

# A Rational Taxation System of Bidis and Cigarettes to Reduce Smoking Deaths in India

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Tobacco smoking of bidis and cigarettes causes about one million deaths a year in India. India's relatively high consumption is due in part to a historically low or no tax on bidis and an inefficient, complex system of taxing cigarettes. In the context of planned tax reforms in India, we provide specific recommendations to raise tobacco taxes and to adopt a simpler and more efficient tax administration that would curb smoking. We estimate that raising the tax as a percentage of retail price from 7% to 33% for bidis and from 43% to 58% for cigarettes would conservatively lead to about 14 million smokers quitting and 27 million children never starting, thereby saving some 69 million years of healthy life over the next 40 years. The increase would also raise about Rs 73 billion or an additional 1.2% of current government revenue, while incurring no or minimal economic harm. Modest action on tobacco taxes in India might well save millions of lives.

Smoking bidis or cigarettes accounts for nearly one million adult deaths a year, or about 10% of all deaths at all ages (Jha et al 2008). The current patterns of tobacco use in India are a consequence of a significant informal economy, structure of taxation, poor information systems and ineffective regulation of tobacco products. Tobacco-attributable deaths have fallen sharply in the last two decades in most high income countries in response to comprehensive tobacco control efforts. Higher taxation of tobacco products is the single most effective intervention to reduce consumption (Jha 2009). Additional components of comprehensive tobacco control include complete bans on smoking in public places; prominent, graphic warning labels and public education campaigns that warn people about the dangers of tobacco use; comprehensive bans on tobacco advertising, promotion; and support for smokers trying to quit (Jha and Chaloupka 1999).

Improved health is a key development goal of the Government of India (GOI). Moreover, GOI has recently begun major reforms of its taxation structures including introduction of value added taxation on goods at the state level and proposes to introduce a goods and services tax at both central and state levels (Rao 2010). Thus, now is an appropriate time to conduct a systematic review of tobacco use and the current taxation structure, and to recommend specific reforms. Here, we review the key economic issues related to tobacco use and its regulation in India. Our chief conclusions are that substantially higher and smarter excise taxes of bidis and cigarettes would prevent millions of premature deaths, raise additional revenue, and that higher taxation would incur minimal economic costs.

We first review the consumption patterns and health consequences of smoking in India, followed by the rationale for taxation and the current chaotic tax structure. We describe our proposed tax reforms in detail and provide empirical analyses of the effects that a more rational system of higher taxes would have on consumption, tobacco mortality, and revenue. We discuss three common objections to higher taxes on tobacco, and provide two specific recommendations.

## Methods

Prevalence data were drawn from the nationally-representative Global Adult Tobacco Survey (GATS) – India from 2009-10 (GOI 2010). Mortality data from smoking were drawn from the nationally-representative “Million Death Study” (Jha et al 2008). Retail prices for bidis and cigarettes were obtained from the Labour Bureau, Ministry of Labour. Excise duty rates were

The views represented are those of the authors and not necessarily of their institutions.

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drawn from the department of revenue; Ministry of Finance. We reviewed price elasticities from published studies. The impact of higher taxes on consumption, mortality and tax revenue was modified from a static compartment model (Jha et al 2006; John et al 2010) which is based on price elasticities, current consumption and impact on cessation or initiation (for current adult smokers and youths below age 15, respectively).

### Prevalence and Risks of Smoking

The most common types of smoked tobacco in India are bidis (which are locally manufactured smoked tobacco wrapped in the leaf of another plant, and contain about a quarter of the tobacco of cigarettes) followed by cigarettes. The GATS study estimated that in 2010, India had about 120 million smokers over the age of 15. Of these, 100 million were men. Thus, India is second only to China, which has over 300 million smokers, who are also mostly male (WHO 2008). These numbers imply a per capita adult male consumption of over six bidis or cigarettes per day (although there is some uncertainty in this, particularly for bidi use), which is comparable to the per capita adult (female and male) consumption in France prior to 1990, and higher than that seen for adults today in Canada (which has declined from about 11 cigarettes per capita in 1960s to below five in 2010). Importantly, the GATS study found that only 2.7% of men were ex-daily smokers, far below the cessation rates seen in high income countries, and indeed many of these men are likely to have quit because of disease. The proportion of women smoking is lower. Still, there are about 20 million female smokers in India. Finally, the GATS study also estimated that 170 million Indian adults chew tobacco daily (113 million males and 57 million females).

We focus on tobacco smoking rather than chewing for three reasons. First, inhaled tobacco causes more disease and more diverse types of disease than does oral tobacco use (IARC 2004; 2007). Second, smoking creates direct negative externalities (adverse health consequences for non-smokers), whereas oral tobacco use does not. Of note, the health hazards of smoking are far greater to smokers than are the health hazards from exposure to second-hand smoke (IARC 2004). Third, the control of smoking is far more feasible under current administrative and regulatory structures than is the control of a large and informal market with many sub-suppliers for oral tobacco.

