Chapter 19

Fiscal Instruments for Health in India

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INTRODUCTION

It has been recognized for some time that the primary determinants of population health and health inequalities, particularly in low- and middle-income countries (LMICs), lie outside of the health care system (CSDH 2008). These determinants include individual-level factors—such as access to clean water and sanitation, nutrition, and antenatal care—as well as environmental-level factors—such as pollution, walkability of neighborhoods, rates of open defecation, and tariffs on food imports and exports.

Exposure to these hazardous risk factors is the primary contributor to adverse health outcomes, which increase resource demands on health care systems and increase private and public health expenditures. The impetus for universal health coverage (UHC) in countries as diverse as Brazil, India, and South Africa has run up against the barrier of these broader determinants that hinder efforts to improve health. There are three additional challenges to UHC:

- The economic slowdown has significantly reduced growth rates and government revenues in LMICs. Annual growth rates in Brazil, the Russian Federation, India, China, and South Africa (BRICS) were a population weighted average of nearly two percentage points lower during 2011–15 than during the previous decade (World Bank and IHME 2016). As a result, government expenditures and the ability to increase spending on health care have tightened.
- The narrow fiscal space for health care, even in countries with relatively high growth rates, is a consequence of a low tax base and constrains health care spending by national and state governments. In India, although government health expenditures as a proportion of total government expenditures are comparable to similar countries, they lag when measured as a proportion of gross domestic product (GDP).
- Countries seeking to transition to UHC have weak health care systems that are challenged in delivering quality health care coverage even when additional resources are available. India and South Africa are examples of countries where the health care system serves a fairly small proportion of the population; large segments are excluded from even basic health coverage.

Despite the recognition that social determinants exercise a significant influence on population health in LMICs as direct interventions in the health sector, there remains a limited understanding of how existing fiscal policy instruments available to governments in LMICs can be leveraged to improve health.

This chapter presents the analytic framework for assessing the potential of fiscal instruments to improve population health. We describe the application of this method to specific interventions in India and discuss the implications of these policy changes. The goal is to inform policies at ministries of finance that have an effect on health, either through new

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policies or by examining existing policies that affect important health risk factors.

ROLE OF FISCAL POLICY INTERVENTIONS

Fiscal measures, including tax and subsidy reforms, offer an appealing complementary opportunity to improve health without reliance on additional budgetary allocations to ministries of health. In India (table 19.1), subsidies for food, fertilizer, and petroleum—three commodities that can have large direct and indirect health impacts—total US$42 billion and together account for twice the direct health expenditures of the roughly US$18 billion spent by the state and central governments on health. Tax and tariff policies are also important and can potentially modify health when applied to commodities that potentially affect health adversely, including alcohol, tobacco, salt, sugar, and trans fats. Current levels of taxes and subsidies for key influencers of health are described in table 19.2.

Fiscal policies can also implicitly influence health and increase public usage of health systems by modifying incentives for treatment of illness, prevention of illness, and promotion of healthy lifestyles. Additionally, fiscal policies can be used to influence the large portion of

Table 19.1 Current National Accounts for India: Combined Revenue and Capital Expenditures and Receipts for Central and State Governments

Item	US$ (Rs 65 = US$1)	GDP (percent)
GDP at current market prices (BE)	2.17 trillion	100.00
Revenue receipts (BE)	437 billion	20.15
Revenue expenditures (BE), including	488 billion	22.51
• Interest payments	67 billion	4.75
• Food subsidy	20 billion	0.92
• Fertilizer subsidy	11 billion	0.52
• Petroleum subsidy	5 billion	0.21
• Health expenditures (includes medical and public health, water supply, sanitation, and family welfare)	21 billion	0.96
• Defense	23 billion	1.07
Total capital expenditures, including loans and advances	95 billion	4.42
Total expenditures (revenue + capital)	583 billion	26.89

Source: Ministry of Finance 2016.
Note: BE = budget estimate; GDP = gross domestic product; Rs = Indian rupees.

Table 19.2 Current Levels of Taxes/Subsidies and Health Risk Factors and Outcomes in India

Commodity	Outcome	Risk factor	Instrument	Level of tax/subsidy in India
Cigarettes[a]	Cancers, heart disease	Smoking, chewing tobacco	Tax	33% plus Rs 2076 per thousand cigarettes (Central Board of Excise and Customs 2017)
Alcohol	Road traffic accidents, cancers, liver disease, STIs	Drunk driving, unsafe sex	Tax	Rates vary by state and product, including prohibition in five states
Condoms	STIs	Unsafe sex	Subsidy	Free condoms for high-risk groups (Ministry of Health and Family Welfare 2016a)
Vaccines	Infectious diseases	Measles, pneumococcal disease, other VPDs	Subsidy	Under Universal Immunization Programme, 10 free vaccines provided against VPDs (Ministry of Health and Family Welfare 2016b)

