



Economics of Tobacco Control

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Abstract

Tobacco use imposes a huge and growing public health and economic burden. Currently, approximately 4 million persons die annually due to smoking. By 2030, the tobacco toll will reach 10 million human lives. Seventy percent of those deaths will occur in low and middle-income countries (Peto and Lopez, 2001). Economic studies provide strong evidence that tobacco tax increases, dissemination of information about health risks from smoking, restrictions on smoking in public places and in workplaces, comprehensive bans on advertising and promotion, and increased access to cessation therapies are all effective in reducing tobacco use and its consequences. Despite this evidence, tobacco control policies have been unevenly applied, partly due to political constraints and lack of local-specific evidence on impact of tobacco control measures.

This chapter provides an overview of economic issues related to tobacco control. It demonstrates that introducing and enforcing effective tobacco control policies can reduce negative economic consequences of tobacco use. An analysis of the factors, correlated with the strength and comprehensiveness of these policies, demonstrates political constraints to tobacco control and points to possible approaches for dealing with them.

Introduction

Cigarette smoking and other tobacco use currently accounts for one of every ten adult deaths. Given current trends, about 500 million people alive today will die prematurely as a result of tobacco use, with one billion deaths from tobacco expected during this century (Peto and Lopez, 2001, WHO, 1997). Future tobacco mortality depends largely on current smoking patterns. The increase in tobacco deaths is the result of both increases in the susceptible population size and increases in age-specific disease rates. Low-income countries will pay the biggest toll in this respect, accounting for 87% of the increase in tobacco-attributable deaths between 1990 and 2020 (Murray and Lopez, 1997). Even though reducing smoking initiation will reduce the burden associated with smoking in the long run, the most immediate reduction in tobacco related mortality would be achieved only by encouraging cessation among current smokers (Peto and Lopez, 2001, Donald et al, 2002).

Given the public health consequences of smoking, some governments began to intervene in the tobacco market with the intention of reducing tobacco use. However, many governments have resisted taking strong action because of concerns that these interventions may harm the economy, or because of strong political links with the tobacco industry.

This chapter reviews economic aspects of tobacco control. It starts with an overview of global tobacco use trend and its implication for health. Next, the theory of the economics of tobacco use is presented followed by a summary of the evidence for the effectiveness of various tobacco control policies. The chapter concludes with a discussion of factors related to the strength and comprehensiveness of tobacco control policies, and of the constraints against their effective implementation.

Trends in Tobacco Use and its Consequences

Estimates indicate that over 1.1 billion people smoke worldwide. About 82 % of all smokers reside in low- and middle-income countries (Jha et al, 2002). According to the World Bank, smoking prevalence is highest in the European/Central Asia region and in the East Asia/Pacific region where over one-third of the population smokes. There is a significant gender gap in smoking prevalence, but it is much higher in low and middle-income countries where

almost every second man smokes, but only one of 13 women is smoking. In high-income countries, one out of 3 men and one out of 5 women smoke (Jha et al, 2002).

Over the past two decades, the upward trend in smoking prevalence in most high-income countries has been reversed. This was attributed to improved dissemination of information linking smoking to poor health and to public health measures trying to curb the tobacco epidemic. On the other hand, smoking continues to increase in many low- and middle-income countries, in part due to increasing income and trade liberalization (Taylor et al, 2000).

Smoking is more common among poor men than among rich men in nearly all countries. In developed countries, smoking accounts for approximately half of the mortality gap between rich and poor males (Bobak et al, 2000). For women, who have generally been smoking in large numbers for a shorter period, the relationship between smoking-attributable mortality and income is less clear.

The impact of smoking on health has been extensively documented elsewhere (Gajalakshmi et al, 2000, Donald et al, 2002, Peto et al, 1994). Data from both high-income and low- and middle-income countries suggest that about half of all long-term regular smokers are killed by their addiction. Half of these deaths occur during productive middle age (35-69 years old) (Peto et al, 1994). Currently, about half of all tobacco-related deaths occur in high-income countries, while the others occur in low and middle-income countries. Given the recent trends in smoking and the lags between smoking and disease onset, approximately 70 percent of the 10 million tobacco-attributable deaths expected in 2030 will take place in low- and middle-income countries.