Bidi account for approximately 85% of total smoked tobacco consumption in India, although cigarettes appear to be displacing bidis among younger males over the last 12 years (Joseph et al 2011). Bidi consumption appears to decline with increasing education; however, this educational gradient is not as clear for cigarette consumption (GOI 2010).

A large, nationally-representative study of mortality in over 1.1 million homes (RGI 2009; Jha et al 2008) estimated that around one million deaths annually will be attributed to smoking by the early 2010s. The study compared the prevalence of smoking among 33,000 deceased women and 41,000 deceased men with the prevalence of smoking among 35,000 living women and 43,000 living men. Mortality risk ratios comparing smokers with non-smokers were adjusted for alcohol use, education and age. Among ages 30-69 years, 20% of all male deaths and 5% of

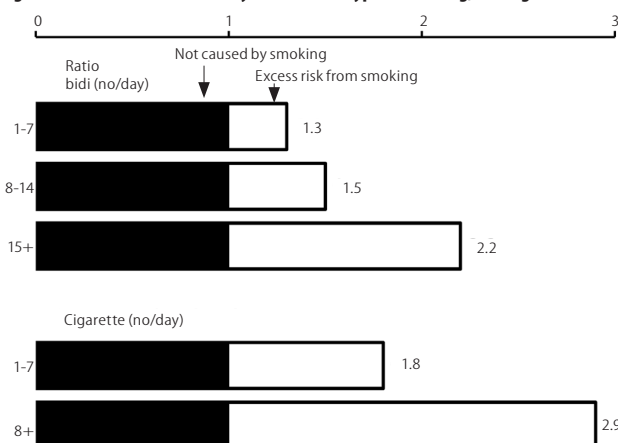
female deaths are caused by smoking. The study also found that the relative risk of death from any medical cause depended on whether bidis or cigarettes were smoked and the amount smoked (Figure 1). The risk ratio for a given number of bidis or cigarettes smoked was greater for cigarettes than for bidis. For example, the relative risk of smoking one to seven bidis per day was 1.3 compared to the relative risk of 1.8 from smoking the same number of cigarettes per day. However, for both bidis and cigarettes, more daily smoking meant higher death risks, with particularly elevated risk ratios for smoking eight or more cigarettes a day (akin to the daily amount among smokers in western countries).

On average, compared to non-smokers, male bidi smokers lose roughly six years, female bidi smokers lose about eight years, and male cigarette smokers lose about 10 years of life. In addition, more than half of deaths occur among the illiterate population and roughly 80% of deaths occur in rural areas (Jha et al 2008).

### Economic Rationale for Government Intervention

The tobacco industry and some economists have argued that increased taxation (and some other regulations on tobacco use) are inefficient and unwarranted (*Economist* 1997). They claim that smokers smoke with full information about its health consequences and take into account the costs and benefits associated with its consumption. However, in practice, the market for tobacco products is characterised by at least three “market failures” (Jha et al 2000). Two market failures relate to information: (i) most consumers do not have full knowledge of risks associated with the consumption of tobacco; and (ii) consumers, especially young smokers, underestimate the risk of addiction to tobacco. In India, few smokers know that 70% of smoking deaths occur during productive middle age (age 30-69 years) or that the average years of life lost from smoking is as great as 10 years. Only about 44% of smokers know that smoking is a cause of strokes (GOI 2010). The lack of information on the full risks of smoking paired with the strongly addictive nature of manufactured smoked tobacco results in smokers facing high costs (withdrawal symptoms, physical distress) if they try to quit. In high income countries with good information on smoking hazards, over 80% of adult smokers wish they had never started. Thus, there is no comparable consumer

Figure 1: Relative Risk of Death by Amount and Type of Smoking, Men Aged 30-69



Risks adjusted for alcohol use, education and age.

Source: Jha et al (2008).

product that carries such severe health risks from continued use, causes regret among informed consumers, and has high costs from the withdrawal of its use. Moreover, the tobacco industry specifically engineers cigarettes to be addictive, and designs reinforcing media messages and consumer signals to maintain this addiction (USDHHS 2001).

The third market failure arises from health externalities due to exposure to tobacco smoke and some financial externalities due to public spending to treat diseases caused by smoking. The costs of exposure to second-hand smoke have not been well studied. However, India spends approximately Rs 30,000 crore annually in both public and private spending on the treatment of tobacco-related illnesses, which accounts for roughly 25% of all public spending on health (Reddy and Gupta 2004). This is much higher than the 6-15% of public spending on health estimated from tobacco-related diseases in other developing countries (Lightwood et al 2000). The direct cost of treating four major tobacco related diseases in India amounted to Rs 54,000 crore or 4.7% of India's national healthcare expenditure in 2004 (John et al 2004). Moreover, the large costs to households who lack formal insurance schemes or pensions from smoking-related diseases include falls into poverty, distress borrowing of selling of assets to pay for treatment, as well as the loss of intergenerational wealth transfers. After accounting for direct expenditure on tobacco by Indian households, it is estimated that tobacco consumption impoverishes roughly 15 million people annually (John et al 2011). Households with a smoker have worse child health outcomes, including lower immunisation rates in children (Rani et al 2004).

