



H N P D I S C U S S I O N P A P E R

Economics of Tobacco Control Paper No. 12

The Economics of Tobacco in Sri Lanka

Nisha Arunatilake and Maduwanthi Opatha

October 2003

Tobacco Free Initiative
World Health Organization



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Health, Nutrition and Population (HNP) Discussion Paper

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The Economics of Tobacco in Sri Lanka

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Paper prepared for The World Bank in 2001

Abstract: This paper describes trends in tobacco use in Sri Lanka, assesses the economic contribution of the industry (jobs, earnings, tax revenues and trade balance), and analyses the relationship between demand for cigarettes and prices and incomes, looking at different socio-economic groups. It uses the estimated elasticities to simulate the likely impact of a tax increase on prices, government revenues and on demand, expenditures and tax burdens of different socio-economic groups.

Keywords: Sri Lanka, tobacco, tobacco tax, cigarettes, cigarette tax, economics of tobacco, economics of tobacco control, smoking, tobacco policy, price elasticity, demand for cigarettes, prevalence, bidi, cigars, tobacco tax revenues, tobacco industry employment, tobacco industry wages, tobacco farming.

Disclaimer: The findings, interpretations and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank or the World Health Organization, their Executive Directors, or the countries they represent.

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TABLE OF CONTENTS

NOTE FROM REGIONAL DIRECTOR, OFFICE FOR SOUTH-EAST ASIA, WORLD HEALTH ORGANIZATION	VII
FOREWORD.....	IX
ACKNOWLEDGEMENTS	XI
SUMMARY.....	XIII
1. INTRODUCTION.....	1
2. TOBACCO CONSUMPTION TRENDS.....	1
2.1 CONSUMPTION OF DIFFERENT TYPES OF TOBACCO PRODUCTS	3
2.2 CURRENT TOBACCO USERS BY AGE CATEGORY AND TYPE.....	3
2.3 CURRENT SMOKERS BY INCOME CATEGORY	4
2.4 CURRENT SMOKERS BY EDUCATION CATEGORY.....	5
2.5 GOVERNMENT POLICY AND TRENDS IN CONSUMPTION LEVELS	6
3. OVERVIEW OF THE TOBACCO INDUSTRY IN SRI LANKA.....	8
3.1. EMPLOYMENT	8
3.2 AVERAGE WAGES AND SALARIES FROM TOBACCO.....	14
3.3 TOBACCO TAXES.....	15
3.4 REVENUE FROM THE TOBACCO INDUSTRY.....	17
3.5 TOBACCO TRADE EARNINGS.....	19
3.6 RAW AND MANUFACTURED TOBACCO PRODUCTION	20
4. ECONOMIC ANALYSIS OF TOBACCO DEMAND IN SRI LANKA	22
4.1 INTRODUCTION.....	22
4.2 DATA, SPECIFIC AIMS, METHODOLOGY AND MODELS	22
4.3 RESULTS.....	26
4.4 POLICY SIMULATIONS.....	32
4.5 DISCUSSION	34
REFERENCES.....	35

List of Tables

Table 1. Profile of smoking prevalence in Sri Lanka by sex, 1991 and 2000	2
Table 2. Profile of current smokers by type – 1991.....	3
Table 3. Current male tobacco users by age group, 1991 and 2000	4
Table 4. Prevalence of current male smokers by income category, 1991.....	5
Table 5. Prevalence of current male tobacco users by income category, 1999	5

Table 6. Current male smokers by education category, 1991 and 2000	6
Table 7. Tobacco leaf suppliers to CTC	9
Table 8. Labor requirement for cultivating and curing tobacco (days per hectare).....	10
Table 9. Tobacco cultivation by season and type of tobacco leaf (hectares).....	10
Table 10. Employment created by tobacco farms.....	11
Table 11. Employment at CTC, 1990–1997	12
Table 12. Activity in the tobacco industry (establishments with more than 5 people).....	13
Table 13. Wages and salaries in the tobacco industry by year	15
Table 14. Excise taxes on tobacco according to categories (Rs.).....	16
Table 15. Duty on imports	16
Table 17. Government revenue from direct and indirect levies (Rs. million)	18
Table 18. Trade in manufactured and raw tobacco products (Rs. millions)	19
Table 19. Tobacco cultivation by season and type of tobacco leaf (hectares).....	20
Table 20. Tobacco cultivation by season and type of tobacco leaf (metric tonnes)	20
Table 21. Production of cigarettes by brand (millions of sticks).....	21
Table 22. Estimated bidi production.....	21
Table 23. Means and descriptions of variables used in the analysis.....	26
Table 24. Results of the tobacco use participation equation (logit model).....	29
Table 25. Results of the conditional demand equation.....	30
Table 26. Total price elasticity by expenditure group	31
Table 27. Total income elasticity by expenditure group	31
Table 28. The impact of price increases on tobacco use prevalence by income quintile	32
Table 29. The impact of price increases on conditional demand by income quintile.....	32
Table 30. The effect of price increases on household expenditure on tobacco	33

List of Figures

Figure 1. Tobacco Price Index and General Consumer Price Index, 1980-2001.....	7
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NOTE FROM REGIONAL DIRECTOR, OFFICE FOR SOUTH-EAST ASIA, WORLD HEALTH ORGANIZATION

The trend in tobacco consumption in many developing countries is worrying. This is not only because of the millions of deaths and related suffering that it involves, but also due to its negative impact on economic development. Experiences from many countries have shown that cost effective tobacco control measures can be taken that could bring net economic gains for the country. Proven, cost-effective measures include: public education and information; a ban on tobacco advertising; tobacco smuggling deterrence and increased tobacco taxes. All these measures can be incorporated in national anti-tobacco legislation. Studies and research from countries around the world have revealed that an increase in tax on tobacco products is perhaps the most effective tool for tobacco control, and is especially effective in reducing tobacco use among young people and people with low incomes. Higher tobacco taxes can help a country in a number of ways – by generating additional revenue, reducing tobacco use leading to less tobacco-related morbidity and mortality and reduced expenditure on treatment of tobacco-related diseases.

Effective collaboration between health and finance ministries is essential to address appropriately the economic and fiscal aspects of tobacco control. Such collaboration could ensure improved health for millions of people by protecting them and their families from the harmful effects of tobacco use.

I am confident that the findings of the study initiated by World Health Organization and World Bank will encourage the policy makers, in particular, in the health and finance ministries, to take appropriate and coordinated action for tobacco control.

Dr Uton Muchtar Rafei
Regional Director
World Health Organization
Regional Office for South-East Asia

10 October, 2003

FOREWORD

In 1999, the World Bank published “Curbing the Epidemic: governments and the economics of tobacco control”, which summarizes the trends in global tobacco use and the resulting immense and growing burden of disease and premature death. By 1999, there were already 4 million deaths from tobacco each year, and this huge number is projected to grow to 10 million per year by 2030, given present trends in tobacco consumption. Already about half of these deaths are in high-income countries, but recent and continued increases in tobacco use in the developing world is causing the tobacco-related burden to shift increasingly to low- and middle-income countries. By 2030, seven of every ten tobacco-attributable deaths will be in developing countries. “Curbing the Epidemic” also summarizes the evidence on the set of policies and interventions that have proved to be effective and cost-effective in reducing tobacco use, in countries around the world.

Tax increases that raise the price of tobacco products are the most powerful policy tool to reduce tobacco use, and the single most cost-effective intervention. They are also the most effective intervention to persuade young people to quit or not to start smoking. This is because young people, like others with low incomes, tend to be highly sensitive to price increases.

Why are these proven cost effective tobacco control measures –especially tax increases– not adopted or implemented more strongly by governments? Many governments hesitate to act decisively to reduce tobacco use, because they fear that tax increases and other tobacco control measures might harm the economy, by reducing the economic benefits their country gains from growing, processing, manufacturing, exporting and taxing tobacco. The argument that “tobacco contributes revenues, jobs and incomes” is a formidable barrier to tobacco control in many countries. Are these fears supported by the facts?

In fact, these fears turn out to be largely unfounded, when the data and evidence on the economics of tobacco and tobacco control are examined. The team of about 30 internationally recognized experts in economics, epidemiology and other relevant disciplines who contributed to the analysis presented in “Curbing the Epidemic” reviewed a large body of existing evidence, and concluded strongly that in most countries, tobacco control would not lead to a net loss of jobs and could, in many circumstances actually generate new jobs. Tax increases would increase (not decrease) total tax revenues, even if cigarette smuggling increased to some extent. Furthermore, the evidence show that cigarette smuggling is caused at least as much by general corruption as by high tobacco product tax and price differentials, and the team recommended strongly that governments not forego the benefits of tobacco tax increases because they feared the possible impact on smuggling, but rather act to deter, detect and punish smuggling.

Much of the evidence presented and summarized in “Curbing the Epidemic” was from high-income countries. But the main battleground against tobacco use is now in low- and middle-income countries. If needless disease and millions of premature deaths are to be prevented, then it is crucial that developing countries raise tobacco taxes, introduce comprehensive bans on all advertising and promotion of tobacco products, ban smoking in public places, inform their

citizens well about the harm that tobacco causes and the benefits of quitting, and provide advice and support to help people who smoke and chew tobacco, to quit.

In talking to policy-makers in developing countries, it became clear that there was a great need for country-specific analytic work, to provide a basis for policy making, within a sound economic framework. So the World Bank and the Tobacco Free Initiative of the World Health Organization (as well as some of the WHO regional offices and several other organizations, acting in partnership or independently) began to commission and support analysis of the economics of tobacco and tobacco control in many countries around the world.

The report presented in this Economic of Tobacco Discussion Paper makes a valuable contribution to our understanding of the issues and likely economic impact of tobacco control in a specific country-setting. Our hope is that the information, analysis and recommendations will prove helpful to policy makers, and help result in stronger policies to reduce the unnecessary harm caused by tobacco use.

Joy de Beyer

Tobacco Control Coordinator
Health, Nutrition and Population
World Bank

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SUMMARY

Tobacco use and policies to discourage it

Data on tobacco use rely on an island-wide survey in 2000 (SLIS), which provides national coverage but only limited information, and a more detailed 1991 survey that was confined to three districts. The 1991 survey found that 38%-51% of men (lowest in Colombo district, higher in the farming areas) and 1% of women currently used tobacco. Small percentages (5-9% for men) were previous users who had quit. The 2000 national survey found similar differentials across districts, but much lower prevalence among men (24% nationally, 17-27% for the three districts) and a worrying rise among women to 6% nationally, varying from 3-8% in the three districts. Prevalence is highest in the 30-60 age groups, amongst people with low education, and those in the second and third lowest expenditure quintiles.

Government policy measures that reduce tobacco use have become stronger during the 1990s, especially higher taxes, that have helped raise the real price (adjusted for inflation) of tobacco products, especially in the late 1990s. Advertising bans are partial, but the TV and radio do not carry tobacco advertisements, and sport sponsorship is said to have ended. However, there is substantial point-of-sale advertising and promotions targeting young people.

The Tobacco Industry in Sri Lanka

Farming: The number of registered tobacco growers rose during the 1980s and most of the 1990s, but fell sharply in 1998 and 1999. It is estimated that tobacco growing provides between 5,355 and 16,580 full-time equivalent jobs (the range depends on the labor requirements per hectare), which is just a fraction of one percent of the total labor force (0.08-0.25%). Earnings from tobacco farming and profitability vary widely. The industry estimates indirect farm-related jobs at 600 (fertilizer and pesticide supply etc.) The land area under tobacco halved between 1990 and 2000, with a corresponding fall in leaf volume. Yields have improved marginally.

Employment in tobacco *manufacturing* has fallen since 1990, from 6-7% of all manufacturing employment to 4-5% (the lower number refers to employment, the higher number also includes others engaged in the sector). Production volumes were fairly steady averaging around 5.2 billion sticks between 1995 and 1999, with a marked fall to 4.6 billion in 2000. An estimated approximately 3 billion bidis are produced annually as well. There is no information on illegal production of so-called "white cigarettes". Average salaries and wages in the tobacco industry are about half the level for all manufacturing, and have fallen slightly in real terms during the 1990s. Manufacturing sector indirect tobacco employment is estimated to be small, of the order of 150 people. There are about 41,000 *retailers* that sell tobacco products, which typically account for only a small part of their total turnover.