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Table 19.2 Current Levels of Taxes/Subsidies and Health Risk Factors and Outcomes in India (continued)

Commodity	Outcome	Risk factor	Instrument	Level of tax/subsidy in India
Essential drugs for infectious disease	HIV, TB, malaria, bacterial infections	Lack of treatment	Subsidy	100% for ARTs (Ministry of Health and Family Welfare 2016c); 100% for TB DOTS (Ministry of Health and Family Welfare 2016d)
TB rapid diagnostics	TB	Lack of TB diagnosis	Subsidy	GeneXpert ceiling price of Rs 2,000 for private clinics receiving reduced pricing (Initiative for Promoting Affordable Quality TB Tests 2013)
Salt	Stroke	Hypertension	Tax	None (Central Board of Excise and Customs 2017)
Sugar-sweetened beverages	Cancer, heart disease, diabetes	Obesity	Tax	40% (Central Board of Excise and Customs 2017)
Trans fats	Heart disease, diabetes	Obesity	Tax	None
Diesel	COPD	Air pollution	Tax	18.6–27% (varies by state)
LPG to substitute for solid cooking fuels	TB, COPD	Air pollution (reduced)	Subsidy	Rs 568 per 14.2 kg cylinder (or Rs 40/kg)

Note: ARTs = antiretroviral therapies; COPD = chronic obstructive pulmonary disease; DOTs = directly observed treatment, short course; HIV = human immunodeficiency virus; kg = kilogram; LPG = liquefied petroleum gas; Rs = Indian rupees; STIs = sexually transmitted diseases; TB = tuberculosis; VPDs = vaccine preventable diseases.
a. Cigarettes not exceeding 65 mm in length.

health prevention expenditures still occurring in the private sector that are not directly paid for or monitored by the government. The government's role can be to encourage uptake of preventive health services using direct subsidy policies that are similar to the production level subsidy for antimalarial artemisinin-combination therapies initiated under the Affordable Medicines Facility-malaria (AMFm) financing mechanism. Fiscal policies are practical alternatives to regulation, particularly in areas where regulation is challenged by the number of actors. For example, subsidies for micronutrient fortification of food commodities may be more effective than compulsory fortification when there are many producers and it is difficult to enforce compliance (Chow, Klein, and Laxminarayan 2010). Fiscal policies can also be more effective than regulation in modifying incentives. For example, a package of regulatory interventions to reduce carbon emissions—efficiency standards for buildings, fuel efficiency standards for vehicles, and a carbon ceiling for energy production—could encourage the substitution of alternative energy sources and reductions in emissions intensity through greater efficiency; however, these regulations would still fail to reduce fuel demand (Parry and others 2014).

ANALYTIC FRAMEWORK

The consumption of commodities such as alcohol, cigarettes, condoms, and vaccines involves external effects that are not taken into consideration by those who consume them. In the case of alcohol and cigarettes, the externalities are negative—consumption of these goods causes secondhand smoke or fires (cigarettes) and drunk driving accidents (alcohol). In the case of condoms and vaccines, the externalities are positive because of reductions in the transmission of infections. Taxes can be levied to facilitate a socially optimal level of consumption of commodities with negative externalities; subsidies can be used for commodities with positive externalities. Paternalistic preferences—where the state's desire to improve societal welfare supersedes the individual's preferences—over health outcomes for other households are a common, although contentious, justification for government intervention. Paternalistic preferences recognize that the social marginal benefit from better health exceeds the private marginal benefit in the case of a positive consumption externality, thereby offsetting the distortion created by the subsidy instrument (Browning 1999.)

However, the optimal tax on a commodity may exceed any amount that might be justified on externality grounds alone if the commodity is a weaker substitute for leisure than the average consumption good; the optimal tax rises further the more inelastic the demand for the taxed commodity (Sandmo 1976).[1] Taxing leisure items—such as tobacco or alcohol—would discourage their use during leisure activities and consequently increase the labor supply. If these taxes offset labor taxes,

which distort labor and leisure decisions, they would increase welfare. Therefore, a tax on individual products can increase welfare, but this will further depend on whether tax-neutrality is specified in legislation. Because extra tax revenues could end up funding more public spending rather than other tax reductions, the fiscal rationale for higher taxes may be undermined and would have to be evaluated under alternative possibilities for recycling of the revenues. In previous work, we estimated that the optimal tax on alcohol exceeds the level warranted on externality grounds by between 59 and 126 percent, because of the revenue-raising component of the optimal tax (Parry, Laxminarayan, and West 2009).

