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The economics of global tobacco control

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Few people now dispute that smoking is damaging human health on a global scale.[1] However, many governments have avoided taking action to control smoking—such as higher taxes—because of concerns that their interventions might have harmful economic consequences, such as permanent job losses.

In 1997 the World Bank, in partnership with the World Health Organization, began a global study on the economics of tobacco control. A team of over 40 economists, epidemiologists, and tobacco control experts critically examined the current state of knowledge about tobacco control. The aim was 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. A synopsis of this work, including interim results, was published in 1999.[2] Final results, including 19 chapters and a statistical appendix, are now available.[3] This article presents the key findings from this study.

Methods

Each chapter of the study relied on extensive literature searches and contact with experts working in the area. A study database was compiled from various sources: the WHO's tobacco database (www.who.int/toh/Library/whopub.htm); agricultural data on consumption (www.econ.ag.gov/briefing/tobacco/); a commercial tobacco database (www.marketfile.com); a World Bank survey of over 70 countries on consumption, prices, taxes, control policies, and other variables (www.worldbank.org/html/extdr/hnp/health/tobacco.htm); and World Bank macroeconomic and demographic data (www.worldbank.org/data/wdi2000/). This study database was used to estimate smoking prevalence across the seven World Bank regions, price levels across countries, the effectiveness and cost effectiveness of interventions, the impact of bans on advertising and promotion, the estimation of revenues, the impact of trade on consumption, and the impact of tax increases on smuggling. Some analyses, such as for smuggling, were restricted to the set of countries for which complete data were available. Details of specific methodologies are provided in each chapter of the study.[3] Anonymous peer reviewers reviewed each chapter.

Summary points

Tax increases are the single most effective intervention to reduce demand for tobacco (tax increases that raise the real price of cigarettes by 10% would reduce smoking by about 4% in high income countries and by about 8% in low income or middle income countries)

Tax comprises about two thirds of retail price of cigarettes in most high income countries but is less than half of the total price on average in lower income countries

Improvements in the quality and extent of information, comprehensive bans on tobacco advertising and promotion, prominent warning labels, restrictions on smoking in public places, and increased access to nicotine replacement treatments are effective in reducing smoking

Reducing the supply of tobacco is not effective in reducing tobacco consumption

Comprehensive tobacco control policies are unlikely to harm economies

Findings

Scale of the problem

About 80% of the world's 1.1 billion smokers live in low income and middle income countries.[4] Data from high income countries, where the tobacco epidemic is well established among men, suggest that about half of long term regular smokers are killed by tobacco and that, of these, about half die in middle age (35-69 years old). Worldwide, about four million people died of tobacco related disease in 1998.[4] This figure is expected to rise to 10 million annual deaths by 2030, with 70% of these deaths occurring in low income countries. Peto and Lopez estimate that about 100 million people were killed by tobacco in the 20th century and that, for the 21st century, the cumulative number could be one billion if current smoking patterns continue.[1] Many of these deaths over the next few decades could be prevented if current smokers quit, but in low income and middle income countries quitting is rare. For

example, only about 5% of males in Mumbai, India, are former smokers.[5]

Economic rationale for intervening in the tobacco market

Some economists have argued that smokers know all of the risks and bear all the costs of their choice.[6] They argue that there is therefore no economic justification for governments to intervene in tobacco markets. There are, however, three "market failures" in the tobacco market: inadequate information about the health risks of tobacco, inadequate information about the risks of addiction, and physical or financial costs imposed on non-smokers.[7 8]

General awareness of the risks of smoking is relatively low in low income and middle income countries.[9] For example, a representative national survey in China found that 55% of Chinese non-smokers and 69% of smokers believed that cigarettes did "little or no harm."[10] While there is more widespread general awareness of the risks of smoking in high income countries, many people underestimate these risks relative to other health risks, and many fail to internalise these risks.[11] Similarly, young people seem to underestimate the risks of addiction. Among US students in their final year at high school, fewer than two out of five smokers who believe that they will quit within five years actually do so.[12] About seven out of 10 adult smokers in high income countries say they regret starting and would like to stop.[13] Recent economic modelling suggests that, even if young people "decide" to risk becoming addicted, imperfect information can result in seemingly rational decisions being later viewed with regret.[14]