In addition to preventing tobacco consumption among children, comprehensive approaches focusing on smoking cessation are critical to near-term improvements in public health. Reducing *only* smoking initiation would have little impact on smoking-attributable deaths during the first half of the 21st century. The vast majority of tobacco-attributed deaths over the next 50 years will occur among current smokers (Peto and Lopez, 2001). A recent study from the United Kingdom found that smoking cessation before middle age avoids more than 90% of the lung cancer mortality risk attributable to tobacco (Peto et al, 2000). This type of evidence points to cessation as the key to progress in curbing the tobacco epidemic over the next few decades.

Economic Theory of Tobacco Consumption

There is compelling evidence that consumer decisions about tobacco use obey the “law of demand:” when prices of tobacco products go up, the amount consumed falls. The majority of economic research focused on the demand functions for cigarettes. The economic theory of cigarette demand assumes existence of an individual’s utility function. An individual utility from consuming cigarettes depends on the number of cigarettes, utility (or pleasure) derived from other goods, and individual tastes. An individual maximizes his or her utility subject to a budget constraint, which is comprised of the price of cigarettes, income, and the prices of all other goods. This constrained maximization determines the demand function for cigarettes where cigarette consumption is related to the price of cigarettes, prices of related goods, income, and individual’s tastes.

Economists use a broad definition of price that includes not only monetary value of a product, but also the time and other costs associated with the purchase and the use of a product. For example, restrictions on smoking impose additional costs on smokers in the form of discomfort, limitations, and a possibility of fines for smoking in restricted areas. Similarly, limits on youth access to tobacco may raise the time and potential legal costs associated with smoking by minors, and new information on the health consequences of tobacco consumption can raise the perceived long-term costs of smoking.

The demand for tobacco has been estimated using different types of data and measures of consumption: time series data on national aggregate consumption; pooled time series of state cross-sections; and micro-level data on consumption from surveys of individuals. The selection of a data type has implication for econometric methods employed for estimating the shape of the demand curve. In addition, the demand curve can be modeled using different assumptions about the level of rationality under which consumers operate. For example, fully rational individual considers past, current, and future prices when making consumption choices. In the rational addiction model, current and future consumption are complementary goods. This implies that long-term response of addicted smokers to permanent price changes is greater than their short-run response (Becker, Grossman, Murphy, 1994).

Rationale for Government Interventions

Tobacco use leads to “market failures” that are associated with social costs that would not have existed otherwise. This provides the rationale for government intervention in the tobacco market. There are several types of social costs (economists call them externalities) associated with smoking. First, there are health care costs covered by public funds. The amount of these costs and their public share depends on the size of the tobacco epidemic and the individual country’s system of providing health care. The public share of these costs will be much larger in countries with national health care systems. Smokers also impose direct financial and non-financial burdens on those who do not smoke. Second hand smoking (or environmental tobacco smoke, ETS) has been linked to numerous health problems and their treatment imposes high costs. In addition, the presence of smokers in a health insurance pool causes an increase of insurance premium for everybody, because the average smoker has higher medical expenses. Smokers also increase fire hazards and the damages to both property and health caused by fire are often recovered from public funds.

Another reason for the government to get involved in tobacco control is an information deficiency. If a consumer has insufficient information about a product, s/he cannot maximize his/her utility function. Almost all first use of cigarettes occurs before the age of high school graduation. At that age, consumers are either not well informed, or they do not consciously process information on the health hazards of smoking. In addition, many smokers do not personalize the health risks associated with tobacco use. Less educated individuals tend to underestimate the health consequences of smoking and the risk of becoming addicted to cigarettes (Warner et al, 1995; Jha et al, 2000b). This problem is even more severe in low- and middle-income countries (Kenkel and Chen, 2000).

Tobacco Industry Arguments Against Tobacco Control

Tobacco industry often argues that tobacco control will harm the national (or regional) economy. Its representatives claim that tobacco farming, manufacturing, distribution and sale constitute a vital part of the economy and that if smoking is eliminated, the country will suffer substantial job losses, incomes will fall, tax revenues from tobacco will disappear, and

international trade will suffer. This is a very misleading argument. With the exception of a few countries (China, Zimbabwe, Zimbabwe, Indonesia, Turkey, Bangladesh, Egypt, the Philippines, and Thailand) tobacco farming employs a small part of the labor force, and tobacco manufacturing employment constitutes well under 1% of total manufacturing employment in most countries (WB, 1999). Tobacco industry experts often count “expenditure induced employment”, which also considers jobs created in all sectors of the economy when tobacco workers spend their incomes on other goods and services. However, if smoking is completely eliminated, the resources previously spent on tobacco will not disappear from the economy. They will be redirected to other goods and services, thereby creating jobs in other sectors of the economy. Certainly, any rapid decline in tobacco consumption could create transitional problems, for example, brief periods of higher unemployment. However, the types of decline in tobacco consumption witnessed in the major industrialized nations are so gradual that they create few transitional problems of consequence. When one recognizes that global tobacco consumption is rising, not falling, the “transitional costs” of successful tobacco control will be reduced to less rapid expansion of the tobacco industry, rather than economic burden. In addition, the tobacco industry itself is frequently responsible for job losses when it promotes mechanization of the tobacco production, when it purchases imported tobacco instead of that grown domestically, or when it pushes up the wholesale price of tobacco leading to reduced cigarette sales.