The biggest cost, of course, is the value of life foregone among smokers who wish to quit, but struggle against the strongly addictive properties of bidis or cigarettes. Newer economic models which incorporate such real preferences (Gruber and Mullainathan 2005; Peck et al 2000) find a strong case for government intervention, and also that taxation effectively increases the welfare of smokers. In countries with good information, the vast majority of smokers themselves support much higher taxation on tobacco products (Hamilton 2005).

## Price Elasticity of Tobacco in India and Worldwide

Increasing tobacco prices has been found to be the single most effective method to reduce smoking (IARC 2011; Jha and Chaloupka 1999). Table 1 presents a review of relevant studies in south Asia that examine the effect of prices on bidis and cigarettes. Research to date suggests that estimates of own-price elasticity for bidis (for example, the percentage change in quantity demanded for bidis in response to a 1% change in price of bidis) are in the range -0.4 to -0.9. Thus, a 100% increase in price of bidis would lower bidi consumption by about 40-90%. Estimates of own-price elasticity for cigarettes vary more; from small and not statistically significant to large ( $> |-1.0|$ ) and statistically significant. Preliminary results using the most recent 10 rounds of the National Sample Survey Office (NSSO) suggest total own-price elasticity for bidis in the range of -0.6 to -1.0 and total own-price elasticity for cigarettes in the range of -0.8 to -1.3 (Guindon et al 2011). The Indian estimates of price elasticity are consistent with global estimates for price elasticity for cigarettes (which range from 0.4 to -0.5 in middle- and high-income countries; Jha and Chaloupka 2000; IARC 2011). In high-income countries, increased prices reduce smoking more in poorer income groups or in younger people than in higher income or older people (Chaloupka et al 2000). There is limited evidence of a similar pattern in low- and middle-income countries (IARC 2011).

Changes in the prices of one type of smoked tobacco might change consumption of other types of smoked tobacco. John (2008) finds little substitution or complementarity between bidis and cigarettes (meaning that smokers do not typically switch from one to the other in response to changes in prices), which is consistent with the observation that the markets for the two products are quite distinct (GOI 2010). The current price elasticities are with reference to the average cigarette and do not differentiate between low priced and high priced cigarettes. As we note below, opportunities for substitution are increased by the current type of tiered tax structure leading to wide price gaps between cigarette brands and lengths.

**Table 1: Studies and Sources of Price Elasticities for Smoking in South Asia**

Country/Study	Data	Methods	Own-Price Elasticity
India: John (2005;2008)	Household-level data (1993/94 and 1999/2000)	Two-equation system of budget shares and unit values	Bidis: large effect sizes (-0.7 to -0.9); SS. Cigarettes: small effect sizes, NSS.
Bangladesh: Nargis, Ruthbah, Fong (2010)	Individual-level data (2009)	Two-part models: logit for participation and OLS for conditional	Bidis: large effect size for participation (-0.46) SS; small effect size, NSS for conditional. Cigarettes: moderate effect size for participation (-0.29) SS; small effect size (-0.14), SS for conditional.
Pakistan: Mushtaq, Mushtaq, Beebe (2011)	Aggregate annual data (1981-2009)	Autoregressive Distributed Lag Model	Cigarettes: large effect size (-1.17) SS.
Sri Lanka: Arunatilake (2002)	Aggregate monthly data (1999-2000)	Instrumental variables regressions	Cigarettes: moderate to large effect sizes (-0.23 to -0.91), NSS.
Sri Lanka: Arunatilake, Opatha (2003)	Household-level data (1999-2000)	Two-part models: logit for participation and OLS for conditional	Tobacco (including cigarettes and bidis): small, positive effect size for participation (0.1) NSS; large effect size (-0.6) SS for conditional.
Nepal: Karki, Pant, Pande (2003)	Household-level data (2000)	Two-part models: logit for participation and OLS for conditional	Bidis/cigarettes: large effect size for participation (-0.46) SS; large effect size (-0.42) SS for conditional.
Seven regional countries: Guindon, Perucic, Boisclair (2003)	Aggregate annual data (panel 1970-2000)	OLS, and other regressions Andersen-Hsiao estimator	Cigarettes: 1) short-run: moderate to large effect sizes (-0.10 to -0.65) SS; 2) long-run: large effect sizes (-0.80 to -1.40) SS.
India: Joseph (2010)	Individual-level data among school going youth (1999-2004)	Two-part models: probit for participation and OLS for conditional	Bidis: large effect size for participation (-2.70) SS; positive, large effect size for conditional (1.37) SS. Cigarettes: moderate effect size for participation (-0.40) SS; small effect size (-0.05) NSS for conditional.

SS= statistically significant, NSS=not statistically significant, OLS=ordinary least squares.

## Current Tax Structure

Like many taxation policies in India, tobacco taxation reflects years of accumulated influences, lobbying, exemptions, and in some cases, even attempts to do social good. The current result is a complex, even chaotic tax structure on smoked tobacco.