Prior to 1990, the only tobacco-specific taxes were an excise on locally grown leaf. In 1990, a new (specific) excise tax was introduced on cigarettes and pipe tobacco, and the rates were increased in 1994, and for cigarettes, again in 1995, 1998 and 2000. From 1995, the excise was differentiated by length of cigarette. By the end of 2000, excises accounted for about 77% of the retail price, and total cigarette revenues had risen to nearly 19 million Rupees. In real terms, the

1995 excise rate increase almost doubled the total revenue generated. Throughout the 1990s, tobacco has provided about 10% of total government revenues.

Export values of raw and manufactured tobacco have fallen, making Sri Lanka a net importer in tobacco trade, with a corresponding outflow of foreign exchange.

Analysis of determinants of tobacco product demand in Sri Lanka

A two-part demand model was estimated of the decision to smoke or not, and then the quantity of tobacco consumed, as a function of price, income, gender, type of occupation, education, age, and geographic location. Income was positively related to the probability of smoking, especially at low-income levels, while those with less education were more likely to smoke. Location was also highly significant. For those who smoke, higher prices are clearly (and statistically significantly) associated with lower consumption. Higher income in the middle-income range and higher education are associated with falling consumption, as in many other countries. People in the lower expenditure quintiles are clearly much more price-responsive to price changes; a 10% real price rise would cause total consumption (combining the effects of prevalence and smoking intensity) to fall by around 6% for lower income people, and 3% for higher income groups.

Simulations of the likely effects of price increases on consumption and tax revenues showed that large real price increases (at least 50%) are needed for a perceptible effect on prevalence rates. But price increases have a much stronger effect on the quantity of cigarettes smoked. The poorest households spent an average of just over 3% of total expenditures on tobacco products. A 10% price rise would cause a very small increase in the proportion of expenditures allocated to tobacco, but larger price rises would cause it to fall. Even very large price increases (100%) have negligible effects on the percentage of total expenditures allocated to tobacco products among high income groups, who spend an average of 0.6% of total expenditures on tobacco.

The study concludes that there is room for large real price increases that would benefit low-income families especially, by inducing them to smoke much less. Tax increases would not reduce total tax revenues, because the fall in consumption would be proportionately less than the tax increase. It also concludes that more public education on the harm caused by tobacco and the benefits of quitting or never starting to smoke is needed, especially targeted to less-educated people. There is also much still to do to prevent promotion and marketing to young people in Sri Lanka.

1. INTRODUCTION

The framework used for public policy on tobacco evolved in the 20th century from a foundation of morality to a foundation of health consequences. Today, public policy on tobacco is being argued on the basis of economics. This is evident in the history of the national policy on tobacco in Sri Lanka. Until the beginning of the last decade, government policy on tobacco control was limited to health warnings on cigarette packets and an excise tax on manufactured cigarettes. In 1990 the government introduced a tax on locally grown tobacco leaf. Since then, the government has increased the tax annually on tobacco leaf, manufactured cigarettes, and pipe tobacco, mainly to increase revenue.

Industry has resisted the government's attempts to curb the growth in tobacco use using economic arguments. In this context, this report undertakes a timely and important economic evaluation of the tobacco industry in Sri Lanka in terms of contributions made by the industry in providing employment, government revenue, and export earnings.

The structure of the report is as follows. Descriptive statistics on smoking behavior in Sri Lanka and trends are presented. The next section looks at the economic contribution of the industry. Direct and indirect employment in the tobacco industry is reported, and salaries and wages earned by individuals engaged in the industry are investigated. The tobacco taxes levied by the Sri Lankan government are described and their contribution to government revenue evaluated. Finally, an analysis of tobacco trade earnings, as well as raw and manufactured tobacco production in the country is presented.

Section 4 offers an in-depth economic analysis of the demand for tobacco products in Sri Lanka. Price and income elasticities are estimated for households in different economic conditions. These estimates describe the effect of price and income on tobacco demand. Since taxes are proportionate to household expenditure on tobacco, it is possible to simulate the effects of tobacco price increases on household expenditures on tobacco and estimate the corresponding effects on household tax burdens and government revenue.

2. TOBACCO CONSUMPTION TRENDS

Detailed information on the smoking habits of the Sri Lankan population over age 65 is not widely available. The data presented in this section were obtained from two surveys:

- Consumption, Production and Distribution Patterns of Tobacco, Alcohol and Other Drugs Among the Sri Lankan Population 1992, referred to as TAD 1992, which collected 1991 data (Alcohol and Drug Information Center 1992)
- Sri Lanka Integrated Survey 1999-2000, known as SLIS 2000, which collected 2000 data (World Bank 2000).

The TAD survey collected detailed information on the smoking behavior of individuals. However, it obtained information on three Sri Lankan districts only: Colombo, Hambantota, and

Polonnaruwa.¹ The SLIS (2000) survey was an island-wide survey weighted to obtain a nationally representative sample, but provides information only on the current tobacco use of individuals, including both smoking and chewing. Hereafter in this report, *current smokers* includes individuals who smoke any form of tobacco product, including cigarettes, bidi, cigar, and pipes. Individuals who smoke *or* chew tobacco are referred to as *tobacco users*.² Given the differences in coverage, a straightforward comparison of the results of these two surveys is difficult, but approximate comparisons of smoking patterns are provided where possible.

According to the TAD 1992 survey, in 1991, 43% of males in Colombo had smoked at some time in their lives, and 38% were current smokers. In comparison, in 2000 only 17% of males in Colombo were current tobacco users. Given that 2000 data provide a broader measure of tobacco use, including use of tobacco for chewing, these statistics clearly show that tobacco use among men declined over the years. Statistics for the other two districts and for females are given in Table 1. The current prevalence of tobacco use throughout Sri Lanka in 2000 was 24% for males, and 6% for females.

Table 1. Profile of smoking prevalence in Sri Lanka by sex, 1991 and 2000

District	Sex	Sample size	1991 ¹ Any experience with smoking ³	1991 Current smokers	2000 ²	
					Sample	Current tobacco users ⁴
Colombo	Male	962	0.43 (0.49) ⁵	0.38 (0.49)	1,161	0.17 (0.38)
	Female	965	0.01 (0.12)	0.01 (0.11)	1,151	0.03 (0.16)
	Total	1,927	0.22 (0.41)	0.20 (0.40)	2,312	0.10 (0.30)
Hambantota	Male	595	0.50 (0.50)	0.44 (0.50)	661	0.22 (0.42)
	Female	524	0.01 (0.11)	0.01 (0.10)	659	0.08 (0.28)
	Total	1,119	0.27 (0.44)	0.24 (0.43)	1,320	0.15 (0.36)
Polonnaruwa	Male	645	0.59 (0.49)	0.51 (0.50)	513	0.27 (0.44)
	Female	634	0.01 (0.11)	0.01 (0.11)	446	0.04 (0.20)
	Total	1,279	0.30 (0.46)	0.26 (0.44)	959	0.16 (0.37)
Sri Lanka	Male	-	-	-	17,027	0.24 (0.42)
	Female	-	-	-	17,297	0.06 (0.24)
	Total	-	-	-	34,324	0.15 (0.36)

1. Tabulated from TAD 1992 survey data.

2. Tabulated from SLIS 2000 data.

3. Any tobacco experience refers to both past and present smokers.

4. Tobacco users refer to individuals who consume tobacco in any form. This includes chewing tobacco.

5. Standard deviations are given in parentheses.

¹ The capital city of Sri Lanka, also called Colombo, is in Colombo district, a coastal district in the southwest corner of the island. Colombo district is more urbanized and developed than Sri Lanka's other 21 districts. Hambantota is also a coastal district in the South, Polonnaruwa is in the middle of the country. Both are rural farming districts.

² Since tobacco smokers are a subset of tobacco users at any one point in time, the prevalence of tobacco smokers must be smaller or equal to the prevalence of tobacco users.

2.1 Consumption of Different Types of Tobacco Products

Currently in Sri Lanka, tobacco is consumed in two forms: smoking and chewing. Chewing tobacco is used mainly as a complement to betel. Smoking is mainly done in the form of cigarettes, bidis, and cigars. Tobacco is also smoked in pipes, but in very small quantities. According to the TAD 1992 survey, the breakdown among the current smokers in Colombo was: 34% smoked cigarettes, 3% smoked bidis, and 2% smoked other types of tobacco, such as cigars and pipes.³ These and corresponding statistics for the other two districts and for females are presented in Table 2. The prevalence of current smoking for both cigarettes and bidis was less for Colombo, at statistically significant levels with 90% confidence limits. The SLIS 2000 survey does not provide detailed information on consumption of different types of tobacco products.

Table 2. Profile of current smokers by type – 1991

District	Sex	Sample	Cigarette smokers*	Bidi smokers	Other smokers
Colombo	Male	962	0.34 (0.47)	0.03 (0.17)	0.02 (0.12)
	Female	965	0.01 (0.11)	0.00 (0.00)	0.00 (0.00)
	Total	1,927	0.18 (0.38)	0.01 (0.12)	0.01 (0.09)
Hambantota	Male	595	0.36 (0.48)	0.06 (0.23)	0.12 (0.33)
	Female	524	0.01 (0.09)	0.00 (0.00)	0.00 (0.04)
	Total	1,119	0.20 (0.40)	0.03 (0.17)	0.07 (0.25)
Polonnaruwa	Male	645	0.38 (0.49)	0.23 (0.42)	0.06 (0.23)
	Female	634	0.01 (0.09)	0.00 (0.06)	0.00 (0.00)
	Total	1,279	0.19 (0.40)	0.12 (0.32)	0.03 (0.17)

Source: Tabulated from TAD 1992 survey data.

Notes: Standard deviations are given in parentheses. "Other smokers" include cigar and pipe smokers.

2.2 Current Tobacco Users by Age Category and Type

The prevalence patterns of smoking by age categories in 1991 were similar in all three districts under review, with the highest levels of smoking prevalence occurring in the 30 to 60 age groups (see Table 3). Even when the broader definition of tobacco use for 2000 is compared with current smokers, the prevalence rates appear to have declined from 1991 to 2000 in almost all age categories, except for the oldest. The decline in prevalence rates is greatest for the younger age groups.

³ Some individuals smoked more than one type of tobacco product; as a result the percentages sum to slightly more than the 38% of current smokers.

