

1

Overview

Prabhat Jha, Frank J. Chaloupka, and Phyllida Brown

This book brings together a set of critical reviews of the current status of knowledge on tobacco control. It is intended to provide a sound and comprehensive evidence-base for the design of effective tobacco control policies in any country, with an emphasis on the needs of the low-income and middle-income countries where most smokers live.

The book at a glance

The structure of the book is as follows. Following the Overview, there are six sections. Section I provides brief descriptive overviews of global trends in smoking and the impact of tobacco on health, as well as a discussion of the costs of tobacco use. Section II provides an economic analysis of tobacco use, focusing on three key issues: tobacco addiction, the costs and benefits of tobacco use, and the economic rationale for government intervention in the tobacco market. Section III reviews the effectiveness of policies intended to reduce *demand* for tobacco: the provision of consumer information about tobacco; the impact of advertising and promotion; the taxation of tobacco products; clean indoor-air policies and other regulatory measures; and smoking cessation therapies. Section IV examines issues affecting the *supply* of tobacco, including a review of the impact of tobacco-control policies on national economies and employment. Section V addresses questions about the design of effective policies, and models the impact of various different control measures on tobacco-related mortality. In this section, there is also a discussion of strategic priorities for international organizations in responding to the global tobacco epidemic. Finally, there are statistical appendices and directions to electronic sources of data on tobacco.

Summaries of the chapters

Section I Tobacco use and its consequences

Chapter 2 Global patterns of smoking and smoking-attributable mortality

Gajalakshmi *et al.* review global data on the prevalence of smoking, trends in tobacco consumption, and smoking-related deaths. They find that eight out of ten smokers now live in developing countries, and that, while the prevalence of smoking has fallen

overall in the past two decades in the high-income countries, it has been rising in most low-income and middle-income countries. Most smokers start early in life and the number of young people who take up regular smoking is estimated to be about 100 000 per day. The addictive nature of nicotine is discussed. Data from the high-income countries, where the tobacco epidemic is well established, suggest that about half of long-term regular smokers are killed by tobacco, and of these, about half die in middle age. Currently, worldwide, about 4 million people die of tobacco-related disease every year. This figure is expected to rise to 10 million by 2030, with seven out of ten deaths being in developing countries. Estimates from the high-income countries indicate that, worldwide, the number of people killed by tobacco through the whole of the twentieth century was about 0.1 billion; for the twenty-first century, the cumulative number could be 1 billion if current smoking patterns continue. Many of the deaths expected in coming decades could be averted if people alive today quit smoking, but in low-income and middle-income countries, quitters are rare.

Chapter 3 Poverty and smoking

Bobak *et al.* examine the available data on the prevalence of smoking in different socio-economic groups, and on socio-economic differences in tobacco-related mortality. They find that, in almost all countries studied, smoking is more common among men of low socio-economic status. For women, who have been smoking in large numbers for a shorter period, the relationship between smoking and socio-economic status is more variable. Where mortality data can be reliably measured, in the high-income countries and the former socialist countries of Europe, it appears that much of the excess mortality of poor and less-educated men can be attributed to smoking.

Chapter 4 Estimating the costs of tobacco use

Lightwood *et al.* review studies that attempt to estimate the costs of tobacco use, focusing on the costs for health systems. Since the methods for these estimates are complex and subject to debate, the authors first review the various methods and their strengths and weaknesses. They show that estimates of the *gross* costs of healthcare related to tobacco use—that is, all care costs in any given year that can be attributed to the extra health needs of smokers—range from 0.1 to 1.1% of gross domestic product in the high-income countries. In low-income countries, there are fewer studies, but those that exist indicate that the gross healthcare costs may be proportionately as high as in high-income countries. Studies of the *net* healthcare costs, which are usually assessed over a lifetime and take account of the fact that smokers' lives tend to be shorter than non-smokers', reach more heterogeneous conclusions because of the different approaches they take. However, the studies that the authors consider to be most robust do conclude that there are net healthcare costs from smoking.

Section II Analytics of tobacco use

Chapter 5 The economics of addiction

Chaloupka *et al.* review economic approaches to addiction and consumer choice, including a discussion of recent work on new economic models of addiction. Having

summarized existing knowledge on the addictive potential of tobacco, the authors discuss economic models of addictive behavior. In the past, economists largely ignored addiction, viewing it as an irrational behavior for which basic economic principles did not apply. Only in recent years have there been attempts to model addiction. Economic models hypothesize that, for addictive behavior, past consumption choices determine current consumption choices because, by definition, a consumer who is addicted to something must have consumed it in the past and will need to maintain, or increase, past consumption levels to service the addiction. This hypothesis is supported by the findings of empirical research. However, empirical applications of the models clearly indicate that increases in cigarette prices and other costs of smoking will reduce cigarette consumption, with the effects of price increases being greater in the long-run than in the short-run. Recent extensions to these models emphasize particular aspects of addictive behavior, including the youth of most 'beginner' smokers and the inadequate level of consumer information available to them. These newer models also discuss the adjustment costs of quitting for adult smokers. Most of these newer models have yet to be tested empirically.