To assess the health and economic effects of tax and subsidy interventions in India, we use simple macrosimulation spreadsheet-based simulation models. Taxes reduce consumption of the taxed good (or increase it in the case of a subsidy—a negative tax), which changes exposure to risk factors within the affected populations. We employ statistical parameters called elasticities to estimate the change in consumption caused by changes in prices. We assume full pass-through of the tax to the consumer and zero tax evasion, except for the alcohol tax intervention. We employ a lagged population impact factor, which estimates the proportional reduction in risk from changing risk factor exposure, in conjunction with life tables to calculate premature deaths averted and years of life gained (YLG). A lag factor is used to incorporate the delay in change in exposure to change in risk and to account for the irreversibility of the effects of some exposures. Incorporating fertility rates and trends in future mortality rates, we project the difference in the number of deaths and YLG over 15 years. We estimate changes in health expenditures (both private and public, except for tuberculosis diagnostic tools subsidies where only private expenditures are estimated) and government receipts. To capture uncertainty, we conduct Monte Carlo simulations with 1,000 iterations at the 95 percent confidence interval on relative risk and elasticity parameters.

The outcomes of taxation will significantly depend on the elasticity of demand. If demand is inelastic, a higher tax will cause only a small fall in demand. Most of the tax will be passed on to consumers. When demand is inelastic, governments will see a significant increase in tax revenue. However, if demand is elastic, the tax will be effective in reducing demand for the commodity, which is helpful in reducing its adverse health impact but may be less effective in raising revenue. Table 19.3 summarizes the evidence on price elasticity of demand for various categories of health-impacting commodities. The next section presents the results of our fiscal policy simulations and complementary policy recommendations.

Table 19.3 Price Elasticity of Demand for Various Commodities That Influence Health

Commodity	Elasticity	Country	Year	Source	Link
Tobacco (bidis)	–0.89	India	1999–2000	John (2008)	http://heapol.oxfordjournals.org/content/23/3/200/T5.expansion.html
Alcohol	–0.9495	India	1999–2000	John (2005)	http://oii.igidr.ac.in:8080/jspui/bitstream/2275/24/1/WP-2005-003.pdf
Condoms	–0.5 to –0.1	Pakistan	1998	Matheny (2004)	http://www.guttmacher.org/pubs/journals/3013404.html
	–0.29 to -2.68	Bangladesh, Haiti, Pakistan	1995	Matheny (2004)	http://www.guttmacher.org/pubs/journals/3013404.html
Vaccines	0 to –1.07 (influenza)	Japan	2001–02 and 2004–05	Kondo, Hoshi, and Okubo (2009)	http://www-ncbi-nlm-nih-gov.ezproxy.bu.edu/pubmed/?term=Does+subsidy+work%3F+Price+elasticity+of+demand+for+influenza+vaccination+among+the+elderly+in+Japan
Essential drugs for treating infectious diseases	–1.9 (Indinavir for HIV)	Morocco	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/767
	–1.2 (Nevirapine for HIV)	Lebanon, Morocco	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/768

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Table 19.3 Price Elasticity of Demand for Various Commodities That Influence Health (continued)

Commodity	Elasticity	Country	Year	Source	Link
	–1.4 (Streptomycin for TB)	Morocco	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/769
	–1.4 (Benzathine benzylpenicillin)	Morocco	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/770
	–1.1 to –1.9 (Zidovudine for HIV)	Lebanon, Malaysia	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/771
	–1.0 to –1.7 (Ceftriaxone)	various countries	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/772
	–1.0 to –1.6 (Ciprofloxacin)	various countries	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/773
	–1.5 to –1.2 (Co-trimoxazole)	Syria, Tunisia	2003	Srivastava and McGuire (2014)	http://www.biomedcentral.com/1471-2458/14/774
Sugar-sweetened beverages	–0.94	India	2009/10	Basu and others (2014)	http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001582
	–1.09	Mexico	1998–99	Barquera and others (2008)	http://jn.nutrition.org/content/138/12/2454.long
	–0.85	Brazil	2005–06	Claro and others (2012)	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3490548/
Grains (rice)	–0.247	India	1983–2004	Kumar and others (2011)	http://ageconsearch.umn.edu/bitstream/109408/2/1-P-Kumar.pdf
Grains (wheat)	–0.34	India	1983–2004	Kumar and others (2011)	http://ageconsearch.umn.edu/bitstream/109408/2/1-P-Kumar.pdf
Trans fats	–0.48	USA	1938–2007	Andreyeva, Long, and Brownell (2010)	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2804646/
Palm oil	–1.24	USA	1991/92–2010/11	Kojima, Parcell, and Cain (2014)	http://ageconsearch.umn.edu/bitstream/162472/2/A%20Demand%20Model%20of%20the%20Wholesale%20Vegetable%20Oils%20Market%20in%20the%20U.S.A%20(Revised%20in%20March%202014)%20(1).pdf
Diesel *(long-run value)*	–0.55	Korea. Rep.	1986–2011	Lim and others (2012)	http://www.mdpi.com/1996-1073/5/12/5055
LPG to substitute for solid cooking fuels	–0.92 to –1.05	India	1998–99	Gundimeda and Köhlin (2006)	http://www.eaber.org/node/22501