Table 3. Current male tobacco users by age group, 1991 and 2000

District	Age group	1991			2000	
		Sample	Cigarette smokers	Current smokers	Sample	Current tobacco users
Colombo	0 to 20	255	0.02 (0.14)	0.02 (0.15)	388	0.00 (0.06)
	20+ to 30	255	0.25 (0.44)	0.31 (0.46)	237	0.15 (0.35)
	30+ to 40	171	0.56 (0.50)	0.60 (0.49)	173	0.25 (0.43)
	40+ to 50	116	0.67 (0.47)	0.71 (0.46)	139	0.33 (0.47)
	50+ to 60	90	0.61 (0.49)	0.64 (0.48)	113	0.33 (0.47)
	60 plus	75	0.39 (0.49)	0.52 (0.50)	111	0.38 (0.49)
	Total	962	0.34 (0.47)	0.38 (0.49)	1,161	0.17 (0.38)
Hambantota	0 to 20	193	0.04 (0.19)	0.08 (0.28)	290	0.00 (0.05)
	20+ to 30	135	0.47 (0.50)	0.50 (0.50)	122	0.15 (0.36)
	30+ to 40	116	0.68 (0.47)	0.71 (0.46)	71	0.35 (0.48)
	40+ to 50	57	0.63 (0.49)	0.74 (0.44)	88	0.63 (0.49)
	50+ to 60	47	0.40 (0.50)	0.70 (0.46)	47	0.59 (0.50)
	60 plus	47	0.23 (0.43)	0.51 (0.51)	43	0.53 (0.51)
	Total	595	0.36 (0.48)	0.44 (0.50)	661	0.22 (0.42)
Polonnaruwa	0 to 20	124	0.10 (0.30)	0.13 (0.34)	217	0.00 (0.05)
	20+ to 30	183	0.39 (0.49)	0.45 (0.50)	105	0.30 (0.46)
	30+ to 40	138	0.63 (0.48)	0.72 (0.45)	65	0.62 (0.49)
	40+ to 50	92	0.49 (0.50)	0.73 (0.45)	64	0.58 (0.50)
	50+ to 60	52	0.33 (0.47)	0.63 (0.49)	36	0.66 (0.48)
	60 plus	56	0.21 (0.41)	0.48 (0.50)	26	0.41 (0.50)
	Total	645	0.38 (0.49)	0.51 (0.50)	513	0.27 (0.44)
Sri Lanka	0 to 20	124	-	-	6,820	0.01 (0.07)
	20+ to 30	183	-	-	3,055	0.16 (0.37)
	30+ to 40	138	-	-	2,256	0.43 (0.49)
	40+ to 50	92	-	-	1,974	0.52 (0.50)
	50+ to 60	52	-	-	1,510	0.53 (0.50)
	60 plus	56	-	-	1,412	0.45 (0.50)
	Total	645	-	-	17,027	0.24 (0.42)

Source: Tabulated from TAD 1992 survey data.

Notes: Standard deviations are given in parentheses.

2.3 Current Smokers by Income Category

The TAD 1992 survey contains individual information for five different income categories.⁴ Table 4 presents the prevalence of current smokers by income category and district. According to these data, the prevalence of smoking is lowest among the poorest individuals.

⁴ In 1991, average per capita income was Rs. 21,564 annually, or Rs. 1,797 monthly. The average exchange rate for 1991 was 41.20 rupees per US\$, so this was equivalent to US\$523 per capita per year, and US\$43.62 per month.

Table 4. Prevalence of current male smokers by income category, 1991

Income Group	District		
	Colombo	Hambantota	Polonnaruwa
Less than 1,000	0.21 (0.40)	0.34 (0.47)	0.38 (0.49)
1,001 – 2,000	0.60 (0.49)	0.72 (0.45)	0.70 (0.46)
2,001 – 3,000	0.62 (0.49)	0.59 (0.50)	0.59 (0.50)
3,001 – 5,000	0.45 (0.50)	0.68 (0.48)	0.57 (0.50)
More than 5,000	0.51 (0.50)	0.44 (0.53)	0.62 (0.50)

Source: Tabulated from TAD 1992 survey data.

Notes: Standard deviations are given in parentheses. Income groups are categorized according to monthly income.

Table 5 presents the prevalence of tobacco use by expenditure quintile. The expenditure quintiles were obtained by grouping the households by their per capita regional price-adjusted expenditures. According to this data, the all-island tobacco use prevalence levels are about the same for all quintiles except for the highest, where prevalence level is lower. Tobacco use prevalence patterns by expenditure quintiles, however, vary from district to district, with no consistent pattern in the two rural districts. Colombo has the highest prevalence in the lowest quintile, and considerably lower prevalence in the highest quintile than any other quintile.

Table 5. Prevalence of current male tobacco users by income category, 1999

Expenditure quintiles ¹	District			Sri Lanka
	Colombo	Hambantota	Polonnaruwa	
Quintile 1	0.25 (0.43)	0.21 (0.41)	0.13 (0.45)	0.23 (0.42)
Quintile 2	0.20 (0.40)	0.20 (0.40)	0.19 (0.46)	0.25 (0.44)
Quintile 3	0.19 (0.40)	0.24 (0.43)	0.17 (0.43)	0.26 (0.44)
Quintile 4	0.21 (0.41)	0.27 (0.45)	0.15 (0.44)	0.24 (0.43)
Quintile 5	0.13 (0.33)	0.13 (0.34)	0.17 (0.43)	0.19 (0.39)

Source: Tabulated from SLIS 2000 survey data.

Notes: Standard deviations are given in parentheses. Income groups are categorized according to monthly per capita expenditure. The threshold per capita levels for different expenditure quintiles are as follows: 1) less than or equal to Rs. 1,062; 2) more than Rs. 1,062, but less than or equal to Rs. 1,383; 3) more than Rs. 1,383, but less than or equal to Rs. 1,746; 4) more than Rs. 1,746, but less than or equal to Rs. 2,365; 5) more than Rs. 2,365.

2.4 Current Smokers by Education Category

Table 6 presents male smoking prevalence by education category. Bidis were popular among the lesser-educated individuals in all districts, while the pattern of cigarette consumption was more or less similar among males in all education categories in 1991.

The prevalence of tobacco use declined sharply for more educated individuals from 1991 to 1999, while for the least-educated group it has roughly remained the same. The prevalence of tobacco use for Sri Lanka in 2000 is highest in the lowest education group and lowest in the highest education group.

Table 6. Current male smokers by education category, 1991 and 2000

District	Education category	1991			2000	
		Sample	Cigarette smokers	Current smokers	Sample	Tobacco users
Colombo	Primary	220	0.36 (0.48)	0.40 (0.49)	116	0.44 (0.50)
	Secondary	336	0.38 (0.48)	0.44 (0.50)	299	0.33 (0.47)
	Passed O/L	214	0.43 (0.50)	0.30 (0.46)	247	0.16 (0.36)
	Passed A/L	84	0.27 (0.45)	0.45 (0.50)	134	0.07 (0.26)
	Degree	27	0.26 (0.45)	0.30 (0.47)	19	0.24 (0.44)
	Total	881	0.37 (0.48)	0.42 (0.49)	815	0.25 (0.43)
Hambantota	Primary	248	0.36 (0.48)	0.50 (0.50)	118	0.58 (0.50)
	Secondary	214	0.37 (0.48)	0.43 (0.50)	143	0.32 (0.47)
	Passed O/L	73	0.40 (0.49)	0.47 (0.51)	73	0.18 (0.39)
	Passed A/L	36	0.42 (0.50)	0.41 (0.50)	40	0.05 (0.23)
	Degree	6	0.33 (0.52)	0.33 (0.52)	8	0.00 (0.00)
	Total	577	0.37 (0.48)	0.46 (0.50)	382	0.35 (0.48)
Polonnaruwa	Primary	287	0.45 (0.50)	0.62 (0.49)	119	0.60 (0.49)
	Secondary	254	0.35 (0.48)	0.46 (0.50)	103	0.55 (0.50)
	Passed O/L	57	0.30 (0.46)	0.28 (0.46)	79	0.11 (0.32)
	Passed A/L	32	0.25 (0.44)	0.39 (0.49)	14	0.13 (0.35)
	Degree	9	0.11 (0.33)	0.22 (0.44)	0	-
	Total	639	0.38 (0.49)	0.51 (0.50)	315	0.44 (0.50)
Sri Lanka	Primary	-	-	-	2,973	0.53 (0.50)
	Secondary	-	-	-	4,111	0.35 (0.48)
	Passed O/L	-	-	-	2,271	0.19 (0.39)
	Passed A/L	-	-	-	1,055	0.13 (0.33)
	Degree	-	-	-	171	0.09 (0.29)
	Total	-	-	-	10,581	0.34 (0.47)

Source: Tabulated from TAD 1992 survey data.

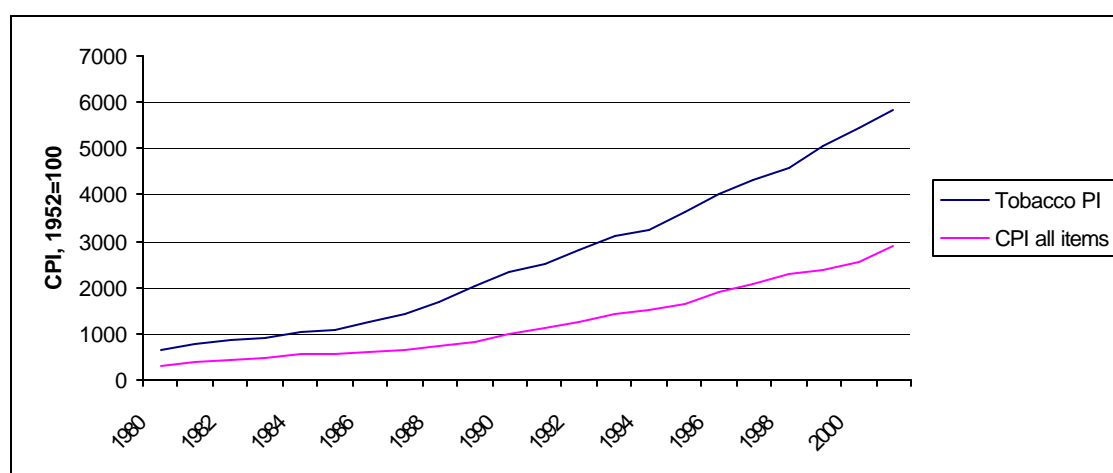
Notes: Standard deviations are given in parentheses. Primary: individuals who have at most had six years of formal education. Secondary: Individuals who have had seven to 10 years of formal education. Passed O/L: individuals who have passed the government- conducted ordinary level examination. Passed A/L: individuals who have passed the government-conducted advance level examination. Degree: individuals who have obtained degrees or have had some type of technical training. Education information was missing for 183 individuals; as a result the total smoking data by district may not correspond with data in Table .2.

2.5 Government Policy and Trends in Consumption Levels

As can be seen in the data presented in Tables 1 to 6, the prevalence rates of tobacco use have declined over the last nine years. This can be explained in part by the tobacco policy changes during the last decade in Sri Lanka. Before 1990, government anti-tobacco policy was limited to health warnings on cigarette packets and an excise tax imposed on manufactured cigarettes. In 1990, the government introduced a tax on locally grown tobacco leaf. Subsequently, the government has increased the tax on tobacco leaf, manufactured cigarettes, and pipe tobacco annually, mainly with the objective of increasing government revenue. Excise tax rates on manufactured tobacco products have increased substantially over the years. In January 1995, the average excise tax on cigarettes was 27.6% of the retail sales price; by December 2000 this had

increased to 76.8%. Figure 1 compares price increases for tobacco products to the general consumer price index. The gap between the two lines shows clearly the rise in real cigarette prices, especially in the 1990s. The average tobacco price rose by 90% between January 1995 and the end of 1999, from US\$3 per pack to US\$5.69. All other prices rose 45% during the same period, so tobacco prices rose 45% in real terms.

Figure 1. Tobacco Price Index and General Consumer Price Index, 1980-2001.



Source: Department of Census and Statistics, Colombo.

Note: The base year for the CPI (all items and tobacco) is 1952. The relative values would remain the same if a later base year were used (but the index numbers would change).

Other policy measures include a restriction on tobacco sales to children under 16, and a limit of 16 milligrams of nicotine content on all tobacco products sold. In 1997 the president appointed a special Task Force on Tobacco and Alcohol Policy to recommend policy measures with a view to improving the health and well-being of all Sri Lankans and reducing tobacco-related harm. Most tobacco control measures in the past have focused on anti-tobacco advertisements and restriction of advertising and promotional campaigns. Currently there is no legislation banning advertising of tobacco products. However, all radio and television stations, led by the two public radio and television stations (Sri Lanka Broadcasting Corporation and Sri Lanka Rupavahini Corporation), by consensus do not carry tobacco-related advertisements. Until recently, newspapers were the only public medium through which tobacco products were advertised. The Ceylon Tobacco Company introduced a self-regulated advertising code in March 2000, which stopped all brand advertising in the media. As a result, advertising in the print media and on billboards, and sponsorship of sporting events has ceased. However tobacco products, especially cigarettes, continue to be advertised at the point of sales in shops, on vehicles used for distribution of tobacco products, at discos and clubs frequented mainly by young adults, and through promotional campaigns.