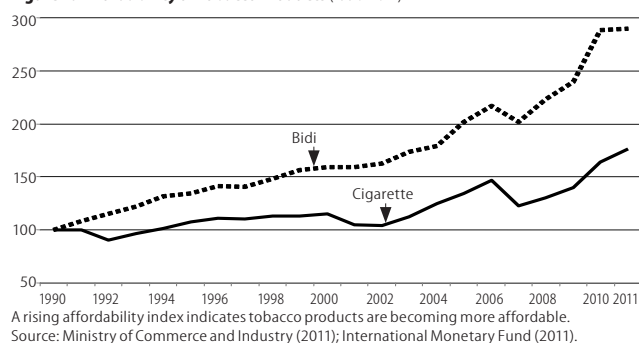
Tobacco in India is subject to a range of taxes imposed by both the central and state governments. The central government imposes duties in the form of central excise on the sale of different tobacco products, a surcharge towards the National Calamity Contingency Fund, and special excise duties. Since 2005-06, additional duties are also levied on *paan masala* and other tobacco products to partly finance the National Rural Health Mission. A bidi workers' welfare assessment is levied only on bidis, at the rate of Rs 4 per 1,000 sticks. States transferred their power to tax tobacco, sugar and textiles to the central government and, since 1957, the central government has collected additional excise duties in lieu of sales tax levied by the states, with these revenues transferred to the states. However, in 2005, the power to levy sales tax has been returned to the states and the transfer of additional excise duty component has been discontinued. In the past two years, several state governments, notably Rajasthan, Gujarat, Himachal Pradesh, Delhi, Goa and Jammu and Kashmir (J&K), have raised value added taxes on bidis and cigarettes. Rajasthan has doubled the value-added tax (VAT) on both bidis and cigarettes between 2010 and 2011, while Delhi, J&K and Goa have introduced VAT on bidis for the first time in 2011.

The current central excise duty as a percentage of price is shown across a sample range of bidis and cigarettes (Table 2, p 48). Taxes on bidis are especially low, with a specific tax in the year 2007-08 of Rs 14 per 1,000 sticks for handmade bidis and Rs 26 per 1,000 for machine-made bidis. Thus, not surprisingly, handmade bidis constitute more than 98% of bidis produced in India (Sunley 2008). Cigarettes are taxed based on their length. Filtered cigarettes have generally faced a relatively higher rate of tax, when compared to unfiltered cigarettes and bidis. Cigarettes of various lengths are taxed at different specific rates, adding to tax complexity. The tax burden per gram of tobacco in filtered cigarettes is much higher than that per gram of tobacco in non-filtered bidis and cigarettes. Sunley (2008) suggests that the market for very low priced cigarettes may not be distinct from that of bidis: in 1994-95 when the excise on micro non-filter cigarettes was reduced from Rs 120 to Rs 60 per 1,000, the consumption of all cigarettes rose the following year probably as bidi smokers shifted to non-filter micro cigarettes. For filtered cigarettes, the share of excise duty as a percentage of price has declined since 2005-06, but for unfiltered cigarettes and bidis, the share has slightly increased during the same period. The total excise duties for cigarettes (filtered and unfiltered) have been periodically raised between 2006 and 2009, but have remained almost unchanged for bidis. In 2008-09, the taxes imposed on both filtered and unfiltered cigarettes were merged, thereby resulting in an increase in the rates applicable on unfiltered cigarettes.

There are five major consequences of this chaotic tax structure. First is increased consumption. Bidis are very cheap, with the average bundle of 25 bidis costing less than Rs 5 (GOI 2010).

Taxes on bidis are very low, averaging only about 7% of the retail price. Cigarette taxes only account for approximately 43% of the retail price, which remains much lower than the average rate of 63% of retail price in most high income countries (WHO 2010). Second, the complex tax structure makes it more difficult to adjust for income growth and inflation. Affordability is a concept that captures the interaction between consumer's income level and tobacco prices (Blecher and van Walbeek 2008). Here, we measure affordability as GDP per capita relative to the wholesale price index for bidis or cigarettes. As price falls relative to income affordability increases and vice versa bidis are nearly three times more affordable in 2011 than they were in 1990, while cigarettes are about 175% more affordable (Figure 2).

**Figure 2: Affordability of Tobacco Products (1990-2011)**



The third major consequence of the chaotic tax structure is a marked variation in tobacco taxes by length that enables the cigarette industry to produce and market cigarettes of various lengths in order to minimise the effect of any tax increase. This enables smokers to switch down in response to price, and enables cigarette manufacturers to alter the structure of products brought to market so as to minimise tax. The fourth consequence is more difficult enforcement of a complex tax structure, increased tax evasion and increased corruption. The final consequence is a far less predictable revenue stream for government.

## A Rational Tobacco Tax Structure in India

Experience from numerous high income countries suggest high excise taxation with periodic adjustments for inflation paired with other tobacco control efforts can achieve the twin objectives of curbing consumption and providing a stable revenue stream with reduced avoidance, leakage and corruption in the tax collection system.