Note: A price elasticity of demand greater than –1 is considered elastic and less than –1 is considered inelastic. A price elasticity of demand equal to –1 would mean a 1 percent change in price results in a 1 percent change in demand. Inelastic goods tend to have fewer substitutes (gasoline), constitute a small percentage of expenditures (salt), or may be necessary for survival (for example, food). Bidi = a small, thin, hand-rolled cigarette made in Southeast Asian countries. HIV = human immunodeficiency virus; LPG = liquefied petroleum gas; TB = tuberculosis.

FISCAL POLICY ANALYSIS AND RECOMMENDATIONS

We explore both fiscal policies that have been adopted widely and those that have been introduced only recently. These include taxes on alcohol, tobacco, coal, transportation fuels, and sugar-sweetened beverages (SSBs) and subsidies for sugar, cooking fuels, and tuberculosis diagnostic tools. This section discusses the main results of our fiscal policy interventions and presents complementary policy recommendations. In many cases, the success of the tax and subsidy policy can be strengthened by implementing these complementary policies. Results from the models are highlighted in table 19.4.

Table 19.4 Results Summary—Health and Economic Effects of India's Main Fiscal Policies, 2017–2032

Intervention area	Product	Intervention	YLG (thousands)	Discounted YLG (thousands)	Deaths averted (thousands)	Tax revenue gains (US$,[a] millions)	Decreased health expenditures (US$, thousands)
Tobacco	Bidi	20% price increase (200% tax increase)	23,082 (13,742–33,131)	17,038 (10,203–24,427)	3,561 (2,020–5,231)	3,998 (3,345–4,521)	87,322 (63,692–114,307)
	Cigarette	50% price increase (90% tax increase)	7,108 (3,695–11,577)	5,410 (2,803–8,846)	851 (449–1,359)	16,200 (11,597–21,081)	40,743 (27,230–53,846)
Alcohol	Country Liquor	20% price increase (170% tax increase)	300 (114–482)	206 (74–339)	35 (13–56)	12,977 (12,303–13,554)	81,002 (60,307–114,769)
	Foreign Liquor	20% price increase (95% tax increase)	76 (–4–170)	58 (–3–130)	9 (–1–20)	24,828 (24,286–25,292)	63,127 (49,538–77,230)
Cooking fuel	LPG	25% of WQ 1 and 2 households receive LPG subsidy	25,839 (2,515–170,956)	67,633 (1,888–127,989)	12,197 (331–23,552)	0	399,548 (149,692–564,000)
Fossil fuels	Diesel	Rs 2.38/liter annual tax increase	86 (46–135)	64 (34–100)	13 (7–21)	268,508 (223,824–308,654)	544 (77–1,430)
	Gasoline	Rs 1.54/liter annual tax increase	26 (12–41)	20 (9–30)	5 (2–7)	146,170 (123,655–166,502)	30 (4–69)
	Coal	Rs 100 annual levy increase over 15 years	419 (216–607)	307 (158–444)	82 (42–118)	164,223 (157,008–171,320)	51,754 (8,153–113,692)
Food	Sugar	Removal of public distribution of sugar subsidy	5,570 (2,380–8,790)	4,331 (1,850–6,835)	437 (174–704)	10,385	27,278 (17,538–40,153)
	SSB Tax	20% price increase (114% tax increase)	267 (109–434)	200 (82–325)	41 (17–68)	74,277 (73,061–75,704)	2,559 (1,692–3,846)
Tuberculosis diagnostic tools	GeneXpert	Replace 1 million sputum smear tests with GeneXpert annually	5,463 (3,610–7,463)	4,131 (2,730–5,642)	704 (464–962)	0	105,287 (–83,384–284,769)

Note: LPG = liquified petroleum gas; Rs = Indian rupees; SSB = sugar-sweetened beverage; WQ = wealth quintile; YLG = years of life gained.
a. US$1 = Rs 65.

Taxation

Taxation of tobacco (cigarettes and bidis [small, thin, hand-rolled cigarettes made in Southeast Asian countries]), alcohol (country liquor and foreign liquor), fossil fuels (diesel, petrol, and coal), and SSBs are discussed in this section.