With regard to the revenue from tobacco taxes, in most countries it constitutes only a few percent of total revenues (Chapman and Wong, 1990). It is true that any country that is heavily reliant on tobacco excise taxation will need to revisit its tax policy. One should realize that taxes represent only income redistribution; they do not add new value to the economy. The only issue will be how to fulfill revenue needs by imposing the tax burden in an equitable manner, once tobacco tax revenues decline.

Several studies sponsored by the industry tried to show that specific tobacco control policies would cause severe economic hardship in specific non-tobacco industries such as the local restaurant industry, tourism, advertising businesses, as well as increasing costs related to hiring labor. The empirical evidence has not supported the claim. Numerous studies found no adverse effect of smoking restrictions, including complete bans, on local restaurants’ business. On the other hand, several of the studies have found a tendency for smoking restrictions to

increase business (Glantz and Charlesworth, 1999; Hong Kong Council on Smoking and Health, 2002). It is possible that there will be temporary job losses in the advertising industry, but in that case other industries will realize compensating job gains (American Economics Group, 1996). There is no proof that smoking restrictions increase the cost of recruiting and retaining workers. In fact, in many settings, non-smokers constituted the majority of employees and they preferred a smoke free environment. A smoke free workplace eliminates the employer's liability regarding health effects of environmental tobacco smoke.

Some recent studies sponsored by the industry claimed that smoking is beneficial for the state budget, because a smoker contributes to it more over the lifetime than a non-smoker (A.D. Little, 2000). They argue that a smoker pays tobacco excise taxes, but does not live long enough to collect the same amount of pensions and other social benefits as a non-smoker. However, the budgetary impact of smoking represents only one dimension of the economic impact that cigarette consumption has on the economy. An accurate economic analysis of smoking has to compare an economy with and without tobacco consumption. It should not count collected excise taxes as society benefits (that represent only income redistribution) and should consider the value of lost human capital due to premature death among smokers.

It is frequently debated whether the net medical care expenses of a smoker are lower than those of a non-smoker who lives longer, thus having more years of medical care. A series of studies dealing with this issue has produced contradictory results. These differences are often attributed to different assumptions, methods, and data. Several published analyses support the conclusion that the net cost is effectively zero (Leu and Schaub, 1983; Barendregt et al., 1997). There are also analyses (Hodgson, 1992) that concluded that smoking did add significantly to the net health care costs of the US. Given the available evidence, even if smoking imposes a financial burden on health care budgets, its net impact is likely modest.

Interventions to Reduce Smoking – Demand Approach

Tobacco Taxation

Tobacco taxes are usually used to generate revenues, but recently they become to play an important role in reducing smoking.

There are significant differences across countries in the level of tobacco taxes. The World Bank data shows that taxes tend to be absolutely higher and account for a greater share of price in high-income countries compared to low- and middle-income countries.

Numerous studies from high-income countries demonstrate that increases in tobacco taxes lead to significant reductions in cigarette smoking and other tobacco use. The impact of price on consumption is measured by the price elasticity of demand, where the elasticity is defined as the percentage change in the quantity consumed resulting from a one-percent increase in price.

Cigarette price elasticity estimates from high-income countries range from -0.3 to -0.5 , indicating that a ten percent increase in cigarette prices will reduce overall cigarette smoking by 3 to 5 percent (Chaloupka et al, 2000, Chaloupka and Warner, 2000, USDHHS, 2000). The theory of addiction accounting for slower response among addicted smokers suggests that long-run price elasticities are approximately twice as high as those in the short-run, with the long-run estimates centered on -0.8 (Becker, Grossman and Murphy, 1994). In addition, research confirmed an inverse relationship between price elasticity and age, with estimates for youth price elasticity of demand up to three times those obtained for adults (Gruber, 2000, Ross and Chaloupka, 2001, Harris and Chan, 1999).