Ideally, interventions that specifically address a market failure should be implemented as the "best" options. In the tobacco market such "best" interventions would include educating young people about the risks of addiction and disease from smoking or restricting their access to tobacco. However, the evidence suggests that these measures are relatively ineffective.[8 15] In contrast, taxation, albeit a blunt instrument and thus a "second best" intervention, is clearly effective at protecting children from taking up smoking. More practically, any tobacco control policy whose sole effect was to deter children from starting smoking would have little impact on numbers of smoking related deaths for many decades, since most of the projected deaths for the first half of the next century are those of current smokers (fig 1).[1] Therefore, achieving health gains in the medium term requires encouraging adult smokers to quit. Taxation can also correct for any health costs imposed by smokers on others. However, taxation and various other interventions do impose costs on smokers.

Measures to reduce demand

Higher tobacco taxes

Tax increases are the single most effective intervention to reduce demand for tobacco. Our review of numerous studies from high income countries and several studies from low income and middle income countries indicates that higher tobacco prices significantly and consistently reduce tobacco use. A price increase of 10% would reduce smoking by about 4% in
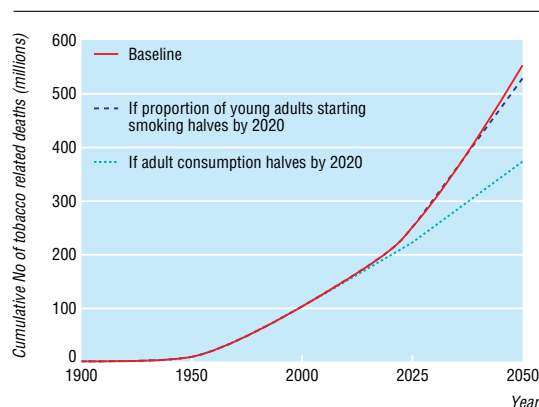

Fig 1 Cumulative numbers of smoking related deaths according to three scenarios. Only current smokers quitting will substantially reduce the number of deaths in the next 50 years. Adapted from Peto and Lopez[1]
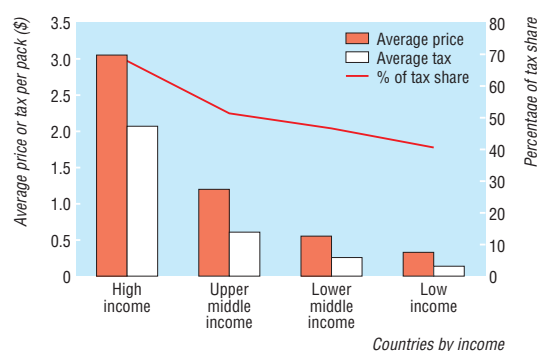

Fig 2 Average cigarette price, tax, and percentage of tax share per pack by countries' income for 1996. If tax is to account for four fifths of the retail price, this requires prices to be increased by four times the manufacturer's (untaxed) price per pack. Thus, if the manufacturer's price is $0.50 then the tax rate would be $2 and the retail price $2.50. Depending on retail factors, an increase of this order would raise the population weighted retail price by 80-100% in low income and middle income countries

high income countries and by about 8% in low income and middle income countries. The evidence indicates that young people, people on low incomes, and those with less education are more responsive to price changes.[16]

The question of what the right level of tax should be is a complex one.[8] The size of the tax depends in subtle ways on empirical facts that may not yet be available. It also depends on societal values, such as the extent to which children should be protected, and on what a society hopes to achieve through the tax, such as an increase in revenues or a reduction in disease. In most high income countries with comprehensive tobacco control policies, tax comprises between two thirds and four fifths of the retail price of cigarettes. In lower income countries taxes are generally less than half of the total price (fig 2).