Chapter 6 A welfare analysis of tobacco use

Peck *et al.* provide a novel approach to assessing the costs and benefits of tobacco use. First, the authors estimate the benefits of smoking to smokers and producers, using the relationship of price and expenditure to the demand and supply curve, respectively. Estimating costs is more difficult, as the authors discuss. Traditional cost-benefit analysis assumes that smokers take into account the costs to themselves when they buy cigarettes, and that these costs should therefore be excluded from the analysis. However, the authors argue that smokers may not be aware of some of the costs of their choice for themselves, such as health damage. Most smokers start young and quickly become addicted, and, in high-income countries where health information is widely available, most adult smokers say that they regret starting. Existing research suggests that people are willing to pay to avoid the costs of lost health and life. In the context of tobacco, the authors argue that uninformed smokers would be willing to pay to avoid premature death or disability, or to avoid the costs of trying to quit. Using a conservative value of the willingness to pay to avoid such costs, the authors then calculate what percentage of the smoking population would have to be unaware of the health risks of smoking for the net benefits from smoking to be zero. Their calculations indicate that if up to 23% of smokers underestimate the health costs of tobacco, then the net benefits of smoking are zero. While higher prices would cause smokers a loss of satisfaction from having to reduce their consumption or quit, the extra health gains from a price increase of 10% globally would outweigh the losses if as few as 3% of smokers are uninformed.

Chapter 7 The economic rationale for intervention in the tobacco market

Economic theory suggests that, if consumers know all the risks and bear all the costs of their choices, there is no justification, on efficiency grounds, for governments to intervene in a market. Jha *et al.* discuss three key inefficiencies in the tobacco market, or market failures: inadequate information about the health risks of tobacco; inadequate information about the risks of addiction; and physical or financial costs imposed on

non-smokers. They conclude that there are clear economic grounds for intervening, particularly to protect young people and non-smokers. The authors identify the ideal responses to these failures and the most effective responses, pointing out that these are not always the same. They conclude that taxation is the most effective measure for correcting several of these market failures, although taxation imposes costs on all smokers. The authors also discuss government intervention on the grounds of reducing inequality between poor and non-poor groups.

Section III Demand for tobacco

Chapter 8 Consumer information and tobacco use

Kenkel and Chen address two questions: first, whether consumers are well informed about the consequences of smoking; and second, whether public policies to improve consumer information about smoking can reduce tobacco consumption. The review finds that there is widespread general awareness of the risks of smoking in high-income countries. However, in low-income and middle-income countries this general awareness of the risks may be more limited. Moreover, even among people who are generally aware of the health risks of tobacco, many underestimate these risks relative to other health risks, and many fail to apply the knowledge to themselves personally. Young people, it appears, underestimate the addictive potential of cigarettes. In some countries, improvements in the quality and extent of information to consumers are still possible; in others, most of the potential improvements in consumer awareness have probably already been achieved. Reviews of the impact of specific types of information (such as ‘information shocks’—the publication of new evidence on the health consequences of smoking—and warnings on cigarette packs) indicate that these can effectively reduce the prevalence of smoking in a population. The evidence suggests that government policies to increase consumer information about the health consequences of smoking can form part of an effective tobacco-control program.

Chapter 9 Tobacco advertising and promotion

Although public health advocates argue that tobacco advertising affects the number of people who smoke and the amount of tobacco they consume, the existing empirical literature concludes that advertising has little or no such impact. Here, Saffer examines the empirical studies more closely, and offers important insight into their limitations. The chapter discusses an alternative approach, based on studying the effects of bans on advertising and promotion. The primary conclusion is that comprehensive bans on tobacco advertising and promotion do reduce cigarette consumption, whereas partial bans have little or no effect. Counter-advertising, the provision of health information about smoking, is also found to be effective.