3. OVERVIEW OF THE TOBACCO INDUSTRY IN SRI LANKA

3.1. Employment

The tobacco industry consists of three main activities: leaf growing and initial processing (cultivation); manufacturing; and distribution and retailing. In turn, these three activities consist of many support elements and together form a chain of linked activities.

The nucleus of the industry is manufacturing. This transforms leaf and other inputs into manufactured tobacco products. The leaf suppliers to the manufacturers, the tobacco farmers, form the backward link of the tobacco industry chain. Other inputs include paper and packaging, chemicals and other additives. Services to get the final product to the consumer, such as distribution and retailing, form the forward links.

Employment in all activities in the tobacco chain is considered direct employment. Employment created by activities in the goods and services needed from other sectors of the economy is considered indirect employment. For example, the providers of fuel (wood or paddy husks) needed to cure tobacco leaf are not directly employed in the industry, but the tobacco industry is part of their market.

Ceylon Tobacco Company (CTC), a subsidiary of the multinational British American Tobacco (BAT), is the only registered company in Sri Lanka that produces cigarettes. In addition, there are a number of bidi and cigar manufacturers in the country, but data on the exact number are difficult to obtain. The All Sri Lanka Bidi Manufacturer's Society has a membership of 64 bidi manufacturers. Most are large-scale bidi manufacturers with a manufacturing capacity of about 10 million bidis per month (approximately, 0.8 kilograms of cured and crushed tobacco is needed to make 1,000 bidis). In addition, there are a number of small-scale bidi manufacturers and illicit "white cigarette" manufacturers.⁵

Employment in Tobacco Cultivation

In Sri Lanka, tobacco is grown year-round in the two seasons: the Maha (November to May) and the Yala (May to November). The time span from preparing nurseries to cultivating and removing tobacco plants is roughly six to seven months. The labor requirements for tobacco cultivation vary widely during this time, with peak employment occurring at the initial and harvesting phases. Some tasks, such as tilling and applying fertilizers and insecticides, are now being mechanized; however, the majority of the tasks are still carried out manually.

Tobacco farmers can be divided into two main categories depending on the type of tobacco grown, the main markets for their produce, and the curing of tobacco leaf: farmers who grow

⁵ Illicit "white cigarettes" are a recent phenomenon in Sri Lanka. They look very similar to brand-name cigarettes, but are manufactured in home-based industries just as bidis are. As a result, "white cigarettes", like bidis, are not subject to the taxes imposed on brand-name cigarettes.

tobacco for CTC and farmers who grow tobacco for the bidi and cigar industries.⁶ Tobacco for CTC is heat cured in barns, while tobacco for bidis and cigars is cured in the sun. “Barn-owners” cure tobacco from their own farms and from other farmers in the area. Farmers who sell their tobacco to barn-owners are usually referred to as “sub-growers”.⁷

Table 7 shows the number of barn-owners and sub-growers who are involved in growing tobacco for CTC. However, these numbers do not accurately indicate the employment created in tobacco cultivation. Most tobacco farmers grow more than one crop at a time, and employment in tobacco cultivation is seasonal. Some farmers with big plots may need to hire labor to cultivate tobacco, while others may only be employed in the tobacco industry part-time.

Table 7. Tobacco leaf suppliers to CTC

Year	Number of registered farmers	
	Barn-owners	Sub-growers
1985	3,712	27,974
1986	3,600	28,800
1987	3,420	23,840
1988	3,612	27,896
1989	3,410	27,280
1990	3,210	25,680
1991	4,150	29,050
1992	5,240	36,680
1993	5,475	32,850
1994	6,702	33,510
1995	6,336	31,680
1996	7,420	29,680
1997	8,743	34,972
1998	3,518	21,108
1999	3,412	22,156

Source: Tobacco Unit, Ministry of Agriculture

A more accurate measure of the employment created by tobacco farms is the number of full-time equivalent jobs created. In order to calculate the total labor requirements for cultivation in Sri Lanka, we first collected information on the labor requirements for a hectare of tobacco through interviews with 12 tobacco farmers from two tobacco-growing areas.⁸ Then total employment created by tobacco farming was calculated by multiplying that number by the number of hectares under cultivation.

⁶ There are also a small number of farmers who grow tobacco for chewing.

⁷ Tobacco barn-owners and sub-growers have to register with the Tobacco Unit of the Ministry of Agriculture. The government controls the production of tobacco by restricting the number of barn owners. Currently the Tobacco Unit of the Ministry of Agriculture is not issuing any new permits. There are a few barn-owners who have abandoned tobacco cultivation for various reasons. When possible, these farmers’ permits are transferred to new tobacco farmers. One of the main reasons for discontinuing tobacco cultivation is the unwillingness of the next generation to remain in farming

⁸ Farmers were interviewed in areas around Welimada and Anuradhapura. Welimada is a small town in the mountains of Sri Lanka. Anuradhapura and the area surrounding it, is on flat land.

The total labor requirement from planting to curing varied among farmers from 218 to 404 person-days per hectare, with an average of 291.4 person-days per hectare over a six- to seven-month period. Assuming that a season is six-and-a-half months, or 195 days, the total labor requirement is roughly 1.1 to 2.1 persons a day.

Labor requirements varied for several reasons. Larger farms required less labor per hectare of land than smaller farms, possibly due to economies of scale. Labor requirements were greater for farms on uneven terrain. The use of machines, such as tractors for tilling land, lowered labor requirements. Some farmers maintained their own nurseries, while others purchased plants from outside nurseries, thus reducing labor requirements marginally. Labor requirements also changed for other crops from season to season, depending on the need to apply pesticides and fertilizers, and on weather conditions. Minimum, maximum, and average labor requirements by task are presented in Table 8.

Table 8. Labor requirement for cultivating and curing tobacco (days per hectare)

Tasks	Minimum	Average	Maximum
Maintaining nurseries to cultivating			
Nursery-related	0.0	1.0	2.0
Watering	2.7	4.5	6.0
Tilling and preparing land	4.0	23.2	36.0
Planting	7.5	15.0	20
Applying fertilizer	2.0	17.3	44.0
Weeding	4.0	12.0	40.0
Spraying pesticides	6.7	28.1	48.0
Harvesting	50	92.4	126.0
Storing	10.0	15.7	25.0
<i>Sub-Total</i>	<i>141</i>	<i>191.5</i>	<i>250.0</i>
Curing to transporting to market			
Curing-related	30	81.1	200
Grading	25	38.2	60
Transporting leaves to the market	15	17.5	20
<i>Sub-Total</i>	<i>66.7</i>	<i>99.9</i>	<i>200</i>
Total	218	291.4	404.0

Source: Survey results.

Tobacco cultivation by season and type of tobacco leaf is given in Table 9. Based on these data and the estimated labor requirement per hectare of tobacco, the number of persons employed in tobacco cultivation for three different estimates of labor requirements for a hectare of land is shown in Table 10. Accordingly, the number of persons employed by tobacco farms on a full-time equivalent basis is between 5,355 and 16,580 people (depending on the year and the estimated labor needed). Given that the total labor force in the country in 1999 was 6,673,000 persons, this amounts to 0.08% to 0.25% of the total labor force.

Table 9. Tobacco cultivation by season and type of tobacco leaf (hectares)

Year	Tobacco for bidi and chewing			Tobacco for cigarette		
	Maha	Yala	Total	Maha	Yala	Total
1990	1,520	400	1,920	4,380	2,620	7,000
1991	700	330	1,030	4,500	2,430	6,930
1992	970	370	1,340	4,530	2,520	7,050
1993	1,190	240	1,430	4,840	3,160	8,000
1994	1,020	240	1,260	4,740	3,540	8,280
1995	980	250	1,230	4,380	2,980	7,360
1996	800	280	1,080	4,190	2,930	7,120
1997	890	240	1,130	3,480	3,220	6,700
1998	620	260	880	3,150	2,720	5,870
1999	730	130	860	1,890	2,040	3,930

Source: Census and Statistics

Table 10. Employment created by tobacco farms

Year	Extent of land cultivated (hectares)	Estimated labor requirement per hectare of land		
		Minimum	Average	Maximum
		(1.1)	(1.5)	(2.1)
1990	8,920	9,972	14,903	30,875
1991	7,960	8,899	13,299	27,553
1992	8,390	9,380	14,017	29,041
1993	9,430	10,542	15,755	32,641
1994	9,540	10,665	15,939	33,021
1995	8,590	9,603	14,351	29,733
1996	8,200	9,167	13,700	28,383
1997	7,830	8,754	13,082	27,103
1998	6,750	7,546	11,277	23,364
1999	4,790	5,355	8,003	16,580

Source: Authors' calculations from survey and census data

There are no official data on indirect employment created by tobacco farms. However, CTC estimates that roughly 600 full-time jobs were created by the tobacco-growing industry in 1997 (Org-Marg Smart 1998). These include employment opportunities created by suppliers of chemicals, fertilizer, other goods, machinery, and services.

Employment in Manufacturing

According to 1997 data, cigarette manufacturing accounts for an estimated 89% of the value and 50% of the volume of all tobacco products sold in Sri Lanka (Org-Marg Smart 1998). Cigarette manufacturing is dominated by a single multinational firm, the Ceylon Tobacco Company (CTC), which has highly automated factories that produce goods that cater to international markets. Bidi and cigar manufacturing, on the other hand, are both cottage industries and are very labor intensive. The production of bidis and cigars is spread among many establishments,

each centering on merchants who organize the entire manufacturing process from leaf purchase to manufacturing and distribution.

Employment at CTC. CTC in Colombo is the only official cigarette manufacturer in Sri Lanka, and in 1997 employed 818 persons on a full-time basis. Employment at CTC since 1990 has been declining steadily (Table 11). This reduction is partly due to mechanization and related productivity increases and partly, according to CTC, due to declining demand.

Table 11. Employment at CTC, 1990–1997

Year	1990	1991	1992	1993	1994	1995	1996	1997
No. of employees	1,688	1,692	1,544	1,370	1,191	1,113	1,010	818

Source: Ceylon Tobacco Company, Census and Statistics Department

Table 12 shows recent employment trends in the tobacco industry for all establishments with five or more workers based on a survey conducted by the Department of Census and Statistics. The data show employment in all tobacco manufacturing industries, including the CTC, bidi and cigar manufacturing industries.⁹ The data are presented for number of persons engaged in the industry as well as those employed by the industry. Persons engaged include those who work in or for the establishment, including working proprietors, active partners, unpaid family workers, operatives, and all other employees. Since some persons engaged in the industry may not be involved in the industry on a full-time basis, the full-time equivalent number of persons may be lower than the number reported. The actual number of persons employed and engaged in the industry could be slightly higher than the data given in Table 12, as data presented only include employment in establishments with more than five workers. The data also do not take into account persons illegally engaged in the industry, such as white cigarette manufacturers.

As Table 12 shows, from 1990 to 1997 the number of establishments manufacturing tobacco products decreased from 2,384 to 1,843. There was also a decline in the number of people engaged in and employed by the tobacco industry.¹⁰ As a percent of total employment in the manufacturing sector, the importance of the tobacco industry declined steadily from 1990 to 1997. In 1990, people directly engaged in the tobacco industry accounted for 7.39% of the manufacturing sector total. By 1997 it had dropped to 4.88%. This decline is a result of both the falling numbers in tobacco manufacturing and rising employment in other manufacturing sectors.

⁹ The reported data are for employment in the manufacturing sector only. Some establishments are involved in both manufacturing and distributing. In these establishments, employment for manufacturing alone is included.

¹⁰ Persons engaged in the tobacco industry include working proprietors, unpaid family workers, and operative workers, whose wages are not fixed. On the other hand, persons employed in the industry include skilled and unskilled operatives, and administrative, technical, and clerical employees. These individuals usually draw a fixed salary.