Consumer information

Policies to improve the quality and extent of information can reduce smoking, especially in low income and middle income countries, where baseline levels of awareness are low.[9] "Information shocks"—

Potential impact of a price increase of 10% and a package of non-price measures (advertising and promotion bans, consumer information, clean air laws, and prominent warning labels) on cigarette consumption and tobacco related deaths*

Countries	Change in No of smokers (millions)		Change in No of deaths (millions)	
	Price increases	Non-price measures	Price increases	Non-price measures
Low or middle income	−38	−19	−9	−4
High income	−4	−4	−1	−1
Worldwide	−42	−23	−10	−5

*Effects estimated only for the 1995 cohort of smokers. Effects of control policies on potential smokers who are not in the 1995 cohort would be additional.

such as the publication of new evidence on the health consequences of smoking—in the United States and Britain in the 1960s and '70s reduced consumption between 4% and 9%, with a cumulative impact between 15% and 30%. Similarly, prominent warning labels on cigarette packs can also reduce consumption.[9] [17]

Bans on advertising and promotion

The existing empirical data suggest that tobacco advertising has, at best, a modest impact on consumption.[18] However, advertising is at such a high level that it is nearly impossible to measure the incremental impact of additional advertising. Examining advertising bans is a more robust way of determining the impact on consumption. A review of 102 countries and econometric analyses of high income countries concludes that comprehensive bans on tobacco advertising can reduce tobacco consumption. Partial advertising bans have little or no effect, given the opportunities for substitution to other forms of media.[18]

Regulatory policies

Evidence, largely from the United States, suggests that policies designed to prevent smoking in public places, workplaces, and other facilities can significantly reduce cigarette consumption.[19] These policies seem to work best when there is a strong social consensus against smoking in public places and, therefore, self enforcement of the restrictions.

Nicotine replacement treatments and other pharmacological aids to quitting can roughly double the chances that an individual will successfully quit.[20] Nicotine replacement treatments are highly regulated, in contrast to the large and unregulated market for cigarettes.[21] The nicotine replacement market is presently limited by several factors, including high retail prices, relatively low global demand for quitting, and complex regulatory issues. Deregulating this market may help to increase demand.

Effectiveness of interventions

A model of the potential impact of control policies was developed for this study.[22] Based on deliberately conservative assumptions, it estimated that tax increases that would raise the real price of cigarettes by 10% worldwide would lead to about 42 million smokers in 1995 quitting and would prevent 10 million premature tobacco related deaths (table). A set of "non-price" measures—including information campaigns, comprehensive bans on tobacco advertising and promotion, prominent warning labels, and comprehensive smoking restrictions—would reduce

the current number of smokers by 23 million and would avert five million deaths. A third measure, the widely increased use of nicotine replacement treatments, would persuade six million smokers to quit and would avert one million deaths.

Measures to reduce supply of tobacco

While interventions to reduce the demand for tobacco are likely to succeed, measures to reduce its supply usually fail. Attempts to impose restrictions on the sale of cigarettes to youths in high income countries have mainly been unsuccessful.[15] Moreover, in low income countries it may be difficult to implement and enforce such restrictions. Crop substitution is often proposed as a means to reduce the tobacco supply, but there is little evidence that it reduces consumption, since the incentives for farmers to grow tobacco are currently much greater than for most other crops.[23]

The evidence suggests that freer trade in tobacco products has led to increases in smoking and other tobacco use. Because trade restrictions impose other costs, a better option is for countries to adopt measures that effectively reduce demand and apply those measures equally to imported and domestically produced cigarettes.[24]

However, one supply side measure is vital—action against smuggling. Effective measures include prominent tax stamps and local language warnings on cigarette packs, as well as the aggressive enforcement of anti-smuggling measures and consistent application of tough penalties to deter smugglers.[25]