Chapter 10 The taxation of tobacco products

Chaloupka *et al.* review a significant body of research from high-income countries on the impact of tax increases on cigarette consumption. The studies consistently

show that higher tobacco prices significantly reduce tobacco use. The majority conclude that an increase in price of 10% would reduce demand by about 4% in these countries. A small but growing body of research indicates that smokers in low-income and middle-income countries are more responsive to price changes than those in high-income countries. Most estimates suggest that a price increase of 10% in these countries would reduce demand by about 8%. In most studies, about half of the reduced demand takes the form of quitting, and about half takes the form of reduced consumption. The evidence indicates that young people are more responsive to price changes than adults. Further studies indicate that people on low incomes and people with lower levels of education are also more responsive to price changes than wealthier, highly-educated people. Because of the addictive nature of tobacco use, the authors find, the impact of price rises on tobacco consumption will be greater in the long-run than in the short-run. The authors discuss the various reasons that governments might choose to increase tobacco taxes, including the generation of revenue, the desire to correct economic inefficiencies, or the desire to improve public health.

Chapter 11 Clean indoor-air laws and youth access restrictions

In this short chapter Woollery *et al.* review the evidence, mainly from the United States, of the impact of policies designed to prevent smoking in public places, workplaces, and other facilities. The authors also assess the evidence on the effectiveness of policies to restrict young people's access to purchasing cigarettes. They find that comprehensive clean-air laws can reduce cigarette consumption, but that such policies work best when there is a strong social consensus against smoking in public places and therefore self-enforcement of the restrictions. Clean-air laws do impose costs on smokers who want to continue to smoke, but claims that they reduce revenues for business, tourism, and the leisure sector are not supported by data. The evidence for the effectiveness of youth access restrictions is more mixed. Some show a promising effect, while others show little or no effect. The importance of enforcing such restrictions is discussed.

Chapter 12 Smoking cessation and nicotine-replacement therapies

In this chapter, Novotny *et al.* briefly review the evidence for the effectiveness of cessation programs and, in particular, of nicotine-replacement therapies (NRTs) of various types. They find that NRTs and other pharmacological quitting aides can approximately double the chances that an individual will succeed in quitting compared with unaided attempts. The authors compare the small and highly regulated market for NRTs with the large and unregulated market for cigarettes, against which NRTs compete. The NRT market is limited by several factors including, at present, high costs in some areas, a relatively low global demand for quitting, and complex regulatory issues. Where there have been studies, these have found that NRTs can be a cost-effective component of tobacco-control programs. The policy implications for governments, such as options for deregulating the NRT market, or financing NRTs for poorer smokers, are discussed.

Section IV Supply of tobacco

Chapter 13 The supply-side effects of tobacco-control policies

Jacobs *et al.* describe the size and nature of the tobacco industry, both farming and manufacturing. They then examine the impact of tobacco control measures on countries' economies, in particular on employment. They find that, if tobacco consumption were to fall because of control policies, the impact on total employment would be minimal or zero in most countries, since the money consumers once spent on tobacco would be spent instead on other goods and services, hence generating jobs. For a small number of tobacco-producing countries that are heavily dependent on this crop, however, there would be net job losses. Reductions in jobs and other adjustments in the economy that result from demand-side measures would be spread over decades or longer. The authors also discuss the effects on cigarette consumption of supply-side policies, such as price supports and quotas, that provide incentives to grow tobacco. They conclude that the net impact of these policies on retail price, and hence on consumption, is small. Attempts to reduce tobacco consumption by reducing the tobacco supply are unlikely to succeed. Given high demand and the presence of alternative suppliers, policies such as crop diversification or buy-outs are largely ineffective. However, diversification, placed within broader rural development programs, can help meet the transition costs of the poorest farmers.

Chapter 14 The impact of trade liberalization on tobacco consumption

Recent trends in global trade, and their impact on tobacco markets and tobacco consumption, are discussed by Taylor *et al.* The authors find that a variety of trade agreements in recent years have significantly reduced the barriers to trade in tobacco products. Economic theory suggests that the reductions in these barriers will increase competition within tobacco markets, reduce prices, and increase marketing efforts, as well as raise incomes. As a result, tobacco use is likely to increase, particularly in low-income and middle-income countries. The limited empirical literature confirms this hypothesis. The authors' new empirical analysis provides additional evidence that cigarette consumption is rising because of freer trade, with the biggest impact on low-income and middle-income countries. The policy implications are briefly discussed.

Chapter 15 How big is the worldwide cigarette-smuggling problem?

In this chapter Merriman *et al.* review the economic theory and empirical literature on cigarette smuggling and provide new estimates of the extent of this illicit trade. By examining the difference between recorded cigarette exports and imports, the authors estimate that about one-third of cigarettes are lost in transit. If these are smuggled, the implication is that about 6% of the total number of cigarettes consumed worldwide is smuggled. A second analysis uses country-level data to examine the key determinants of smuggling. The risk of smuggling is often cited as a counter-argument to the policy of raising cigarette taxes, because large tax differentials between nearby legislatures provide an obvious motive for smuggling. However, Merriman *et al.* conclude that corruption within countries is a stronger predictor of smuggling than price. The authors also analyze data from European countries to estimate the extent of bootlegging in

response to inter-country price differentials. They find that bootlegged tobacco products account for about 8.5% of consumption. Based on simulations from this European analysis, the authors conclude that a unilateral tax increase by one country would lead to increased tax revenues, even after the likely impact of increasing smuggling is taken into account. Coordinated tax increases between neighboring legislatures would increase tax revenues by greater amounts. The authors conclude that the problem of smuggling should not be seen as an insurmountable obstacle to increasing taxes. Higher cigarette taxes will both reduce cigarette smoking and increase government revenues, even in the presence of smuggling.