We propose a rational and simple taxation system (Table 2) that would be implemented in several phases. The immediate phase would tax all cigarettes uniformly at the highest rates currently applied to the longest length of cigarettes; namely at Rs 2,363 per 1,000 sticks (this would involve raising the basic excise duty to this level, and eliminate the currently earmarked health and other duties). Such a change would represent an increase in excise duty of about Rs 1,000 above the current average level of Rs 1,300 per 1,000 sticks. For the most popular categories (filter cigarettes of >75-85 and >60-70 mm length), such a change would represent increases of approximately Rs 400 and 1,400 respectively. It would raise the street price of cigarettes from about Rs 30 (per pack of 10) to about Rs 40 representing a 33% increase in the average price and raise the proportion of this price that is tax from 43% to 58%.

**Table 2: Current and Proposed Changes in the First Year on Taxes on Bidis and Cigarettes**

	Market Share, % (November 2010)*	Excise Duty, Rs Per 1000 Sticks (2011-12)	Excise Duty** (Rs Per gram)	Proposed Excise Duty, Rs Per 1,000 Sticks	Proposed Excise Duty* (Rs per gram)
<b>Bidis</b>					
Machine-made	2%	26	0.13	100	0.50
Handmade	98%	14	0.07	100	0.50
<b>Cigarettes</b>					
Filter, >85 mm	<0.1%	2,363	3.15	2,363	3.15
Filter, >75-85 mm	27%	1,959	2.61	2,363	3.15
Filter, >70-75 mm	7%	1,473	1.96	2,363	3.15
Filter, >60-70 mm	61%	969	1.29	2,363	3.15
Filter, ≤60 mm	<0.1%	669	0.89	2,363	3.15
Non-filter, >60-70 mm	5%	1,473	1.96	2,363	3.15
Non-filter, ≤60 mm	<0.1%	669	0.89	2,363	3.15

\* Market share data for bidis are based on Sunley (2008); \*\* We assume bidis weigh 200 g and cigarettes weigh 750 g.

Source: Department of Revenue, Ministry of Finance (2011); Sunley (2008).

For bidis, the proposed tax rate in the first year is chosen to be administratively feasible, and to achieve a ratio of tax to retail price that is somewhat comparable to that for cigarettes prior to our suggested reforms. This would involve an excise duty of Rs 100 per 1,000 sticks, up from the current Rs 14 and Rs 26. The price differential between handmade and machine rolled cigarettes would end. This would raise the average price of a bundle of 25 bidis from Rs 5 to slightly more than Rs 7, or about 40% higher than the current retail price. Such a change would raise the tax proportion of retail price from 7% to 33%.

High specific excise duties are far more likely to discourage switching between different types of tobacco products, are much easier to administer, and produce a much steadier stream of revenue (WHO 2010). The exact impact of this excise duty structure would depend, of course, on the market conditions, industry efforts to counter the tax hike, and on large scale tax avoidance. The use of excise duty also would decrease the difference between higher and lower priced cigarettes, effectively increasing the public health impact. Given evidence of a marked switch from bidis to cigarettes (Joseph et al 2011), higher taxes on all length of cigarettes would slow growth of lower length cigarettes which appear to be displacing bidi sales. The main weakness is that such excise duties need to adjust periodically for inflation, which averages nearly 7% over the last two decades in India (IMF 2011). Thus phase two of our proposed reforms would involve raising the excise duty every year from fiscal year 2013, in line with overall inflation and preferably in excess of inflation, such that the number of ex-smokers increases every year. Australia and New Zealand have opted to raise tax rates above inflation automatically, rather than necessitating annual increases through the usual channels (WHO 2010). France pursued such an objective starting in 1991, and increased cigarette prices by 5% or more in excess of inflation (Recours 1999; see later in the paper). In high inflation settings like India, it might make sense to focus on affordability, in which case tobacco taxes would be increased by enough to raise prices above income growth so as to reduce affordability (Blecher and van Walbeek 2008).

Much as central banks announce inflation targets, it is reasonable for GOI to announce future bidi and cigarette tax targets as a proportion of retail price. One option would be to announce a tax target for 2015 that would have bidis tax at 50% of the retail price and cigarettes tax at 70% of the retail price. Tax targets would be

only for specific excise taxation (i.e., excluding VAT). An additional value of a large increase is also that it conveys useful information to the public that the government is taking seriously the harms of tobacco use. Indeed, Finance Minister Pranab Mukherjee justified modest increases in cigarette taxes in the 2009 budget speech on health grounds. Similarly, just the debate around a tax increase in Switzerland (which was not adopted) lowered consumption (Kenkel and Chen 2000).

Finally, the simplicity and transparency of a high excise tax rate enables easier planning of sales by the tobacco industry. The persistent price differential between bidis and cigarettes might encourage substitution of a small number of cigarette smokers to bidis, but given that the markets appear to be reasonably segmented, this is less of a concern than would be first feared.