Tobacco

Tobacco taxation is one of India's most familiar and widely used health-directed fiscal policies. In 2016, roughly 29 percent of Indian adults used tobacco in some form (smoked or smokeless) (Ministry of Health and Family Welfare 2017). Over 900,000 lives are lost prematurely each year from tobacco-related diseases (IHME 2015). The Indian federal government and the states taxed tobacco products, with significant lack of harmonization in taxes across states until July 2017, when the goods and services tax (GST) harmonized tobacco tax. In recent years, including the increase in tax due to GST implemenation, the real tax increase on cigarettes has been small, and bidi taxes remain significantly lower than levels recommended by the World Health Organization (WHO).

Our simulations focus on increased taxation of smoked tobacco products. Our modeling suggests that increasing the bidi tax by 200 percent could lead to 23.0 (95% confidence interval [CI]: 13.8–33.1) million YLG over 15 years and an increase in government tax revenues by US$3.9 (CI: $3.3–$4.5) billion. Health expenditures can decrease by US$87 (CI: $63–$114) million from the bidi tax increase. Increasing the cigarette tax by 90 percent can lead to 7.1 (CI: 3.6–11.6)

million YLG over 15 years and an increase in government tax revenues of $16.2 (CI: $11.6–$21.0) billion. Health expenditures can decrease by US$40.7 (CI: $27.2–$53.8) million. Our estimates of health effects ignore the harms of secondhand smoke, resulting in an underestimation of possible health gains. Additional recommendations presented are directed at creating a more consistent tax structure throughout the country and stepping up the implementation of complementary interventions.

The following additional interventions could further improve health and ensure success of taxation:

- Increase state and union territory National Tobacco Control Programme (NTCP) fund transfers to be used for improved awareness and education campaigns, more effective smoking cessation centers, and greater enforcement of existing laws.
- Link current tobacco taxes to inflation.
- Allocate funds to retrain bidi workers and tobacco farmers.
- Remove tax exemptions for small bidi producers.
- Remove price controls on tendu leaves (a plant native to Asia that is used for making bidis).

Traditional economic theories suggest that as taxes increase, the incentives for smuggling and black market activity increase (Cnossen 2006). Black market activity, by its very nature, is difficult to gauge; for this reason, it is also difficult to measure black market activities that involve tobacco products that are smoked (Blecher and others 2015). However, it is well documented that many countries have successfully implemented high levels of tobacco taxation without drastic increases in black market activity (WHO 2015). In our analysis, we only simulate tax levels consistent with WHO recommendations for tobacco products that are smoked and additionally recommend greater resources for India's NTCP, which follows best practices for curtailing black market activity.

Alcohol

Alcohol taxation is another widely used health-directed fiscal policy. In 2015, alcohol consumption in India was implicated in nearly 360,000 premature deaths (IHME 2015). Alcohol taxes are levied at the state and central government levels and provide as much as 20 percent of state government income except in the states of Bihar, Gujarat, Manipur, Mizoram, and Nagaland, where alcohol is prohibited. Like tobacco, alcohol taxes are complex and inconsistent. Alcohol regulation is further complicated by the presence of a large illicit liquor market; some estimates suggest that up to 50 percent of alcohol is illicitly produced. Increasing Indian liquor taxation and foreign liquor taxation by 170 percent and 95 percent, respectively, could result in 300,000 (CI: 114,000–482,000) YLG and 76,000 (CI: −4,000–170,000) YLG, respectively, over 15 years. Tax revenues can increase by US$13.0 (CI: $12.3–$13.5) billion from country liquor taxation and by US$24.8 (CI: $24.3–$25.3) billion from foreign liquor taxation, over 15 years.[2] Health expenditures can decrease by US$81 (CI: $60–$114) million from country liquor taxation and by US$63 (CI: $49–$77) million over 15 years from foreign liquor taxation. In our analysis of health effects, we exclude externalities, which would include individuals killed by drunk drivers or alcohol-induced violence against others, resulting in an underestimate of the health effects. These health gains and any excess gains are contingent on strong tax administration and control of illicit liquor production. We make four complementary recommendations:

- Formulate a national strategy on alcohol policy to guide state-level alcohol policy.
- Use alcohol tax revenue for research on alcohol consumption patterns and unrecorded alcohol production.
- Restrict the marketing of alcohol products to youth.
- Earmark alcohol tax revenues for strengthening enforcement to reduce the consumption of illicitly produced liquor.
- Increase funding for alcohol addiction centers.

In the case of alcohol taxation, the presence of a very large illicit market for Indian-made liquor may challenge the success of future tax increases and possibly exacerbate the current illicit liquor problem. Therefore, it is necessary to first ensure that future tax increases do not result in increased illicit liquor production by providing greater monitoring of the alcohol market and increased resources for tax administration.