Table 12. Activity in the tobacco industry (establishments with more than 5 people)

Year	No. of establishments	No of employees ¹	No. of persons engaged ²	Tobacco employees as % of all manufacturing sector employees	Persons engaged as % of manufacturing sector total
1990	2,384	25,203	32,061	6.11	7.39
1991	2,419	26,838	32,419	6.04	6.95
1992	2,342	26,276	32,082	-	-
1993	2,266	25,713	31,746	5.15	6.61
1994	2,252	18,202	23,483	3.50	4.68
1995	2,280	23,114	30,304	4.67	5.89
1996	2,262	22,441	27,384	4.64	5.49
1997	1,843	17,593	22,371	3.98	4.88

Source: Annual Survey of Industries, Department of Census and Statistics, Ministry of Finance and Planning

1. Employees are all persons who work for a wage in the industry.

2. Persons engaged include persons working for a wage as well as persons who are attached to the industry without receiving a wage, such as owners and workers who work without pay.

Indirect Employment in Tobacco Manufacturing

Indirect employment in tobacco manufacturing industries consists of employment in businesses supplying goods and services to cigarette, bidi, and cigar manufacturers. Since many of these establishments supply services to a multitude of industries, estimating employment created by the tobacco industry in these industries is difficult. According to the 1997 Annual Survey of Industries 1997 by the Department of Census and Statistics, the cost of the industrial services¹¹ provided by others amounted to Rs.16,487,707 in 1996. Assuming an average annual wage of Rs. 104,000 (the actual average for technical grade employees attached to the tobacco industry in 1996) for industrial services, this yields an indirect employment of 158 in manufacturing for 1996.

Employment in Distribution and Retailing of Tobacco Products

As in most countries, the retail chain in Sri Lanka is complex. Tobacco products are retailed through a great variety of outlets, ranging from small family businesses, to grocery shops, convenience stores, hotels, restaurants, snack bars, large retail chains, and supermarkets. A 1997 census by Org-Marg Smart, a private research consulting company in Sri Lanka, revealed that in the urban areas, 66.5% of all grocery stores and 76% of all restaurants and eateries sold cigarettes. Therefore there are approximately 41,000 retailers selling cigarettes. There are approximately 60 distributors and 31,000 retailers that deal directly with CTC. Since almost all of these sales outlets sell a variety of goods along with tobacco products, it is difficult to identify

¹¹ This includes contract and commission work done by others on materials supplied by the establishment and repairs and maintenance services provided by others.

the employment created by tobacco products. Little or no information is available on bidi and cigar distribution and retailing.

3.2 Average Wages and salaries from tobacco

Income from Tobacco Cultivation

Income from tobacco cultivation consists of the net earnings of the farmers, earnings of the tobacco farm laborers, and wages and salaries paid to employees involved in tobacco cultivation. A survey of 12 farmers revealed that the profits from growing a hectare of tobacco ranged widely (from Rs. 1,600 to Rs. 48,450). The average profit was Rs. 25,606.¹² Location was a key factor in determining profits, and labor requirements varied across farms. Some farmers grew tobacco on rented land, which reduced their profits. The costs of other inputs such as fertilizer and pesticides also varied among farmers, affecting their profits.

The earnings of the tobacco farm laborers ranged from Rs. 100 to Rs. 250 per day (in 2001 prices), depending on location, age, gender, and experience of the worker. However, as discussed earlier, the employment provided by tobacco farms is seasonal, so these wages were not steady throughout the year.

When asked about the profitability of growing tobacco compared to other crops, the reaction of farmers was quite divergent. In some areas, tobacco is considered an attractive crop for farmers, providing a higher net income per unit of land than most other cash crops, and substantially more income than food crops. Some farmers who grow tobacco for CTC noted that their decision was also influenced by guaranteed crop prices, loans, and other technical advice from CTC. Recently, CTC has been conducting many seminars and training sessions on increasing profitability by reducing input costs.

Some farmers said they grew tobacco because it requires less labor and water, and is easier to protect from wild animals, than other crops.¹³ Financially, the high costs of inputs and the low revenue, due to downgrading of cured leaf,¹⁴ discourage farmers from growing tobacco. In addition, the inability to use tobacco for home consumption, the inability to grow tobacco on the same plot for several seasons because the tobacco leaches nutrients from the soil, and the adverse health problems associated with cultivating tobacco discourage farmers from growing it.¹⁵

¹² Here, profit is defined as revenue minus total cost. Costs include the opportunity costs of family members who worked in the farms, but not an imputed rent for land owned by the farmer.

¹³ Especially in areas threatened by wild elephants, tobacco is the only crop farmers could grow.

¹⁴ After the tobacco leaf is cured it is graded, and purchase prices differ according to the quality of the leaf. The prices are decided every season at a meeting attended by CTC, the Tobacco Unit of the Ministry of Agriculture and the Barn-Owners Association. As of February 2001, there were six grades. The price for a kilogram of cured tobacco ranges from Rs. 150 to Rs. 65 across these grades. The residuals and the cured tobacco below the graded standards (perish) are used by bidi manufacturers and sold at a rate of about Rs. 7 per kg.

¹⁵ According to some farmers, work on tobacco farms can be carried out only during early morning (before 10 AM) or in the late afternoon (after 4 PM), as farmers are not able to withstand the vapor from the tobacco plants when the sun is strong.

Wages and Salaries in Tobacco Manufacturing

The salaries and wages received by workers in the tobacco industry are shown in Table 13. In 1996, for example, a person employed in the tobacco manufacturing industry earned on average Rs.17,520 annually. In comparison, the 1996 average wages and salaries for the whole manufacturing sector were Rs. 43,817 annually. This large difference may be partly explained by the fact that small establishments employ most individuals engaged in the tobacco industry. In 1996, small establishments that engage five to 25 workers employed 70% of the workers in the tobacco manufacturing industries. In comparison, in the manufacturing sector as a whole, only 19% of employees worked in small establishments.

Table 13. Wages and salaries in the tobacco industry by year, nominal and real values (1990=100)

Year	Salaries and wages (tobacco industry total) (Rs. nominal)	Salaries and wages (tobacco industry total) (Rs. Real, 1990=100)	Average salaries and wages (per person employed) (Rs.)	Average salaries and wages (per person employed) (Rs. Real, 1990=100)
1990	297,839,326	297,839,326	11,818	11,818
1991	368,765,217	328,711,090	13,740	12,248
1992	-	-	-	-
1993	430,782,932	308,497,348	16,754	11,998
1994	315,948,269	208,632,594	17,358	11,462
1995	344,340,737	211,177,227	14,897	9,136
1996	393,164,530	207,974,902	17,520	9,268
1997	387,397,383	187,032,215	22,020	10,631

Source: Industry Survey, Census and Statistic Department, Ministry of Finance (nimla values), editor's calculations for real values.

Note: Only establishments with five or more persons engaged are considered.

3.3 Tobacco Taxes

Government raises revenue from the tobacco industry through two means: taxes imposed exclusively on the industry and taxes imposed on all goods and services. Taxes imposed exclusively on tobacco products consist of excise duty on both unmanufactured and manufactured tobacco, duty on tobacco imports, and corporate taxes on profits. In addition, tobacco products are also subjected to a goods and services tax and a defense levy imposed on all goods and services.

Excise Tax

Prior to 1990, only one excise tax existed. This was imposed on locally grown tobacco leaf and charged at the time of sale of raw tobacco. In November 1990, a new tax was introduced on manufactured cigarettes under the Excise (Special Provision) Act, No. 13 of 1989. This Act made cigarettes the only tobacco product subjected to an excise duty.

The method of taxing manufactured tobacco products has changed over the years (see Table 14). Until 1995, the number of cigarettes was taxed, irrespective of length and weight. In response, the industry attempted to reduce the impact of the tax by lengthening the cigarettes, and in turn, the government changed the method of taxation. From 1995 on, the tax was differentiated according to the length of the cigarette. Initially cigarettes were categorized into two groups according to length; at present there are five different length categories.

Table 14. Excise taxes on tobacco according to categories (Rs.) and CPI

Selected years	Tax on manufactured cigarettes (per 1,000 sticks)	Pipe tobacco per kg	CPI, 1990=100
1990	135	50	100
1994	700	250	151
1995	2,340 to 3,500	250	163
1998	2,702 to 3,350	250	227
2000	2,249 to 4,824	-	252

Source: Sri Lanka Customs

Note: The applicable tax rates were differentiated according to the length of the cigarette after 1995.

Excise tax rates on manufactured tobacco products have increased substantially over the years, even taking inflation into account. In January 1995, the average excise tax on cigarettes was 27.6% of the retail sales price. By December 2000, it had increased to 76.8%. Tax on unmanufactured tobacco has not changed as much. Currently there is a tax of Rs. 10 on a kilogram of unmanufactured tobacco.

Import duty

Since 1996, small amounts of imported cigarettes have entered Sri Lanka. In 2000, 4.2 million sticks were imported. This amounted to less than 1% of the cigarettes manufactured in the country. As with manufactured cigarettes, the duty on imported cigarettes differs according to their length. In addition to the duties on manufactured cigarettes, a 75% duty is charged on unmanufactured tobacco products (see Table 15).

Table 15. Duty on imports

Tobacco product	1996	1999
Unmanufactured tobacco	75%	75%
Manufactured tobacco and pipe tobacco	250% or Rs.1370 per kg	250% or Rs.1370 per kg
Cigars	Rs. 1370 per kg	Rs. 1370 per kg
Bidis	Rs. 1570 per kg. or 50%	Rs. 1570 per kg or 50%
Cigarettes	100%	100% or Rs.1468-4042 per 1,000 sticks
CPI	100	125

Source: Sri Lanka Customs

3.4 Revenue from the Tobacco Industry

The Excise Department of Customs administers the collection of excises. Table 16 shows total tax revenue from manufactured and imported cigarettes since 1995.

Table 16. Tax revenue from manufactured and imported cigarettes (Rs. Million nominal, and real using 1995 as the base year=100)

Year	Manufactured (actual Rs m.)	Manufactured (real values)	Imported (actual Rs m.)	Imported (real values)
1995	5,820.2	5,820.20	-	-
1996	13,417.5	11,573.10	0.73	0.63
1997	14,146.2	11,136.30	13.40	10.55
1998	15,154.8	10,907.95	5.39	3.88
1999	17,587.9	12,091.91	16.40	11.28
2000	18,837.7	12,198.00	1.95	1.26

Source: Sri Lanka Customs (nominal values), editor's calculations for real values

Table 17 shows the direct levies (i.e., total excise tax) collected by the government from CTC as taxes on unmanufactured and manufactured tobacco. In 1999, the excise tax revenue on cigarettes was Rs. 20,297 million, accounting for almost half of total excise duty collected by the government. Despite the continuous decline in cigarette sales, the excise tax revenue from cigarettes has been growing at a steady rate. As mentioned above, other government levies include a 12.5% goods and services tax and a 7.5% defense levy on the gross value of sales at each stage of production.

Corporate Taxes

In addition to the above-mentioned taxes, the government collects a corporate tax and a pay-as-you-earn tax on the personal income of employees involved in the tobacco industry. As bidi and cigar manufacturing is mostly a cottage industry, the direct tax payments are negligible. The revenue collected by the government in the form of corporate tax from CTC is given in Table 17.