Several studies have explored differences in the price sensitivity of cigarette demand by income, education, and/or socioeconomic status (Chaloupka et al, 2000, Chaloupka and Warner, 2000, USDHHS, 2000). They demonstrated that less educated persons (Chaloupka, 1991), lower income individuals (CDC, 1994), and people with lower socioeconomic status (Townsend, Roderick and Cooper, 1994) reduce their tobacco consumption more in response to price increases than people who are more educated, have higher income levels, and have higher socioeconomic status.

Higher price responsiveness among lower income groups is supported by research in low and middle-income countries (Chaloupka et al, 2000). In general, estimates of price elasticity for low and middle-income countries are about double those estimated for high-income countries, implying that significant increases in tobacco taxes in these countries would be very effective in reducing tobacco use.

In summary, the empirical evidence indicates that increases in tobacco taxes reduce tobacco use by preventing initiation (and subsequent addiction), increasing the likelihood of

cessation among current users, reducing relapse among former users, and reducing consumption among continuing users. Thus, higher tobacco taxes will lead to substantial improvements in public health and to lower social costs attributable to smoking.

Restrictions on Smoking

Negative health consequences of passive smoking, particularly for children, provide rationale for adopting restrictions on smoking. These restrictions also reduce smokers' opportunities to smoke, thus increasing the price of smoking. In Western populations, comprehensive restrictions on smoking lead to 5 -15% reductions in population smoking rates (Hopkins et al, 2001, Emont et al, 1992, Levy and Friend, 2001, Ohsfeldt et al, 1998) and to the changes in social norms regarding smoking behavior, especially among youth (Woolery, Asma and Sharp, 2000). Smoking bans in workplaces generally reduce quantity smoked by 5-25%, and prevalence rates up to 20% (Levy and Friend, 2002, Fichtenberg and Glantz, 2002). The no-smoking policies seem to be most effective when strong social norms against smoking help to make smoking restrictions self-enforcing (Jacobson and Wasserman, 1997).

Health Information and Counter Advertising

The information shock in early 1960's caused by publication of US and UK reports linking smoking to lung cancer led to significant reductions in cigarette smoking, with initial declines of 4 to 9 %, and longer-term cumulative declines of 15 to 30 % (Kenkel and Chen, 2000, Townsend, 1993). Similar declines accompanied information dissemination on tobacco harm in low and middle-income countries several years later (Kenkel and Chen, 2000). Even now, mass media anti-smoking campaigns still have the potential to reduce smoking prevalence by 4-12% if sufficiently funded and combined with other tobacco control policies (Hopkins et al, 2001, Friend and Levy, 2002). There is still much to be done in health education: new evidence about the harmful effects of tobacco use needs to be disseminated, and many individuals, particularly in low- and middle-income countries, need to be persuaded about the risks of tobacco use.

Tobacco Industry Advertising and Promotion

It is difficult to evaluate the effect of advertising and promotional restrictions on tobacco demand because econometric methods cannot detect marginal change in behavior when advertising and promotional activities of tobacco companies are near the point of saturation. In that situation, which exists in almost every market for tobacco products, the effect of a small change in advertising expenditures is almost untraceable (Chaloupka et al, 2000, Townsend, 1993, FTC, 2001). For this reason, most economic studies exploring the relationship between cigarette advertising and cigarette demand have produced mixed findings, with the majority of them concluding that advertising has, at most, a small positive impact on demand (Chaloupka et al, 2000, Townsend, 1993). Analyzing advertising and promotion bans provides more direct evidence on the impact of advertising (Chaloupka and Warner, 2000, Saffer, 2000). For example, a recent study predicted that a comprehensive set of tobacco advertising bans in high-income countries could reduce tobacco consumption by over 6%, adjusted for price effects (Saffer and Chaloupka, 2000). The study found that partial bans have little impact on smoking behavior, given that the tobacco industry can shift its resources from the banned media to those that are not banned. In addition, qualitative methods complimenting the economic research in this area support the hypothesis that increased exposure to advertising leads to higher cigarette demand (USDHHS, 1994, UK Department of Health, 1992).

To summarize, economic research has demonstrated that demand side interventions are highly effective in reducing the demand for tobacco products. Widespread adoption of these measures would reduce the public health toll from tobacco.