### Better Tax Collection

Our tax reforms need to be accompanied by several administratively feasible efforts to boost the efficiency and transparency of tax collection over the limited number of cigarette and much larger number of bidi manufacturers. First, prominent warning labels (which are already being introduced by GOI) in regional languages enable easier identification of packs smuggled from outside India. Second, tax stamps (ideally the more sophisticated new generation of encrypted stamps) that are inside the plastic wrapper help to identify illicit products (WHO 2010). Third, policymakers need to recognize that the bidi industry is structured and organised to evade taxes. Several specific efforts need to be implemented. Preferably, the current tax exemption for small producers should be eliminated. A second-best option is to limit this exemption to truly small companies (not those effectively under the direct ownership or control of larger companies). Currently, the bidi industry has a large number of small-scale manufacturers, with more than 98% of bidis being handmade. None of the more than 300 brands of bidis command even a 5% market share within India (GOI 2010). There were still about 3,000 bidi producers in 2004, despite the number falling by more than half in recent years due to domestic outsourcing to households to avoid tax and labour regulations. While these are often small-scale industries, many are owned by or under control of larger manufacturers, and indeed these larger manufacturers split their businesses into smaller units so as to take advantage of the tax exemptions for small cottage industries. Third, the sale of unbranded bidis should be prohibited, and manufacturer names should be printed on bidi packets to ensure higher tax compliance. Finally, the reporting of the sale and purchase of processed bidi tobacco by any persons or entity should be made mandatory. The volume of transaction and the names of persons involved in it also should be documented (Sunley 2008).

In contrast to the opaque ownership of the bidi industry, ownership of cigarette manufacturers is clearer. Four companies, three of them multinational, account for almost all of India's cigarette manufacturing sector (ITC, Godfrey Philips India, VSR Industries and GTC Industries), totalling Rs 150 billion in annual revenue. Cigarette production in India is dominated by a single entity – the ITC, a subsidiary of the multinational British American Tobacco – which controls about 70% of cigarette trade in volume terms.

## Potential Impact of a More Rational Tobacco Tax Structure

Using conservative estimates of the price elasticity for cigarettes (-0.4) and bidis (-0.7), we have computed the effect of raising tobacco taxes on consumption and revenue. Annual consumption of manufactured cigarettes and bidis in India varies across data sources. Estimates obtained from survey data suggest an annual consumption of about 73 billion cigarettes and 268 billion bidis in 2009-10 (GOI 2010). Estimates obtained from industrial and trade statistics suggest annual consumption in the range of 86 to 106 billion cigarettes and 240 billion bidis (ERC 2010). Others provide undocumented estimates of annual bidi consumption as high as 500 to 1,200 billion sticks (All India Bidi Industry Federation 2000; Sunley 2008). In order to keep our model internally consistent, we use annual consumption estimates for cigarettes and bidis obtained from tax revenue: 72 billion cigarettes and 344 billion bidis. Noting that such estimates are likely to underestimate true consumption, this approach, in addition to being internally consistent, has the advantage of reflecting tax-paid cigarette and bidi consumption more accurately. Revenue from central excise duties on cigarettes and bidis were estimated to be Rs 93.1 billion and 4.9 billion in 2009-10 (\$2.1 billion and 0.1 billion). Table 3 presents our model baseline values and assumptions. In addition to the price elasticity estimates described earlier, our simple static model assumes that youth are twice as price responsive as adults and that price changes have an impact on tobacco-attributable mortality solely through changes in smoking prevalence (prevalence impact is assumed to be 50%). Given the higher mortality risks from cigarettes versus bidis, we assume that 55% and 40% of continuing smokers of cigarettes and bidis, respectively, will be killed by their addiction unless they quit. Based on cessation benefits in high income countries and India's current age structure (Jha 2009), we conservatively assume that only 70% of those who quit smoking reduce their risk of death to factors seen among non-smokers. Finally, our model assumes no change in population and income levels.<sup>1</sup> India's growing population and incomes are both expected to raise the total consumption of tobacco products.

Our proposed rational and simple taxation system for cigarettes and bidis can be expected to decrease cigarette consumption by more than 10 billion sticks and bidi consumption by more than

**Table 3: Projection Model Baseline Values and Assumptions**

	Cigarettes	Bidis
Baseline values		
Tax (Rs per 1,000)	1,295	14
Tax revenue, Rs (in billions)	956	49
Price per pack, Rs (10 sticks)	30.00	5.00
Total smokers (in millions)	46.4	73.3
Population under age 15 years (in millions)	364.0	364.0
Model assumptions		
Price elasticity, adults over age 15 years	-0.4	-0.7
Price elasticity, youth under age 15 years	-0.8	-1.4
Percentage impact of price on cessation	50	50
Mortality proportion among continuing smokers (%)	55	40
Per cent who avoid death upon quitting smoking	70	70
Average years of life lost (smokers vs non-smokers)	10	8

