867	0·11:1	309 196	391 426	0·79:1
1983	30 867	398 153	0·08:1	344 594	434 976	0·79:1
1984	51 378	375 578	0·14:1	407 053	420 896	0·97:1
1985	76 478	418 523	0·18:1	386 752	465 369	0·83:1
1986	81 619	356 170	0·23:1	338 764	406 271	0·83:1

Source: Department of Trade and Industry. *Overseas Trade Statistics of the UK*. London: HMSO (monthly).

CONCLUSION

The tobacco industry is an oligopoly—that is, there are few sellers—and production is concentrated in all activities: leaf purchasing, manufacture, and sale. In the UK the industry employs under 17 000 people in direct manufacture in the tobacco trade. The trade (import and export) in tobacco changed in the 1980s and the balance of trade in tobacco goods has improved considerably since 1971. Clearly these flows, which sustain jobs at home and abroad, would be changed by positive antismoking policies.

Tax policy options and their effects on consumption and the industry

TAXATION OF TOBACCO

During the past decade the real (adjusted for inflation) price of cigarettes has fluctuated, the purchasing power of smokers has increased—for example, in terms of the number of cigarettes that can be bought by one hour's work—and taxation on tobacco as a share of total expenditure on tobacco products has increased (table V).

TABLE V—*Relative prices of cigarettes*

Year	Real prices* (1980=100)	No of cigarettes† that can be bought by one hour's work		Tobacco taxation‡ as share of total expenditure on tobacco products
		Male manual	Female manual	
1957	113·7	25	16	72·3
1960	115·6	29	17	71·3
1962	120·7	29	18	70·4
1965	127·5	29	17	69·7
1967	122·0	33 (39)§	20 (20)§	68·7
1970	120·5	44	26	67·1
1972	107·8	54	32	64·7
1975	104·4	58	39	64·9
1977	113·8	64	45	69·5
1978	102·6	64	46	67·5
1979	99·2	71	49	69·5
1980	100·0	67	47	69·0
1981	110·9	61	42	70·3
1982	118·0	59	40	73·1
1983	119·2	60	41	73·3
1984	125·8	56	39	73·8
1985	131·2	56	39	74·9
1986	140·0	54	38	75·3

*Calculated by dividing current expenditure on cigarettes by expenditure on cigarettes valued at 1980 prices and the "all items" implicit price deflator.
†Men and women manual workers' hourly earnings from the *Department of Employment Gazette*. Typical cigarette prices obtained from annual reports of HM Customs and Excise and for 1956-67 relate to the typical price of a standard plain cigarette, for 1968-78 to a standard filter cigarette, and for 1979-85 to a typical king size cigarette.
‡Figures calculated from UK National Accounts, various years.
§Figures in parentheses were calculated using the price of a standard filter cigarette in 1967 for comparison with the 1968 figure. The 1978 typical prices for a standard filter and a king size cigarette were the same.
Sources: HM Customs and Excise. *Report of the Commissioners of Her Majesty's Customs and Excise*. London: HMSO (annual).
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Central Statistical Office. *United Kingdom National Accounts* (CSO blue book). London: HMSO (annual).

Table VI gives details of tobacco taxation since 1980. The real price of cigarettes has increased but with no consistent pattern, and consumption declined each year but unevenly between 1980 and 1986. The taxation on cigarettes is a monetary amount per unit and an ad valorem element of 21%. The monetary amount per unit needs constant uprating to maintain its real value if prices rise. The freedom of the government to control consumption in this way may, however, be circumscribed by European Community regulations.[17]

TAX REVENUE ON TOBACCO

The real yield from taxation on tobacco peaked in

TABLE VI—*Changes in recent budgets*

Year	Typical price after budget of 20 king size cigarettes (pence)	Tax per cigarette (including value added tax) (pence)	Index of real duty per cigarette (1980=100)	Change in consumption in year after budget (%)
1980	73	51·6	100·0	−3·45
1981	91	67·1	115·5	−10·50
(Additional adjustment in June)	95	70·5		
1982	102	76·1	118·6	−6·65
1983	109	80·4	119·9	−0·70
1984	123	91·8	130·0	−5·31
1985	133	99·2	132·5	−2·70
1986	148	111·6	149·1	−2·78

Sources: For columns 1, 2, and 3: HM Customs and Excise. *Report of the Commissioners of Her Majesty's Customs and Excise*. London: HMSO (annual).
Consumption figures are for tobacco expenditure by financial year in 1980 prices, taken from Central Statistical Office. *United Kingdom National Accounts* (CSO blue book). London: HMSO (annual).