Chapter 16 Issues in the smuggling of tobacco products

Joossens *et al.* describe the different types of legal, quasi-legal, and illegal activities that are variously described as cross-border shopping and smuggling, and discuss their determinants. The impact of tax increases on smuggling is examined in more detail, with particular reference to the experiences of Canada and Sweden, where taxes were cut because of a perceived problem with smuggling. In each case, as a result of the cut, cigarette consumption climbed and revenue fell. The authors conclude, like the authors of Chapter 15, that higher taxes do lead to reduced consumption and increased revenues. Evidence for the tobacco industry's involvement in smuggling is reviewed. The policy options for dealing with smuggling are briefly discussed.

Section V Policy directions

Chapter 17 The design, administration, and potential revenue of tobacco excises

This chapter discusses the practical and policy issues in designing tobacco excise taxes in low-income and middle-income countries. Sunley *et al.* provide estimates of the revenue-generating potential of tax increases based on existing empirical evidence on price, tax and demand elasticity for 70 countries. The authors conclude that an increase of 10% in the tax on cigarettes in each of these countries would raise government revenues by nearly 7% on average. The increase in revenues would be somewhat larger in high-income countries, where demand is more inelastic and taxes account for a larger share of pack price. However, in low-income countries, the increased revenues, though smaller, would still be considerable.

Chapter 18 The effectiveness and cost-effectiveness of price increases and other tobacco-control policies

Ranson *et al.* examine the global impact of various tobacco-control measures on cigarette consumption and tobacco-attributable deaths, for the cohort of smokers alive in 1995. Based on deliberately conservative assumptions, they find that tax increases that would raise the real price of cigarettes by about 10% worldwide could cause about 42 million smokers alive in 1995 to quit, and could prevent a minimum of 10 million premature tobacco-related deaths. A set of 'non-price' measures, including information campaigns, comprehensive bans on advertising and promotion, prominent warning

labels, and clean-air restrictions, could persuade 23 million smokers alive in 1995 to quit and could avert 5 million deaths. A third measure, the widely increased use of nicotine-replacement therapies, could persuade 6 million to quit and could avert 1 million deaths. By weighing the public-sector costs of implementing these interventions against their expected health gains (measured in disability-adjusted life years), and based on various assumptions, the researchers conclude that all three types of intervention could be cost-effective compared with many other health interventions. However, given substantial variation in implementation costs and likely effectiveness in different contexts, local cost-effectiveness estimates would be useful for the design of policies.

Chapter 19 Strategic priorities in tobacco control for governments and international agencies

This final chapter discusses some of the issues facing governments and international agencies when developing policies. Jha *et al.* first review national comprehensive control programs, including their goals, targets, and instruments. They find that for short-term progress in reducing tobacco mortality, programs need to focus on preventing the uptake of smoking by children, and persuading adults to quit. Most tobacco-control programs will use a mix of price, information, and regulation interventions, although the exact mix will vary across countries. The evidence from countries where comprehensive tobacco-control programs have been evaluated suggests that they can significantly reduce cigarette consumption. To be effective, control programs need to use a broad mix of policy instruments, involving finance and commerce ministries, as well as health ministries. Given the global nature of trade, some aspects of tobacco control require international or cross-border action. The WHO's *Framework Convention on Tobacco Control* is a promising vehicle for such action. Finally, the authors argue, research on the causes and consequences of tobacco use—including the costs of smoking—is a high priority and an international public good. Most importantly, middle-income and low-income countries require detailed ongoing studies of the impact of tobacco on population health, including studies of the impact of quitting.

Appendices

The statistical appendices provide information for readers about other sources of information on the tobacco epidemic that are updated periodically. For example, we provide information on the epidemiology of tobacco-attributable diseases, the prevalence of tobacco use, taxes, prices, smuggling, agricultural and industrial issues, spending on tobacco control, and the extent of existing tobacco-control programs. The reader is referred to web sites and other sources where information can be presented in much greater detail than is possible in book form. Appendix 3 provides important information about the classification of countries by World Bank definitions of income and by World Bank regions. This information is key to an understanding of many of the tables and figures in the chapters.