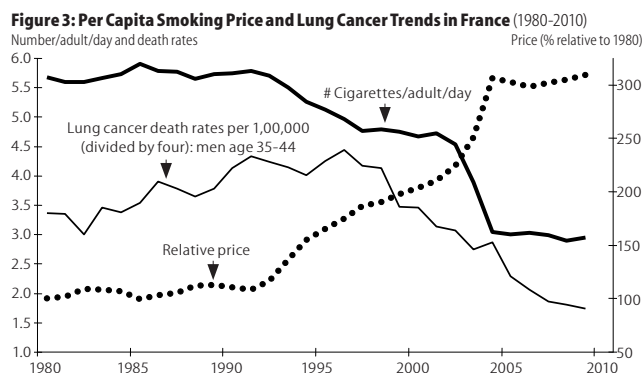
Data sources: tax rates, tax revenue: department of revenue, Ministry of Finance, Government of India; Prices: Labour Bureau, Ministry of Labour, Government of India; Number of smokers: Government of India and International Institute for Population Sciences; Population: Population Division, department of economic and social affairs, United Nations.

100 billion sticks (Table 4). We estimate that about 3.3 million current cigarette smokers and about 11 million current bidi smokers would quit. Moreover, youth are more price responsive than adults (IARC 2011). As such, over 6.7 million youth below age 15 would not start smoking cigarettes and over 21.4 million would not start smoking bidis. We assume that, compared to a non-smoker, every cigarette smoker who continues smoking would lose 10 years of life, and every bidi smoker would lose eight years of life. By multiplying the total number of cigarette and bidi quitters calculated above by these estimated years of life, and then discounting these healthy years gained at a 3% discount rate (the average of that recommended in World Bank cost-effectiveness analyses) over 40 years, we can calculate the total number of healthy years gained. This calculation yields 28.6 million healthy years gained from reductions in cigarette and bidi consumption and 40.2 million life years gained from youth not starting to smoke.

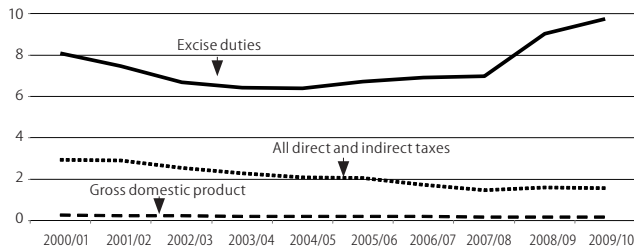
**Table 4: Consumption and Revenue Impact of a More Rational Tax System for Bidis and Cigarettes**

	Unit Price, Rs	Tax, Rs Per Stick	Tax Rate, % of Retail Price	Consumption, Billion Sticks	Tax Revenue, Billion Rs
Bidis					
Current	0.2	0.014	7.12	343.9	4.9
Proposed	0.3	0.100	33.3	240.7	24.1
Cigarettes					
Current	3.0	1.30	43.2	73.8	95.6
Proposed	4.1	2.36	58.1	63.3	149.5
Change	+1.1	+1.1	+14.9	-10.5	+53.9

As with all projections, our analyses are subject to assumptions. However, its results are consistent with other models that have estimated the impact of higher prices (John et al 2010; Jha et al 2006; WHO 2010). Moreover, this analysis is not simply a theoretical one. Consider the French example (Jha 2009). France's uptake of smoking was chiefly after the second world war and its prevalence rose until the mid-1980s. From 1990 to 2005, cigarette consumption fell from about six cigarettes per adult per day (which is comparable to the per capita adult male consumption in India today) to three cigarettes (Figure 3). This sharp decline was mostly due to a sharp increase in tobacco taxation starting in 1990 under the then president Jacques Chirac. These price increases raised the inflation-adjusted price by threefold. Among men, the corresponding lung cancer rates at ages 35-44 fell sharply from 1997 onward. During this period, revenues in real terms rose from about 6 billion euros to 12 billion euros (Hill 2010). Of note, the stagnation in tax levels from 2004 onward when Nicolas Sarkozy became finance minister has also led to stagnation in per capita cigarette consumption (Hill 2010).



**Figure 4: Contribution of Bidi and Cigarette Taxes to Central Government Revenues (2000-01 to 2009-10)**



### Consequences of Higher Taxation of Tobacco in India

What are the drawbacks of higher tobacco taxes? We discuss three most commonly raised objections: (i) revenues would decline, or more specifically that these high taxation levels would “kill the golden goose”; (ii) higher taxation would entail massive job losses, particularly in the bidi industry; and (iii) there would be a marked rise in smuggling.

#### Revenue

In 2009-10, bidi and cigarette taxes accounted for less than 2% of total tax revenue, accounting for nearly 10% of central government excise revenue or about 0.16% of GDP. Most of this revenue arose from cigarettes, with little coming from bidis. The share of tax revenue from bidis and cigarettes has fallen from about 3% in 2000-01 to less than 1.6% in 2009-10 (Figure 4). However, under our proposed reforms, health gains from decreased tobacco consumption are accompanied by increased tax revenue as demand remains inelastic. Notwithstanding the declining proportion of tax to total revenue, the absolute amount of annual revenue gained from the tax reform remains large: about Rs 73 billion (nearly Rs 20 billion from bidis and Rs 53 billion from cigarettes) or about 1.2% of current revenue.