Costs and consequences of tobacco control

Several concerns are often raised about taking measures to reduce tobacco consumption. The first is that tobacco control will cause permanent job losses. However, falling demand for tobacco does not mean falling employment. Money that smokers once spent on cigarettes would instead be spent on other goods and services, generating other jobs to replace any lost from the tobacco industry.[23] Studies show that most countries would see no net job losses, and a few would see net gains, if tobacco consumption fell (see extra tables on *BMJ* website for details). Even under the most optimistic scenarios, measures to reduce demand would slow the growth in global demand rather than significantly reducing it in the near term. However, a very small number of countries are heavily dependent on tobacco farming. For them, reductions in domestic demand would have little impact, but a global fall in demand would result in job losses. Policies to aid adjustment in these circumstances would be essential.

A second concern is that higher tax rates will reduce government revenues. We estimated the revenue generating potential in 70 countries and found that a 10% increase in cigarette taxes in these countries would raise cigarette tax revenues by nearly 7% on average.[16] The increase in revenues would be somewhat larger in high income countries, where demand is less elastic and taxes account for a larger share of price. However, even in low income countries the increased revenues, though smaller, would still be considerable.

A third concern is that higher taxes would lead to massive increases in smuggling, thereby keeping smoking high but reducing government revenues. Smuggling is a serious problem. Estimates suggest that 6-8% of all cigarettes consumed globally are smuggled, mostly in the form of non-taxed cigarettes exported free of tax and smuggled back into a country. Large tax differentials between countries provide an obvious motive for smuggling. However, corruption within countries is a stronger predictor of smuggling than price. An econometric model that accounts for potential bootlegging (the legal purchase of cigarettes in one country for consumption or resale in another country without paying applicable taxes or duties) in response to tax increases in 23 European countries in 1995 finds that a unilateral tax increase of 10% by one country would lead to an average increase of 7% in revenue. Coordinated tax increases among neighbouring legislatures would increase tax revenues by 8%.[26]

It is important to note the experience of Canada,[27] which reduced its tax rates as an attempt to counter smuggling. The result was that consumption rose, especially among youths, and revenues fell. Thus, rather than forgoing the health benefits of reduced smoking, and increased revenue, the appropriate response for governments is to crack down on smuggling. Smuggling control is a top priority of the World Health Organization's framework convention on tobacco control.

Conclusion

The threat posed by smoking to global health is unprecedented, but so is the potential for preventing millions of smoking related deaths with highly effective policies. A comprehensive tobacco control policy is not likely to harm economies.

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Everest and the therapeutic cigarette

Recently I had the opportunity to read the official account of the 1922 Everest expedition, written mainly by its leader, Brigadier the Honorable C G Bruce. Of special medical interest, however, is a chapter on respiratory problems by Captain G I Finch, a strong and, at the time, rather unpopoular advocate of auxilliary oxygen, but, after Mallory, probably the finest mountaineer in the party. It reads:
    "Cigarette smoking proved of great value at high altitudes. At first we noticed that unless one kept one's mind on the question of breathing—that is, made breathing a voluntary process instead of the involuntary process it normally is—one suffered from a lack of air and a consequent feeling of suffocation.... A voluntary process must be substituted, and this throws a considerable strain on the mind and renders sleep impossible. On smoking cigarettes, we discovered that after the first few inhalations it was no longer necessary to concentrate on breathing, the process becoming once more an involuntary one. Evidently some constituent of the cigarette smoke takes the place and performs the stimulation function of the carbon dioxide normally present. The effect of a cigarette lasted for about three hours."

    It is also of interest that listed among the stores of the successful first ascent of Kangchenjunga in 1955 were 25 000 cigarettes and 16 lb of tobacco, and I bet they finished the lot.

C L Davidson *retired consultant physician, Skipton*