Fossil Fuels

Fossil fuel taxes—on coal, diesel, and gasoline—are designed to reduce air pollution and its massive deleterious health consequences in India. Ambient particulate matter pollution costs the Indian economy an estimated Rs 3.1 trillion per year, or 0.89 percent of GDP (World Bank 2016). The two major sources of air pollution are emissions from coal-fired power plants and vehicles. An annual increase of Rs 2.38 and Rs 1.54 per liter in the diesel and gasoline taxes over 15 years could result in 86,000 (CI: 46,000–135,000) and 26,000 (CI: 12,000–41,000) YLG respectively, and an increase in aggregate tax revenues of US$414 (CI: $436–$474) billion.

Aggregate health expenditures could decrease by US$574,000 (CI: $81,000–$1,494,000). Complementary recommendations include the following:

- Allocate tax revenues for public transportation investments.
- Implement toll roads or congestion charges.
- Establish new parking fines and enforce current fines.
- Facilitate the adoption of improved emission standards for vehicles.
- Reduce and control fuel adulteration.

Annually increasing the coal levy, which is now largely a means of raising revenue for the National Clean Energy Fund (NCEF), by Rs 100 over 15 years could prevent 82,000 (CI: 42,000–118,000) premature deaths and result in 419,000 (CI: 216,000–607,000) YLG while increasing tax revenues by US$164 (CI: $157–$171) billion over 15 years. Health expenditures could decrease by US$51 (CI: $8–$113) million. We only consider the health effects from changes in coal used for power generation and exclude the 30 percent of coal used for other purposes, resulting in a conservative estimate of the possible health effects. Complementary recommendations for coal taxation are as follows:

- Increase the coal levy revenue allocation to the NCEF.
- Increase transparency in the use of NCEF funds and use them for the intended purposes.
- Prioritize NCEF allocations for improving the grid infrastructure.
- Allocate revenues to increase the efficiency of coal-fired power plants to reduce emissions.
- Allocate coal levy revenues to expand continuous emissions monitoring systems in power plants.

Sugar-Sweetened Beverages

An increase in the tax on SSBs could help to curb the nascent obesity epidemic in India. An SSB tax was first imposed in 2014 and was increased to 21 percent in 2017. This tax had not dampened demand sufficiently, and following India's Committee on Goods and Services Tax's recommendation, the tax was increased to 40 percent under the GST. We found that a tax increase of 114 percent, corresponding to a tax rate of 40 percent, could result in 267,000 (CI: 109,000–434,000) YLG over 15 years and increase tax revenues by US$74 (CI: $73–$76) billion. Health expenditures can decrease by $2.5 (CI: $1.7–$3.8) million. Complementary policies include the following:

- Conduct education and awareness campaigns on healthy diets.
- Label the sugar content of drinks clearly to make nutritional information accessible to consumers.
- Restrict advertisements for sugary beverages.
- Subsidize healthier food options.

Subsidies

The analysis of the remaining health-directed fiscal policies involve subsidies related to sugar, cooking fuels, and tuberculosis diagnostic tools.

Public Distribution Sugar Subsidy

The first policy examined the reduction or elimination of the existing public distribution sugar subsidy. The past sugar subsidy under the public distribution system (PDS) (US$692 million annually) provided sugar subsidies to poor households. This year, the Indian government announced it would not be funding the subsidy and left this option to the states. Recently, however, the government has decided to provide sugar subsidies to only the 25 million poorest families in the country. Historically, inclusion error has resulted in richer households also benefiting from the subsidy. Removal of the subsidy could result in 5.5 (CI: 2.3–8.8) million YLGs over 15 years. Our estimates suggest health expenditures could decrease by US$27.3 (CI: $17.5–$40.1) million. For our analysis, we have considered the effects of the intervention on body mass index (BMI) and added sugar consumption. Although individuals in the the lowest wealth quintile benefited from reduced added sugar consumption, including potential reductions in BMIs, there are concens about the negative health consequences of reduced BMIs. Therefore, we recommend that poorer households receive a replacement subsidy for healthy food products, such as fruits, vegetables, or grains, rather than a sugar subsidy, as the current policy has suggested. Although past PDS subsidies have sometimes failed to target their intended beneficiaries, some states have successfully implemented reforms in recent years that encourage us to suggest greater subsidies that target the poor in lieu of the sugar subsidy. For example, Bihar has been able to decrease leaks (diversion of subsidized food commodities to nonbeneficiaries) from 91 percent in 2004 to 24 percent in 2011, with further improvements in the past few years, by tracking coupon use and better targeting households who would benefit most from a reduced sugar subsidy (Dreze and Khera 2015). Complementary measures to promote healthy diets are similar to those discussed in the SSB tax section.