1965 and by 1986 had fallen by 10%. Table VII shows that the importance of this tax as a source of government revenue has also fallen rapidly to 12% of total expenditure tax yields and only 4% of total tax revenue. These yields are not small. For instance, in 1986-7 they were equivalent to about 4p on the basic rate of income tax or to raising value added tax from 15 to 20%.

If cigarette consumption fell to very low levels government revenue would, of course, drop. But if this happened over a long period, as in the recent past, tax revenues could be recouped from other sources. If people do not consume tobacco they will demand other goods, pay taxes on them, and so augment government revenues.

INCREASING TAXATION ON TOBACCO

Effects on consumption and revenue

Because of the relatively low price elasticities it is possible to raise taxation appreciably and have some effects on consumption and positive effects on tax revenue. Table VIII shows the estimated effects of

TABLE VII—*Importance of tobacco revenue*

Year	Real tax yields* (duty and value added tax) (£m)	Tax yield as percentage of all government taxes on expenditure	Tax yield as percentage of total current government revenue
1957	3823	28·2	11·8
1960	4163	28·7	11·9
1962	4192	26·8	10·6
1965	4317	24·0	9·8
1967	4224	21·4	8·4
1970	4006	18·0	6·4
1972	3511	16·2	5·8
1975	3393	15·8	4·9
1977	3633	16·6	5·1
1978	3462	15·2	4·8
1979	3422	13·5	4·5
1980	3363	12·7	4·2
1981	3557	12·6	4·3
1982	3539	12·3	4·2
1983	3586	12·3	4·1
1984	3689	12·4	4·1
1985	3786	12·2	4·0
1986	3877	11·9	4·1

*Deflated by the "all items" implicit price deflator.
Source: Central Statistical Office. *United Kingdom National Accounts* (CSO blue book). London: HMSO (annual).

TABLE VIII—*Year by year estimated changes in consumption*

Year	0% Yearly real price increases		5% Yearly real price increases		10% Yearly real price increases	
	Consumption*	Annual % change	Consumption*	Annual % change	Consumption*	Annual % change
1985	3·76		3·76		3·76	
1986	3·72	−0·99	3·62	−3·65	3·53	−6·13
1987	3·68	−0·99	3·49	−3·65	3·31	−6·13
1988	3·65	−0·99	3·36	−3·65	3·11	−6·13
1989	3·61	−0·99	3·24	−3·65	2·92	−6·13
1990	3·58	−0·99	3·12	−3·65	2·74	−6·13

*Consumption measured in lbs weight of tobacco in cigarettes per head.
Source: Calculated from Godfrey's model, assuming growth of real income by 3% a year.

alternative tax increases and these indicate that, even if real prices are only maintained, consumption will continue to fall owing to underlying health education shock effects. A 10% annual increase in real prices would cut consumption by over 6% each year and yield increases in tax income throughout the forecast period (table IX). All these predictions assume a (high) 3% increase in real incomes throughout the period and are derived from Godfrey's model as described above. There is, however, much uncertainty when predicting the effects of sustained tobacco tax policy by means of a model estimated using figures relating to periods in which no such policy has been in force. The results are also sensitive to the price elasticity used.

TABLE IX—*Estimated change in tobacco revenue from a yearly 10% increase in real price*

Year	Estimated revenue (£m) (1985)	Yearly % change
1986	5609	+6·9
1987	5990	+6·8
1988	6362	+6·2
1989	6743	+6·0
1990	7128	+5·7

Source: As table VIII. Revenue figures for 1985 from Central Statistical Office. *United Kingdom National Accounts* (CSO blue book). London: HMSO (annual).

Effects on production and employment

Table X contains figures on the changes in production, consumption, and employment during 1980-5. There is no clear relation between these three series. Levels of employment and output in the tobacco industry are not determined only by domestic consumption. Exports are an important part of output, and technical changes have resulted in increases in productivity so that increases in output need not require increases in employment. The estimation of a simple model relating employment to the level of production and a time trend to take account of technical progress yields an employment elasticity of 0·7, so that a 10% fall in production would be predicted to result in a 7% fall in employment with technical progress reducing employment by a further 1% a year.

TABLE X—*Percentage yearly changes in tobacco production, consumption, and employment*

Year	Consumption*	Production†	Employment‡
1980	−2·0	+2·8	−4·3
1981	−10·0	−2·8	−6·7
1982	−6·8	−6·7	−6·6
1983	−0·3	−0·3	−4·2
1984	−2·6	−0·3	−10·4
1985	−1·7	−8·2	−10·5
1986	−3·5	−10·4	−14·2

*Consumption measured as the number of cigarettes released for home consumption. For this table these figures were not deflated for population changes.
†Tobacco production from index of output of the production industries.
‡Employment in tobacco industry from the Census of Production which gives UK figures.
Sources: Central Statistical Office. *Monthly Digest of Statistics*. London: HMSO (monthly).
Central Statistical Office. *Annual Abstract of Statistics*. London: HMSO (annual).
Business Statistics Office. *Annual Census of Production*. London: HMSO (annual).