Table 17. Government revenue from direct and indirect levies (Rs. Million in nominal and real values, 1989=100)

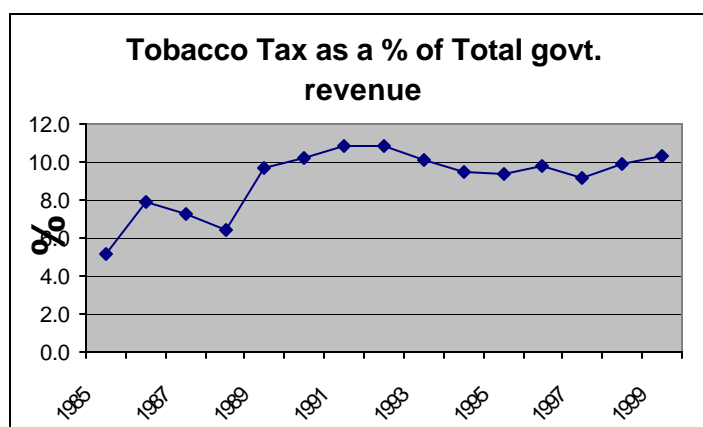
Year	Nominal values			Real values, 1989=100		
	Direct levies	Other government Levies	Corporate taxes	Direct Levies	Other Government Levies	Corporate taxes
1989	5,250	79	177	5,250	79	177
1990	6,904	376	256	5,683	309	211
1991	8,243	355	256	6,048	260	188
1992	9,316	556	215	6,136	366	142
1993	9,938	298	262	5,858	176	154
1994	10,468	470	224	5,690	255	122
1995	12,728	1,238	308	6,425	625	155
1996	14,380	426	268	6,261	185	117
1997	15,180	1,076	213	6,032	428	85
1998	17,397	94	197	6,321	34	72
1999	20,297	184	272	7,044	64	94

Source: Ceylon Tobacco Company, Colombo, and editor's calculations for real values

Significance of Tobacco Taxes for Government Revenue

The revenue collected from tobacco is a significant contributor to total government revenue in Sri Lanka. As seen in Figure 1, since 1989 the tax revenue from tobacco products has fluctuated around 10% of total government revenue.

Figure 1. Tobacco tax as a percentage of total government revenue



Source: Central Bank Annual Report, Ceylon Tobacco Company

3.5 Tobacco trade earnings

Sri Lanka imports and exports both manufactured and raw tobacco. The domestic cigarette manufacturing industry absorbs most of the cured crop, so exports of tobacco leaf are relatively insignificant. Some specific types of tobacco needed for special blends have been imported even in years when overall, the total volume of tobacco grown in Sri Lanka exceeded the amount needed for domestic tobacco product manufacturing.

Table 18 shows the value of trade in manufactured and raw tobacco. As can be seen, the value of total tobacco imports to the country – mainly due to a rise in raw tobacco products – has increased in nominal terms, but fallen in real terms except for 1999, while the value of exports has decreased considerably in real and nominal terms. Sri Lanka has moved from being a net exporter of tobacco products to a net importer. Trade in manufactured tobacco products has fallen, but was always much smaller than the value of trade in raw tobacco.

Table 18. Trade in manufactured and raw tobacco products (Rs. Millions nominal, and real values, 1995=100)

Year	Manufactured		Raw		Total		
	Imports	Exports	Imports	Exports	Imports	Exports	Net Exports
1995	794	648	2,214	3,021	3,008	3,669	661
1996	733	294	2,483	3,229	3,216	3,523	307
1997	1,053	348	2,519	1,831	3,572	2,179	-1,393
1998	444	191	2,496	2,611	2,940	2,802	-138
1999	390	131	3,825	1,662	4,215	1,793	-2,422
	Real values, 1995=100						
1995	794	648	2,214	3,021	3,008	3,669	661
1996	632	254	2,142	2,785	2,774	3,039	265
1997	829	274	1,983	1,441	2,812	1,715	-1,097
1998	320	137	1,797	1,879	2,116	2,017	-99
1999	268	90	2,630	1,143	2,898	1,233	-1,665

Source: Sri Lanka Customs (nominal values), editor's calculations for real values.

Manufactured tobacco exports consist mostly of cigarettes exported by CTC. The key market is the Middle East, although exports to that region have decreased over the past five years due to price increases in that market. The main sources for imported manufactured tobacco products in 1999 were the United States, Hong Kong, and Singapore.

3.6 Raw and Manufactured Tobacco Production

Raw Tobacco Production

As noted, Sri Lanka grows tobacco mainly as a raw material for the bidi and cigarette industries; a very small amount of tobacco is grown for chewing. Both the number of hectares under tobacco cultivation and raw tobacco production have declined over time for both types of tobacco (see Tables 19 and 20). Over the last decade, the number of hectares under tobacco cultivation declined by 54% from 8,920 to 4,790 hectares.

Raw tobacco production has been declining for both types of tobacco over the past several years. Agricultural productivity – measured in terms of yield per hectare – of tobacco grown for making cigarettes has improved marginally over time, largely influenced by technical support from the CTC to farmers.

Table 19. Tobacco cultivation by season and type of tobacco leaf (hectares)

Year	Tobacco for bidi and chewing			Tobacco for cigarettes		
	Maha	Yala	Total	Maha	Yala	Total
1990	1,520	400	1,920	4,380	2,620	7,000
1991	700	330	1,030	4,500	2,430	6,930
1992	970	370	1,340	4,530	2,520	7,050
1993	1,190	240	1,430	4,840	3,160	8,000
1994	1,020	240	1,260	4,740	3,540	8,280
1995	980	250	1,230	4,380	2,980	7,360
1996	800	280	1,080	4,190	2,930	7,120
1997	890	240	1,130	3,480	3,220	6,700
1998	620	260	880	3,150	2,720	5,870
1999	730	130	860	1,890	2,040	3,930

Source: Census and Statistics.

Table 20. Tobacco cultivation by season and type of tobacco leaf (metric tones)

Year	Tobacco for bidi and chewing			Tobacco for cigarettes		
	Maha	Yala	Total	Maha	Yala	Total
1990	1,900	600	2,500	4,800	3,100	7,900
1991	900	470	1,370	4,900	2,920	7,820
1992	1,100	500	1,600	4,700	2,900	7,600
1993	2,700	400	3,100	4,700	3,800	8,500
1994	2,480	340	2,820	4,830	4,600	9,430
1995	2,320	350	2,670	4,500	4,220	8,720
1996	2,020	380	2,400	4,190	4,140	8,330
1997	1,250	340	1,590	3,500	4,900	8,400
1998	910	350	1,260	4,200	3,590	7,790
1999	820	170	990	2,240	2,780	5,020

Source: Census and Statistics.

Manufactured Tobacco Production

Cigarette Production

Table 21 shows the production of cigarettes by brand over time. The last two categories of cigarettes are short cigarettes, which are cheaper and were recently introduced to capture low-income individuals.¹⁶ Excise tax duty changes since 1998 have increased the tax rate on short cigarettes by relatively greater percentages, making them less attractive to poorer segments of the markets. For example, the tax revision in May 2000 increased the tax rates on Bristol and Gold Leaf and Benson & Hedges by 10%, while the taxes on Captain and Bristol Buddy cigarettes were increased by more than 15%.

Table 21. Production of cigarettes by brand (millions of sticks)

Cigarette brand	1995	1996	1997	1998	1999	2000
Bristol	3,499	3,980	3,558	3,405	3,093	2,527
Gold Leaf, Benson & Hedges	1,697	1,408	1,496	1,715	1,878	2,026
Captain	-	-	-	73	58	26
Bristol Buddy	-	-	-	5	7	28
Total	5,196	5,387	5,054	5,199	5,036	4,605

Source: Customs Department.

Bidi Production

Data on production of bidis is not available for Sri Lanka. Table 22 gives estimated levels of bidi sticks produced in the country. A bidi is produced by wrapping crushed tobacco in a special type of imported paper known as bidi-leaf. According to information provided by bidi manufacturers, around 2,000 bidi sticks can be produced with one kilogram of bidi-leaf. Estimates of bidi sticks produced were made by multiplying the net imports of bidi-leaf by 2,000. These estimates are only for the legal manufacture of bidis. In addition, illegal bidis (called “white cigarettes”) are also produced in Sri Lanka. Information on illegal bidi production is not available.

Table 22. Estimated bidi production

Year	Net import of Bidi-leaf (kg)	Bidi production (million sticks)
1995	1,391,575	2,783.2
1996	1,587,333	3,174.7
1997	1,569,697	3,139.2
1998	1,640,477	3,281.0
1999	1,431,357	2,862.7

Source: Author's estimate using trade data on bidi-leaf from the Customs Department.

¹⁶ At the time of writing, the prices of Bristol, Gold Leaf, Captain and Bristol Buddy cigarettes were: Rs. 5.50, Rs. 6.50, Rs. 3.50 and Rs. 5.00, respectively.

4. ECONOMIC ANALYSIS OF TOBACCO DEMAND IN SRI LANKA

4.1 Introduction

The health and economic consequences of tobacco consumption are numerous and well documented (World Bank 1999). Perhaps less well known and studied are the effects of tobacco use on household finances. Tobacco users impose a double burden on household finances. They reduce household expenditures on other goods and services by diverting spending to tobacco; and reduce household income due to higher morbidity and early mortality from tobacco-attributable illnesses. They may also increase household spending on health care. These financial effects are augmented in poorer households, and can have adverse effects on household nutrition, welfare, and savings. As a result, tobacco consumption could contribute toward worsening poverty at the household level and may increase the demands on social welfare programs. The extent and magnitude of these demands will depend on the prevalence of tobacco use in poorer households, and the consequent morbidity and mortality.

As discussed in section 2 of this paper, the limited information available on tobacco use patterns in Sri Lanka indicates a decline over the last decade, which has been more apparent in richer households than in poorer households (see Table 4). This indicates that effective interventions that reduce tobacco use among poor households especially could help in reducing poverty.

Research in developed countries finds that various policy interventions used by governments to curb the tobacco epidemic affect different socio-economic groups differently. For example, the young and the less educated respond less to information on health effects of tobacco than the old and the more educated; and the poor respond to price interventions more than the rich (Chaloupka and Wechsler 1997; World Bank 1999). Understanding the effect of price on tobacco use can help in the development of tobacco control policies which effectively meet the objectives of reducing tobacco-related harm and increasing tax revenue, while contributing the goal of reducing poverty and improving lives.

The remainder of this paper examines the effect of price and income on tobacco demand in Sri Lanka for households from different economic groups. The data requirements and specific aims of the analysis are presented and the model and estimation methods outlined. The results are analyzed and used to estimate total income and price elasticities. Finally, the simulation results are examined and conclusions drawn.

4.2 Data, Specific Aims, Methodology and Models

Data and Specific Aims of the Analysis

The Sri Lanka Integrated Survey Data (SLIS), which collected 1999-2000 data on a nationally representative sample of 7,500 households, provides household level information on tobacco use and tobacco expenditure. The available data are not rich enough to extend the analysis to estimate elasticities for different types of tobacco (i.e., cigarettes, bidis, etc.) separately. This section of the paper estimates the price and income elasticities of tobacco use at the household

level with the hope of facilitating policy decisions regarding tobacco control using prices. The specific objectives are to estimate: a) the price elasticity of smoking participation; b) the conditional price elasticity of demand; and c) the total price elasticity by expenditure quintiles.

Using these estimates, we simulate the impact of price changes on whether or not people smoke and, for those who do, on their tobacco consumption. The analysis is conducted separately for households in five different economic groups. The results of the elasticity estimates are then used to examine the effect of price increases on tobacco prevalence, conditional demand of tobacco, and household tobacco expenditures.

The Model and Estimation Methods

Since not all households participate in tobacco use, ordinary least squares techniques are not appropriate for estimating tobacco demand. Hu et al. (1995) and Chaloupka and Wechsler (1997) use two-part models to overcome this problem. We use a similar model to examine tobacco demand behavior of the households in the sample. The first part of the model – usually referred to as the decision equation – predicts the decision to consume tobacco using a logit equation:

$$(1) \text{Prob}(C>0) = 1/[1 + \exp(- (e_d \ln P + I_d \ln I + x \alpha))]$$

where $\text{Prob}(C>0)$ is the probability of positive consumption (using tobacco), P is price, I is income, and x is a vector of socio-demographic variables. e_d , I_d and α are parameters to be estimated, where e_d and I_d are coefficients for log (price) and log (income) respectively.