Cooking Fuel Subsidies

Improved targeting of the cooking fuel subsidy is modeled to estimate the effect of accelerated progress of the current liquefied petroleum gas (LPG) subsidy. The rationale for this government subsidy is to reduce the

number of households relying on biomass fuel for indoor cooking, which takes a large toll on cardiovascular and respiratory health. Unfortunately, as implemented, the subsidy has not greatly benefited the target population—households in the lowest income quintile, particularly in rural areas—because of distribution challenges and preferences for biomass cooking. If 25 percent of households currently using biomass switched to LPG next year, the result would be 25.8 (CI: 2.5–170.9) million YLGs over 15 years. Health expenditures would decrease by US$399 (CI: $149–$565) million. To ensure the success of the intervention, it will be critical to invest in education and other behavioral change interventions to increase uptake of the LPG subsidy. Uptake of the LPG subsidy can even be considered a greater challenge than ensuring supply and accessibility, as has been demonstrated in previous studies (Grossman 2012; Hanna, Duflo, and Greenstone 2012). Employing innovative behavior change interventions will help increase demand for LPG cooking.

Tuberculosis Diagnostic Tools

The final intervention is a subsidy for tuberculosis diagnostic tools. India has the highest tuberculosis burden in the world. Progress in controlling tuberculosis has been hindered by poor diagnostic practices, related to longstanding problems in the Indian health care system—mainly in the predominant private sector. A large proportion of the population chooses to use private sector providers, who deliver almost half of India's tuberculosis services, many of which are of poor quality. Decreasing the price of accurate diagnostic technologies (including removing existing import tariffs), particularly for the private sector, and giving private practitioners incentives either to refer tuberculosis cases to the public sector for treatment or to improve their own treatment practices, would raise the overall quality of tuberculosis control. For example, provision of negotiated public sector pricing for more accurate diagnostic tools, such as GeneXpert MTB/RIF (mycobacterium tuberculosis/rifampicin) for India's large private sector can increase demand for these tools. Our modeling suggests that replacing one million sputum smear tests annually with the accurate GeneXpert MTB/RIF test would decrease tuberculosis incidence by 26 (CI: 19–34) per 100,000 people over 15 years and result in 5.4 (CI: 3.6–7.4) million YLGs. Private health expenditures would decrease by US$105 (CI: -$84 –$284) million.[3]

Complementary measures are as follows:

- Enable reduced pricing for all accurate and approved diagnostic tools in the private sector.
- Remove import duties on GeneXpert MTB/RIF.
- Conduct public awareness campaigns on Revised National Tuberculosis Control Program (RNTCP), and publicize tuberculosis prevention and treatment options.
- Engage private health care providers to improve their diagnostic and treatment practices.
- Promote public-private alliances (PPAs), including innovative schemes to incentivize notification and referral of patients to the RNTCP.
- Conduct periodic national surveys of tuberculosis prevalence and treatment practices.

Increased taxes will necessitate increases in tax administration resources. Our modeling results will be realized only if new taxes are actually collected. This may be more of a challenge for some items, such as alcohol, where additional resources must be employed to control illicit liquor production. Our complementary policies suggest some of the ways in which the unintended negative consequences can be mitigated and overall welfare gains maximized. These additional policies include assistance for affected workers and producers as they transition to alternative industries, investments in superior substitutes (in the case of fuels, for example), and strengthening monitoring and enforcement of regulations. Deploying a portion of the tax revenues could fund these policies.

Our analysis provides the lower bounds for the possible effects in three ways:

- We focus only on mortality, excluding morbidity.
- We do not consider externalities, except in the case of fossil fuel.
- We limit our analysis to health effects for older age groups for many of our interventions because of the lack of health risk data for all age groups.

DISCUSSION

Health outcomes are determined by the complex interplay of social, economic, biological, and environmental factors, which can be influenced through fiscal policies. Our report demonstrates that in times of fiscal exigency, taxation and subsidy reform for certain goods may deliver tremendous health gains while actually increasing government receipts. Even though challenged by large fiscal deficits and insufficient outlays for health care, India has great scope to use complementary fiscal policies to improve both population health and fiscal health. The results of the fiscal policy interventions modeled suggest that there are large potential health gains to be made from correcting market failures through tax and subsidy policies.

The gains in health are proportional to the changes in taxes or subsidies modeled, and the tax and subsidy

levels we chose to model were determined by a number of factors, including the feasibility of uptake of the policy and the ability to administer and successfully enforce a tax or subsidy level. For tobacco, alcohol, and fossil fuels, theoretically, greater taxation could reduce health burdens by reducing exposure to the taxed product. However, tax officials may not have the resources to ensure the enforcement of a higher level of tax. For example, half of alcohol consumption is currently illicit; very large tax increases can further exacerbate this situation, if greater resources are not devoted to ensure successful implementation of the tax and elimination of potential black market activity.