If the estimated employment elasticity of 0·7 is used and falls in consumption are assumed to translate fully into falls in production—that is, tobacco companies cannot increase exports—then a 10% increase in tax each year could be estimated to result in a fall of 3700 jobs in the British tobacco industry by 1990. Falls in employment in the tobacco industry, however, will be compensated by increased employment in other sectors as patterns of consumers' expenditure change. The net effect on employment will depend on the

characteristics of the shifts in demand and the labour requirements associated with the two different sets of consumption.

Effects on social class

Levels of tobacco expenditure increase with gross household income. In the 1986 family expenditure survey the lowest quintile of the income distribution have an average tobacco expenditure of £2.67 per week while the highest quintile group spend £5.25. The poor, however, pay a larger proportion of their income (on average) in taxes on tobacco. The Central Statistical Office[18] calculated that in 1985 taxes on tobacco were 5·3% of disposable income for the bottom quintile income group of non-retired households and 1·2% for the top quintile. The effects of tax changes on different income and social class groups will vary if they have different price elasticities. In a 1983 unpublished paper concerned with analyses of gender and class differences in tobacco consumption Townsend obtained a higher price elasticity (−1·3) for the lower social class than for the higher social classes (−0·54 to −0·75).[19] Also, Atkinson, Gomulka, and Stern (working paper 57 of the Economic and Social Science Research Council programme on taxation, incentives and the distribution of income, London School of Economics), using family expenditure survey data for 1970 to 1980, estimated that if the price increased by 25% consumption for households headed by an unemployed man would fall by 16·4%, while for households headed by a professional owner-occupier the fall would be only 11·5%. Thus in the absence of other changes increasing taxation might reduce the degree of regressivity. On the other hand, if the demand of the lower social classes for tobacco has become less price responsive since these studies were carried out then increasing taxation might increase regressivity.

SUMMARY

Tax levels have important effects on cigarette prices and tax revenues. Over 70p of every £ spent on tobacco goes to the Chancellor of the Exchequer, yielding over £5 billion. But the value of tobacco tax revenues have generally fallen—by 1986 they were 10% lower than at their peak in 1965, and tobacco revenue is becoming a smaller proportion of total tax receipts.

The impact of a consistent increase in tobacco taxation is important in terms of reduced consumption (and harm to health) as well as in terms of reduced employment. Revenue may, however, increase in the short term. Finally, if the findings of Townsend[19] and Atkinson *et al* (see above) still apply then the distributive effects of increased taxation on the poor might be less than is sometimes feared.

Conclusions

The impact of price (taxation) on the consumption of tobacco appears to be important and may be greater than suggested by studies using data from the 1970s. It seems that, other things being equal, a 10% increase in taxation would cut tobacco consumption by 5-6%.

The effects of income, advertising, and health education may also be important, and manipulating these variables will cut consumption. Reductions in consumption will lead to reduced mortality and morbidity, and the economic consequences of changing patterns of mortality and morbidity remain to be examined. As far as effects on tax revenue are concerned, increased taxation is likely to increase government tax revenues in the short run.

While reduced consumption will reduce employment in the tobacco industry, job creation resulting from a shift in consumption patterns (out of tobacco and to other goods and services) will offset these effects on employment and the net effects are unlikely to be as large as claimed by the tobacco industry.

The conclusion to be drawn is that the demand of tobacco is influenced greatly by economic factors and that simple economic analysis can illuminate usefully the supply characteristics of the tobacco industry.

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Correction

Un-health promotion: results of a survey of alcohol promotion on television

An error occurred in this paper by Dr Roger Barton and Ms Sally Godfrey (4 June, p 1593). Figure 2 incorrectly showed that all advertisements between 1600 and 1800 were promoting alcohol. The correct figure is given below.

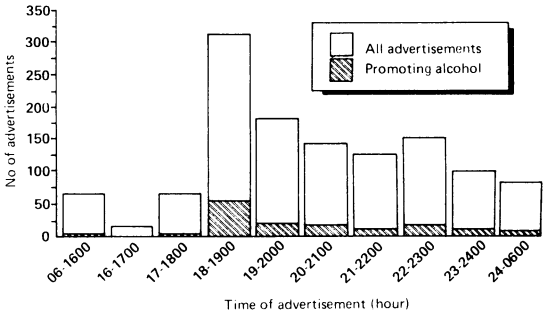

FIG 2—*The numbers of advertisements recorded for each hour of the day. The increase in the number of advertisements promoting alcohol between the hours of 1800 and 1900 is notable*