The second part is usually known as the conditional demand equation. It describes how much tobacco a household is consuming, given that the household has decided to consume tobacco. It can be formulated in the following way, as a function of price, incomes and the vector of other relevant socio-economic variables:

$$(2) \ln(C| C>0) = e_{cd} \ln P + I_{cd} \ln I + x \beta + \varepsilon$$

where e_{cd} , I_{cd} – the coefficients for log (price) and log (income) – and β are parameters to be estimated and ε is an error term. In this part, ordinary least squares estimation is used to estimate per capita monthly tobacco consumption of households that consume tobacco.

Derivation of Overall Income and Price Elasticities

Equations (1) and (2) allow us to estimate price and income elasticities separately for tobacco use participation and level of tobacco use, if using tobacco. In order to understand the effect of price on overall demand for tobacco, we need to calculate the overall income and price elasticities. Given the coefficient estimates of log (price) and log (income) of tobacco use participation and conditional demand equations, following Hu et al. (1995), the overall price and income elasticities of tobacco are derived using the following formulae:

$$(3) \text{Total price elasticity} = (1 - p(c= 1)) * e_d + e_{cd}$$

$$(4) \text{ Total income elasticity} = (1 - p(c=1)) * I_d + I_{cd}$$

Where, $p(c=1)$ is the tobacco use prevalence in the sample.

Dependent Variables and Samples

The dependent variable in the decision equation is a dichotomous variable which is one if the household consumes tobacco, and zero otherwise. This equation is estimated for all households in the sample. In the conditional demand equation, the dependent variable is the adult per capita monthly consumption of tobacco. This was calculated by dividing the household total consumption of tobacco by the number of adults – individuals 15 years and over – in the household. The conditional demand equation is estimated for those households that use tobacco.

One objective of the study is to differentiate the responsiveness of demand to price changes in different economic groups. To do this, the two equations are estimated for the overall sample as well as for five expenditure quintiles.¹⁷ The survey households were selected through a multistage sampling framework. The analysis weights all estimations using sample weights, in order to obtain nationally representative results.

Data on Price and Income

The SLIS did not collect information on tobacco prices. However, it did collect information on expenditure on tobacco products. Using this information, the average price of tobacco products can be arrived at by dividing the expenditure on all tobacco products by the quantity consumed. However, using this as a proxy for the average price faced by a household causes an endogeneity problem. The average price thus created reflects household choices of various tobacco products available in the market (cigarettes, bidis and chewing tobacco), and as such it is not independent of their tobacco consumption decisions. This creates biased estimates of the price elasticity. To overcome this problem, we calculated the average price faced by a community¹⁸ in the SLIS survey and used this as a proxy for the exogenous price faced by households in that community. If a community did not have any households consuming tobacco, the district average price of tobacco was assigned as the community average price faced by the households.

The effect of income on tobacco consumption has changed over time in developed countries. Early studies for low and middle-income countries usually find a positive relationship between income and tobacco consumption, while more recent studies find a negative relationship. This suggests that in these countries, tobacco (mostly cigarettes) has changed from being a normal good to an inferior good (Keeler et. al. 1993), and is thought to reflect the effect of better information among people with higher incomes about the health risks from tobacco use. In the

¹⁷ All households in the survey were ranked by their per capita regional price-adjusted expenditures and divided into five groups, keeping the number of individuals in each group equal. These groups are classified as expenditure quintiles taking values from 1 to 5, where 1 is the quintile containing the 20% of individuals with the lowest per capita expenditures.

¹⁸ The sample frame for the SLIS survey consisted of 375 Primary Sampling Units (PSUs). Each PSU was selected through a multistage stratified random sample design taking sectors of a district as the domain for stratification. For the purpose of calculating average price, each PSU was considered to be a community.

present study, household per capita income is used to explain the effect of income on tobacco consumption. The income variable includes household monthly income from earnings, income from home-produced goods, income from social transfers, and other non-earned incomes such as income from remittances, insurance, etc.

Other Explanatory Variables

A univariate analysis of individual level tobacco use status revealed that the incidence of tobacco use was around 24% among males, and 6% among females. Tobacco use was highest among the middle-aged individuals (40 to 60 age group). Tobacco use was lowest – 19% – among the individuals in the richest expenditure quintile, while it was similar – varying between 23% and 26% – among individuals in the other expenditure quintiles. Tobacco use was highest among the least educated. About 53% of individuals with less than a primary school education used tobacco, while only 9% of individuals holding a degree used tobacco. (See Tables 1 to 6 for trends in tobacco use by income, education, and age category.)

Based on the individual-level survey data, a variety of independent variables are constructed to control for other factors affecting tobacco use (participation and consumption levels). Since the analysis is conducted at the household level, it was necessary to construct variables to convert individual-level data to household level. For example, to capture the gender differences in tobacco use, the household adult male to female ratio was used. Table 23 lists the variables used in the analysis and gives their mean values for the overall sample. The equations control for the male ratio, occupation of head of household, education, age, and location.

Table 23. Means and descriptions of variables used in the analysis

Variable Name	Mean (overall)	Description
Log (price)	1.14	Log of tobacco price per unit of tobacco (Rs.)
Log (per capita income)	7.15	Log of monthly per capita income (Rs.)
Male ratio	0.48	Ratio of adult males to females
Occupation		
None	0.26	Head of household not employed
Casual work	0.24	Head of household works as a casual worker
Estate work	0.04	Head of household works in an estate
Business	0.11	Head of household is a businessman
Other	0.20	Other
Salaried (base)	0.15	Head of household has a salaried occupation
Education		
None	0.08	Proportion of adults with no education
Primary	0.20	Proportion of adults with only primary school education
Secondary-plus	0.32	Proportion of adults with more than secondary level education
Secondary (base)	0.41	Proportion of adults with up to a secondary level education
Age category		
15+ to 30	0.32	Proportion of adults in the 15 plus to 30 age group
45+ to 60	0.21	Proportion of adults in the 45 plus to 60 age group
60+	0.14	Proportion of adults in the 60 plus age group
30+ to 45 (base)	0.34	Proportion of adults in the 30 plus to 45 age group
Location		
Central	0.14	Live in the Central Province
Southern	0.13	Live in the Southern Province
North-Eastern	0.12	Live in the North-Eastern Province
North-Western	0.13	Live in the North-Western Province
North-Central	0.07	Live in the North-Central Province
Uva	0.07	Live in the Uva Province
Sabaragamuwa	0.09	Live in the Sabaragamuwa Province
Western (base)	0.25	Live in the Western Province

Source: Authors' estimates based on SLIS data.

4.3 Results

Results of the tobacco use participation and conditional demand models are given in Tables 24 and 25 respectively.

Effect of price and income on tobacco use (participation)

Income has a positive impact on tobacco use participation in the overall sample as well as in the poorest expenditure quintile. An increase in per capita household income increases the

likelihood that a household member will use tobacco, and particularly, in the poorest expenditure quintile.

The price variable is only significant in tobacco use participation in the estimates for the richer expenditure quintiles (i.e., it is significant in the third and fifth quintiles). This suggests that price has little impact on the decision to smoke/chew or not. Unexpectedly, the impact of price on tobacco use participation appears to be positive.

The positive relationship between price and tobacco use participation perhaps reflects marketing strategies for the sale of cigarettes, the most popular form of tobacco product in Sri Lanka, especially among the rich. As discussed in section 2.5, there is no legislation banning advertising of tobacco products, although radio and television stations do not carry tobacco-related advertisements and CTC recently introduced a self-regulated advertising code that stopped all brand advertising in media. However, promotional campaigns, aimed mainly at the young and the rich, who consume more expensive cigarettes, continue. It is possible that the positive relationship between price and tobacco use participation is influenced by these campaigns. Evidence for other countries also shows that advertising and promotion have a strong influence on cigarette consumption (World Bank 1999).

Effects of price and income on conditional demand for tobacco

In the results of the conditional demand equation, price is negative and statistically significant (at the 1% level) for all the five sub-samples and the full sample. The conditional price elasticity of demand shows no consistent pattern across the expenditure quintiles, being lowest for the lowest and highest quintiles, (-0.52 and -0.56), and highest for the middle expenditure quintiles (-0.74 for quintile 3).

The results on the income variable were significant for the three middle expenditure quintiles. In all three, income had a negative relationship to conditional demand. In other words, in these quintiles, households reduce the consumption of tobacco as per capita income increases. Literature for other countries has found similar results (Wasserman et al.1991; Keeler et al. 1993).

Results for other variables

Households with a higher ratio of adult males to adult females were more likely to include someone who used tobacco. This was true for all six samples considered. The effect of type of occupation of head of family on tobacco use was mostly not statistically significant. Households headed by casual workers were more likely to participate in tobacco use in three of the six samples. Education appears to be a statistically significant factor in determining tobacco use participation. Households with a higher proportion of adults with less than a primary school education were more likely to participate in tobacco use. Households with a higher proportion of adults with more than a secondary level education were less likely to participate in using tobacco. Age played a significant role in explaining tobacco use participation. Relative to households with a high proportion of 30- to 45-year-olds, households with a higher proportion of older adults were less likely to participate in tobacco use. The results for the households with a

higher proportion of 15- to 30-year-olds were mixed. Location showed a significant effect on tobacco use participation.

In the conditional demand equation, the more adult men in a household, the higher the household tobacco consumption. Education also influenced the level of tobacco use significantly. Relative to households with a higher proportion of adults with a secondary level education, households with a higher proportion of individuals with less than a primary school education smoked/chewed more, while households with a higher proportion of more than a secondary level education used a smaller quantity of tobacco. Compared to households with a higher proportion of individuals in the 30 to 45 age group, all other households seemed to consume less tobacco, implying that 30- to 45-year-olds use the highest quantities of tobacco products. The level of tobacco use varied across provinces.

Estimating total income and price elasticities

As discussed earlier, price and income have two separate effects on tobacco consumption. They affect tobacco use participation and the level of tobacco use. It is necessary to calculate the overall price and income elasticities of tobacco demand to see the total effect of price and income on the demand for tobacco in the market.

The estimated total price and income elasticities, calculated using equations (3) and (4), are given in Tables 26 and 27. Total price elasticity is negative in all the sub-samples and the full sample. This implies that at higher prices, demand for tobacco will be lower for all expenditure groups. As expected, the poorer expenditure quintiles are more responsive to price changes: the total price elasticity of demand was -0.29 in the richest expenditure quintile, while it varied between -0.55 and -0.64 among the other four expenditure quintiles.¹⁹

The total income elasticities are weak for all sub-samples and the full sample. In both the decision and conditional demand equations, the income elasticities were insignificant in the richest expenditure quintile. Total income elasticity is weak and positive in the poorest expenditure quintile, while it is weak and negative in the three middle expenditure quintiles.

¹⁹These results are largely consistent with results found for other countries. According to World Bank (1999), the price elasticity of demand varies between -0.6 to -1.0 for low- and middle-income countries, while it is lower for high income countries.

Table 24. Results of the tobacco use participation equation (logit model)

	Overall		Expenditure Quintiles									
			1		2		3		4		5	
Log (price)	0.10	*	-0.17		0.17		0.21	*	0.01		0.34	**
Log (per cap Income)	0.05	*	0.17	*	0.06		0.07		0.07		-0.09	
Male Ratio	1.13	***	1.30	***	1.10	***	1.14	***	1.19	***	1.24	***
Occupation												
None	-0.08		0.08		0.04		0.16		-0.49	**	-0.28	
Casual work	0.29	***	0.30		0.07		0.50	**	0.31	*	0.10	
Estate work	0.07		0.24		0.21		0.31		-0.53		-1.14	*
Business	0.14		0.22		-0.36		0.22		-0.03		0.33	*
Other	0.14		-0.26		0.15		0.38	*	0.04		0.09	
Salaried (base)												
Education												
None	0.53	***	0.78	**	1.12	***	0.25		0.30		0.37	
Primary	0.35	***	0.41	*	0.79	***	0.22		0.11		0.03	
Secondary-plus	-0.72	***	-0.39		-0.76	***	-0.71	***	-0.46	**	-1.08	***
Secondary (base)												
Age category												
15+ to 30	-0.01		-0.07		0.51	**	-0.38	*	-0.03		-0.23	
45+ to 60	-0.23	**	-0.68	**	-0.25		-0.67	***	0.02		0.31	
60 +	-1.12	***	-2.05	***	-0.98	***	-0.96	***	-0.84	**	-0.81	**
30+ to 45 (base)												
Location												
Central	0.15		-0.38	*	0.54	**	0.03		0.34		0.44	*
Southern	0.38	***	-0.37	*	0.86	***	0.46	**	0.57	***	0.23	
North-Eastern	0.47	***	-0.06		1.15	***	0.45	**	0.22		0.40	*
North-Western	0.01		-1.23	***	0.48	**	-0.25		0.34	*	0.48	**
North-Central	0.53	***	0.52		0.82	***	0.30		0.43	*	0.54	*
Uva	0.24	**	-0.28		0.39		0.20		0.54	**	0.17	
Sabaragamuwa	0.06		-0.47	*	0.35		-0.13		0.35		0.09	
Western (base)												
Constant	-1.87	***	-2.01	*	-2.60	***	-1.85	***	-1.85	***	-1.23	**
Sample	7,366		1,266		1,381		1,460		1,542		1717	

Notes: Significance at 1%, 5%, and 10% are indicated by ***, **, *, respectively.