The tobacco industry argues that the “Laffer curve” (whereby revenues fall in response to tax increases) is likely to occur. However, in reality declines in revenue are not expected from the current relationship of price and consumption. Worldwide, a 10% higher excise tax yields about 7% higher revenue (Sunley et al 2000), even in high tax settings. Some of the Scandinavian countries have demonstrated that even with taxation nearing 80% or higher of retail price, tax increases continue to generate higher revenues (WHO 2010).

#### Bidi Industry Job Losses

In India, tobacco is a labour-intensive crop involving three stages: cultivation, harvesting, and processing (Kaur 2002). The NSSO revealed that the direct and indirect tobacco workforce in India was approximately 7 million during 2004-05, representing approximately 1.5% of overall employment in the formal sector. Sunley (2008) reports about 4 million workers in the bidi industry. By contrast, the number of jobs in the cigarette industry is trivial. The estimated number of tobacco workers rose from about 3 million in 1983 to roughly 7 million in 2004-05. However, given that many of these workers are employed part-time, these figures tend to be an overestimation. Tobacco growing employs less than 10% of the total tobacco workforce. More than two-thirds of such employment involves rural-based jobs, primarily in the bidi manufacturing industry.

Analyses of various other tobacco producing countries have shown that the net impact, even of the hypothetical overnight elimination of all consumption, does not result in job losses (Jacobs et al 2000). The logic is simple: money not spent by consumers on tobacco would be spent elsewhere in the economy, and these would generate additional jobs and opportunities for taxation (Jha and Chaloupka 1999).

Moreover, reductions in demand take time, and like all other sectors, the supply of bidis can adapt. The absolute number of bidis or cigarettes sold in India is expected to grow, and indeed the last 12 years have shown growth particularly in the number of cigarette smokers (Joseph et al 2011). Even the dramatic reductions in smoking that would result from our proposed tax reforms are unlikely to have an impact on most current bidi jobs. The main consequence would be to slow the entry of additional employees into the bidi industry. The main issue is one of the transition costs of bidi growing and political opposition from well funded and well organised bidi industry owners. Earmarking some of the tax revenues for helping lower income bidi workers transit to different livelihoods has been proposed as a political step. Turkey, for example, has adopted this strategy (Yurekli 2010). However, the current murky co-ownership of the bidi industry (Gupta and Asma 2008) would need to be clarified in order to understand if such a political buy-out is desirable and equitable.

Taken to a logical conclusion, the main public policy choice is the societal value of a few million part-time jobs versus one million smoking deaths (0.7 million of which occur in middle age).

#### Smuggling of Cigarettes in India

It is often argued that an increase in taxes on tobacco products could lead to massive increases in smuggling, eroding the effectiveness of the higher taxes. Smuggling concerns apply to cigarettes and less to bidis, which are currently manufactured only in India and Bangladesh. Merriman et al (2000) estimated that 1% of 1995 domestic cigarettes sales in India were smuggled, comparable to estimates by the World Tobacco File (1996). Joossens et al (2009) estimated that 14% of cigarettes were smuggled in the year 2004.

Experience from South Africa and other settings suggest that even in the face of smuggling, higher taxes raise revenue and decrease consumption (Jha and Chaloupka 1999). Efforts to improve tax compliance and reduce illicit trade can reduce tax evasion and avoidance. Adopting high-quality tax stamps that are difficult to counterfeit (particularly the new generation of hi-tech stamps that include features such as holograms or radio-frequency identification), coupled with strong tax administration, aggressive enforcement and strong penalties, are likely to be effective in curbing smuggling and to more than pay for themselves as taxes are collected on products that previously evaded taxes (WHO 2010). Our proposed simpler tax structure on cigarettes would also deter smuggling, because tax administration would be simpler.

Finally, the multinational tobacco industry has a track record of smuggling its own products (Joossens et al 2009). Their incentive is to scare finance ministers into keeping tax rates low and to maintain market share, even with the contraband products. Thus many western countries have brought and won legal cases against the multinational tobacco companies for their role in smuggling.

## Specific Recommendations

A comprehensive approach for tobacco control would dramatically reduce premature mortality, and raise, in the medium term, substantial revenue. We have two summary recommendations to the GOI:

(1) Implement a comprehensive tobacco control strategy that uses price and information and regulation measures to curb consumption.

(2) Adopt higher and smarter levels of taxation, focused on a higher excise tax rate on bidis and cigarettes, with annual adjustment for inflation. These would be paired with practicable strategies to decrease tax avoidance and evasion, while increasing transparency and decreasing corruption.

Modest action on tobacco taxes in India might well save millions of lives.

## NOTE

1 A copy of the simple Excel spreadsheet for estimation is available by writing to the lead author.

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