Interventions to Reduce Smoking – Supply Approach

In contrast to the effectiveness of demand side interventions, there is very little evidence that reducing the supply of tobacco is effective in curbing the tobacco epidemic (WHO, 1997). For example, limiting youth access to tobacco was not yet clearly linked to less tobacco use (USDHHS, 2000, Woolery, Asma and Sharp, 2000). The effective implementation and enforcement of these policies also requires infrastructure and resources that are difficult to secure. Crop substitution and diversification programs are often proposed as means to reduce the

supply of tobacco. However, there is little evidence that these programs significantly reduce supply, given that the incentives for tobacco growing attract new farmers who replace those who do move out of tobacco farming (Jacobs et al, 2000). While trade liberalization has contributed to increases in tobacco use, particularly in low- and middle-income countries, restrictions on trade in tobacco that violate international trade agreements may result in retaliatory measures harming the whole economy (Taylor et al, 2000).

The key intervention on the supply side is the control of cigarette smuggling, currently estimated to amount for 6 – 8% of global consumption (Merriman, Yurekli and Chaloupka, 2000). While differences in taxes and prices across countries suggest a motive for smuggling, a recent analysis showed that corruption within countries is a stronger predictor of smuggling than price (Merriman, Yurekli and Chaloupka, 2000). Effective anti-smuggling supply side measures are not very well studied, but are likely to include prominent tax stamps and warning labels in local languages, better methods for tracking cigarettes through the distribution chain, aggressive enforcement of anti-smuggling laws, and stronger penalties for those caught violating these laws (Joossens et al, 2000).

Comprehensive Programs to Reduce Tobacco Use

Comprehensive programs to reduce tobacco use are based on an assumption that there is a synergy among various anti-smoking policies improving their individual effectiveness. In general, these programs have one or more of four key components: national and community interventions, counter marketing campaigns, antismoking policy and regulation, and surveillance and evaluation (USDHHS, 2000). In recent years, several governments, mostly in high-income countries, have adopted comprehensive programs to reduce tobacco use, often funded by earmarked tobacco tax revenues. The evidence from the US and UK clearly indicates that these comprehensive efforts have been successful in reducing tobacco use and in improving public health (USDHHS, 2000, Farrelly, Pechacek and Chaloupka, 2001, Wakefield and Chaloupka, 2000, Townsend, 1998). In California, for example, the state's comprehensive tobacco control program has doubled the rate of decline in tobacco use compared to the rest of the US (CDC, 2000).

Implementation of Effective Tobacco Control Policies

While there is substantial evidence concerning the effectiveness of numerous policy interventions to reduce tobacco use, their implementation is uneven and limited. An analysis of legislative data abstracted from the *Tobacco Control Country Profiles* database (Corrao et al, 2000) indicates that the higher income countries have more anti-smoking laws in place than the low- and middle-income countries. Evidence points to a positive relationship between the comprehensiveness of tobacco control policies and income level, but there are also wide differences among countries within an income group (Chaloupka et al, 2001). Despite a possible connection, these differences are not linked to the relative employment in tobacco agriculture. However, they may be affected by tobacco industry lobbying power, and other factors such as rule of law and government effectiveness. The country's overall commitment to tobacco controls is also reflected in active enforcement of tobacco control regulations (Chaloupka et al, 2001).

Political resistance to tobacco control usually comes from worries about the loss of budget income from tobacco tax. Often, governments do not realize that if tobacco disappears from the economy, there is no net tax loss, because other products can replace tobacco as a tax base. Providing evidence that tobacco control programs, including research, could be self-financing when funded by tobacco excise taxes, can diminish the opposition. Another political tool used to gain the political and civil society support for tobacco control is to earmark tobacco tax. Earmarking means setting aside a portion of collected taxes for services that would not have existed otherwise (e.g. various prevention programs).

The Framework Convention on Tobacco Control (FCTC) could help to overcome some of the constraints on tobacco control policies. The FCTC aims to be an international treaty that would commit 191 member states of the WHO to adopting strong, effective tobacco control policies (Taylor and Bettcher, 2000). The FCTC could be most effective in addressing issues associated with tobacco industry globalization such as restricting tobacco advertising and promotion, controlling the smuggling of tobacco products, improving the sharing of information internationally, and more.

Summary

Tobacco use is a huge and growing cause of death worldwide. If the current consumption patterns continue, it will kill about one billion people in the 21st century. There is strong evidence that tobacco tax increases, the dissemination of information about the health risks from smoking, restrictions on smoking in public places and workplaces, comprehensive bans on advertising and promotion, and increased access to cessation therapies are effective in reducing tobacco use. Despite this evidence, these policies have been unevenly applied, partly due to political constraints and lack of awareness about the power of these interventions. Tobacco control advocates, medical doctors and others conducting research in this area will play an important role in dealing with this global public health problem.

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