Source: Author's estimates based on SLIS data.

**Table 25. Results of the conditional demand equation
(ordinary least squares estimates, where the dependent variable is the log of per capita consumption)**

	Overall	Expenditure Quintiles										
		1	2	3	4	5						
Log (price)	-0.60	***	-0.52	***	-0.67	***	-0.74	***	-0.69	***	-0.56	***
Log (per cap Income)	0.01		-0.06		-0.10	**	-0.13	***	-0.15	***	0.08	
Male Ratio	0.30	**	-0.14		0.12		0.52	**	0.34		0.39	
Occupation												
None	-0.14	**	-0.36	*	0.15		-0.14		0.04		-0.06	
Casual work	0.08		-0.10		0.34	**	-0.03		0.18		0.51	***
Estate work	-0.08		-0.30		0.08		-0.00		0.05		-1.01	*
Business	0.11		-0.49	*	-0.04		0.10		0.12		0.25	**
Other	-0.13	**	-0.16		0.08		-0.36	***	-0.03		0.28	*
Salaried (base)												
Education												
None	0.40	***	0.20		0.46	**	0.92	***	0.31		0.32	
Primary	0.19	***	0.03		0.22		0.18		0.50	***	0.28	
Secondary-plus	-0.13	**	-0.66	***	-0.56	***	-0.43	***	-0.17		0.25	*
Secondary (base)												
Age category												
15+ to 30	-0.63	***	-0.32	**	-0.10		-0.72	***	-0.67	***	-0.85	***
45+ to 60	-0.36	***	-0.63	***	-0.85	***	-0.47	***	-0.27	**	-0.24	
60 +	-0.76	***	-1.07	***	-1.30	***	-0.66	***	-0.60	***	-0.79	***
30+ to 45 (base)												
Location												
Central	0.07		0.17		0.20		0.32	**	0.12		0.05	
Southern	-0.20	***	-0.25	*	-0.04		-0.08		-0.11		-0.18	
North-Eastern	0.42	***	0.83	***	0.35	**	0.37	***	0.40	***	0.26	
North-Western	0.39	***	0.36	*	0.09		0.55	***	0.46	***	0.39	***
North Central	0.34	***	0.30		0.36	**	0.28	*	0.20		0.45	**
Uva	0.25	***	0.17		0.13		0.37	**	0.15		0.38	*
Sabaragamuwa	-0.19	**	-0.14		-0.05		0.05		0.18		-0.84	***
Western (base)												
Constant	3.95	***	4.59	***	4.45	***	5.10	***	5.08	***	3.36	***
Sample	2,239		374		462		510		512		381	

Notes: Significance at 1%, 5%, and 10% are indicated by ***, **, *, respectively.

Source: Author's estimates based on SLIS data.

Table 26. Total price elasticity by expenditure group

	Overall		Expenditure quintiles									
			1		2		3		4		5	
Price elasticity of smoking participation	0.10	*	-0.17		0.17		0.21	*	0.01		0.34	**
Conditional price elasticity of demand	-0.60	***	-0.52	***	-0.67	***	-0.74	***	-0.69	***	-0.56	***
Household smoking prevalence (%)	30.00		30.00		30.00		35.00		33.00		22.00	
Total Price elasticity	-0.53		-0.64		-0.55		-0.60		-0.68		-0.29	

Notes: Significance at 1%, 5%, and 10% are indicated by ***, **, *, respectively.

Source: Authors' estimates based on SLIS data.

Table 27. Total income elasticity by expenditure group

	Overall		Expenditure quintiles									
			1		2		3		4		5	
Income elasticity of smoking participation	0.05	*	0.17	*	0.06		0.07		0.07		-0.09	
Conditional Income elasticity of demand	0.01		-0.06		-0.10	**	-0.13	***	-0.15	***	0.08	
Household smoking prevalence (%)	30.00		30.00		30.00		35.00		33.00		22.00	
Total Income elasticity	0.05		0.06		-0.06		-0.08		-0.10		0.01	

Notes: Significance at 1%, 5%, and 10% are indicated by ***, **, *, respectively.

Source: Authors' estimates based on SLIS data.

4.4 Policy Simulations

The impact of price increases on tobacco prevalence and conditional demand

Table 28 gives the results of the simulation exercise examining how cigarette price increases of 10%, 50%, and 100% would affect smoking participation.²⁰ Price increases have only a very small effect on smoking prevalence. For three quintiles, more than a 50% price increase is needed to change prevalence level perceptibly. In all quintiles, a 50% price increase changes prevalence by no more than 1%. In the lowest expenditure quintile, prevalence falls with (large) price increases as expected, but perversely, it increases at higher prices in the other quintiles.

Table 28. The impact of price increases on tobacco use prevalence by income quintile

	Prevalence			
	At original price	10% price increase	50% price increase	100% price increase
Quintile 1	0.28	0.28	0.28	0.27
Quintile 2	0.33	0.33	0.34	0.34
Quintile 3	0.34	0.34	0.35	0.35
Quintile 4	0.31	0.31	0.31	0.31
Quintile 5	0.19	0.20	0.20	0.21
Overall	0.29	0.29	0.29	0.30

Source: Author's estimates based on SLIS data.

Table 29 gives the results of the simulation examining the effect of price increases on tobacco quantity consumed. The results show that price increases would reduce the tobacco quantity consumed significantly for all quintiles. For example, a 10% change in price reduces consumption in the poorest quintile by 2%.

Table 29. Impact of price increases on conditional demand by income quintile (% change in consumption)

	Price Increases		
	10%	50%	100%
Quintile 1	-2.0	-6.8	-6.8
Quintile 2	-3.0	-8.6	-7.7
Quintile 3	-3.0	-9.5	-9.5
Quintile 4	-3.0	-8.6	-8.6
Quintile 5	-3.0	-6.8	-6.8
Overall	-2.0	-7.7	-7.7

Source: Author's estimates based on SLIS data.

²⁰As the total income elasticity for all expenditure quintiles showed only a weak relationship to consumption, the simulations are carried out only to examine the effect of price changes on consumption, but not for changes in income. Also, policy-makers have full ability to change tax rates in order to change prices, but much less ability to affect incomes.

The impact of price increases on household expenditures

Tobacco price increases affects household expenditure on tobacco in two ways. The direct effect is to raise expenditures, since the unit cost increases. But the price increases causes a fall in the quantity consumed. The overall effect on total expenditures depends on the relative sizes of the fall in quantity and the rise in price. Table 30 gives the overall effect of a price increase on tobacco expenditure. For example, a 10% increase in price increases household expenditure on tobacco in the poorest quintile from Rs. 117.5 to Rs. 121.0 or from 3.2% of average household income to 3.3% of average household income.

Poorer households spend a higher proportion of their (lower) income on tobacco than richer households. At prevailing prices, the households in the poorest expenditure quintile spent 3.2% of their household income on tobacco, while the households in the richest expenditure quintile spent only 0.6% of their household income on tobacco. Results show that a 10% increase in price increases tobacco expenditure for all expenditure quintiles. However, as price increases further, the expenditure on tobacco decreases for poorer expenditure quintiles, while even a 100% price increase does not decrease the expenditure on tobacco for the richest income quintile.²¹ An evaluation of the price increase that resulted in the highest expenditure showed the tobacco expenditure maximizing price level to be 44% higher than the prevailing price level.

Table 30. The effect of price increases on household expenditure on tobacco²²

	Units	Price Increases			
		0%	10%	50%	100%
Quintile 1	(Rs.)	117.5	121.0	120.0	84.9
	(% of household income)	3.2	3.3	3.3	2.3
Quintile 2	(Rs.)	134.1	139.4	145.7	120.4
	(% of household income)	3.2	3.3	3.5	2.9
Quintile 3	(Rs.)	150.9	156.0	158.1	119.7
	(% of household income)	2.8	2.9	3.0	2.2
Quintile 4	(Rs.)	146.3	150.0	144.5	92.7
	(% of household income)	2.2	2.3	2.2	1.4
Quintile 5	(Rs.)	118.8	126.8	151.9	167.5
	(% of household income)	0.6	0.7	0.8	0.9
Overall	(Rs.)	133.8	139.4	147.5	125.8
	(% of household income)	1.5	1.6	1.7	1.5

Source: Author's estimates based on SLIS data.

Notes: The change in expenditure due to a price increase is calculated using the following equation:

$E1 = [P0 (1+x/100)] * [C0 (1 + E * x/100)]$, where E1 is new expenditure on tobacco, P0 is initial price, C0 is initial consumption level, E is total price elasticity of tobacco, and x is the % change in price.

²¹We assume that the price elasticity of demand has a linear relationship to price. Some papers argue that this is not the case due to the addictive nature of tobacco.

²² These results are consistent with the findings of Household Income and Expenditure Survey 1995/1996 (Department of Census and Statistics 2000). Calculations made based on this survey showed that an average household spent 1.5% of its income on tobacco.

4.5 Discussion

The results show that price increases could reduce tobacco use prevalence and tobacco consumption in households in all income categories. The government could decrease tobacco use among the poor by increasing the average price of tobacco products. As long as the average tobacco price increase is less than 44%, price increases would not result in reductions in household expenditure on tobacco. Assuming tax revenue from tobacco is proportional to expenditure on tobacco, the implication is that the government can expect to increase prices – through taxes – up to 44% and still expect to maintain or increase their tobacco tax revenue. This implies considerable room for further tobacco tax increases.

Thus far, however, government policy on taxing tobacco products has been restricted to taxing cigarettes and pipe tobacco (see Table 14 and the accompanying discussion on taxation of tobacco products). Given the current taxing system in Sri Lanka, only cigarette consumption can be influenced through taxes. As long as cheaper tobacco products are available, the effectiveness of price as a mechanism for reducing tobacco-related harm will not be maximized.

As a proportion of household income, poorer households spend more on tobacco than richer households. This effect is first increased then reduced as prices are increased, which suggests that tobacco taxes are regressive, but that large enough tobacco tax increases are progressive. However, the actual contribution to tax revenue would also depend on the composition of the tobacco products consumed by the households. Since poorer households are likely to consume a higher proportion of cheaper tobacco products, which tend to be taxed at a lower rate, their contribution to taxes is likely to be a smaller proportion of their expenditure on tobacco than that of the richer expenditure groups.

The effect of income on tobacco demand is weak and mixed. It is positive for the poorest expenditure group only, while it is negative for the middle-income groups, and insignificant for the richest-income group. Studies in other countries point out that this could be due to higher education levels of individuals in higher expenditure groups, associated with increased awareness of the adverse effects of tobacco use. This suggests that increasing awareness of tobacco-related health risks in the poorer expenditure quintiles could be effective in reducing tobacco use prevalence in those households. Results of the education variables in the two equations also support this theory. They show that households with a higher proportion of educated individuals use tobacco less.

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