Other welfare effects need to be considered as well. In the short run, these may include reduced employment; the medium- and long-term effects may be on economic growth through a more productive labor force or through effects on pension systems and health care costs. In the case of fossil fuel taxation, the long-term effects may be on economic growth or the costs of goods. Given the potential unintended consequences of our policies, it is critical that the complementary measures and the complete set of policy recommendations that accompany our tax and subsidy policy recommendations be given as much importance as the tax or subsidy recommendation itself.

Tax and subsidy policies cannot be undertaken in isolation: they require complementary policies to realize the potential health and revenue gains that our modeling results suggest. Two themes that recur in the complementary recommendations across the interventions are (a) education and awareness and (b) monitoring and enforcement of taxes and regulations. Other complementary policies are more specific and focus on minimizing any potential adverse consequences of policies—for example, by using the revenues or savings to invest in counseling and addiction services, alternative energy sources, and public transportation systems. These complementary measures involve revenue recycling into initiatives that may not be the purview of ministries of finance or excise departments. For example, the complementary policy recommendations for tobacco may involve the Ministry of Labour and Employment in retraining bidi workers or the Ministry of Education in conducting tobacco awareness campaigns in schools.

A holistic view of health and its importance needs to be adopted by all sectors of government. Subsidies by one department should not incentivize the use of coal, for example, while another department pushes for a coal levy. Coordination and communication will ensure that polices are consistent across departments. Given the complex and sometimes unanticipated outcomes of government policies, stakeholder engagement with relevant government departments and affected populations will be crucial in the policy development process.

Limitations

It is important to recognize the limitations of our models. First, the results rely heavily on a few central parameters, such as relative risk and elasticity. We have attempted to employ estimates that would be suitable for the Indian population; however, these estimates, particularly with respect to elasticity, are calculated for certain populations in the past and may not be applicable to the populations in our study. Second, we only consider partial equilibrium effects of fiscal interventions and not the general equilibrium effects arising from the effect of these interventions on deficits, employment, growth, and debt. Third, limitations in data do not allow us to calculate health effects for all age groups, and we exclude calculation of externality costs potentially leading to lower-bound estimates of health outcomes. Finally, our consumption data for many interventions are based on household and individual surveys, which may not capture true consumption patterns, given the effects of recall bias and underreporting.

CONCLUSIONS

Although direct public health expenditures undoubtedly play an integral role in determining population health, health outcomes are determined by the complex interactions of social, economic, biological, and environmental factors. A wide range of viable fiscal policy interventions could modify these proximate factors. These are particularly useful when governments find themselves unable to expand direct health care expenditures. This chapter highlights that in times of fiscal exigency, reforming taxes and subsidies for certain commodities may yield tremendous health gains while increasing government receipts.

NOTES

World Bank Income Classifications as of July 2014 are as follows, based on estimates of gross national income (GNI) per capita for 2013:

- Low-income countries (LICs) = US$1,045 or less
- Middle-income countries (MICs) are subdivided:
  (a) lower-middle-income = US$1,046 to US$4,125
  (b) upper-middle-income (UMICs) = US$4,126 to US$12,745
- High-income countries (HICs) = US$12,746 or more.

1. Recent literature on green tax swaps provides more insight on this finding by decomposing two different links between taxes on products or inputs and the broader fiscal system (for example, Bovenberg and Goulder [2002]; Parry and Oates [2000]). First is the efficiency gain from using new revenue sources to reduce preexisting, distortionary taxes elsewhere in the economy. Second is a counteracting effect, because of the impact of commodity taxes on driving up the general price level, thereby reducing real household wages and slightly reducing the overall level of labor supply. For the average good, the second effect dominates the former, so fiscal considerations warrant setting commodity taxes below (rather than above) marginal external costs. However, the second effect is weaker, and possibly reverses sign, when the commodity in question is a relatively weak substitute (or complement) for leisure. Sgontz (1993) discusses the efficiency gains from recycling alcohol tax revenues in labor tax reductions. However, his partial equilibrium framework excludes impacts on labor supply from the increase in price of alcohol relative to the price of leisure.
2. This assumes 50 percent of country liquor is shifted from licit to illicit consumption, which has the same mortality risks as licit country liquor and does not get taxed.
3. This intervention assumes reduced public sector pricing for GeneXpert for private firms, which the private sectors can operate profitably. Health expenditure estimates assume access to reduced price GeneXpert for diagnosis and a shift from private to public treatment.

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