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Talking Tobacco: How Reduced Consumption Benefits the Economy

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Acronyms

CTC	-	Ceylon Tobacco Company
DCS	-	Department of Census and Statistics
FCTC	-	Framework Convention for Tobacco Control
GDP	-	Gross Domestic Product
HH	-	Household
HIES	-	Household Income and Expenditure Survey
I-O	-	Input-Output
NATA	-	National Authority on Tobacco and Alcohol
NCDs	-	Non-communicable Diseases
WHO	-	World Health Organization

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Executive Summary

On average, a tobacco-user household spends nearly LKR 2,000 per month on tobacco, constituting 4 per cent of the household budget. Spending on tobacco can drive out other critical household expenditures, including basic needs. This 'crowding out effect' would be the greatest for poor families, affecting not only the smoker but the rest of the family as well.

Based on the Household Income and Expenditure Survey (HIES) data, the study reveals that household spending on basic needs is negatively affected by tobacco-related expenditures. Poor families spend a larger proportion of their income, nearly 60-70 per cent of the household budget on food, reflecting the budget constraints for other basic needs such as education, health and housing. Further, among the poorest 40 per cent, tobacco-user households allocate a significantly lower budget share on food, health, education and housing compared to tobacco non-user households. This scenario shows that household budget allocations are constrained by tobacco expenditures.

Despite the threat of tobacco to human health, many governments have not taken considerable action on tobacco control, partly due to concerns about the undesirable consequences on national income. The fear regarding the possible negative impact on national income by reduced tobacco production is due to the lack of information.

Following the Economics of Tobacco Toolkit developed by the World Bank, this study examines the impact of tobacco consumption reduction on the national economy, using the

national input-output (I-O) tables developed by the Department of Census and Statistics (DCS).

This study offers empirical evidence that the net impact on overall economic output, due to decreased tobacco consumption, would be positive through the spending of released tobacco expenditures on non-tobacco goods and services. The study finds that a 20 per cent reduction in tobacco consumption will lead to a 30 per cent net benefit to the economy through increased consumption of non-tobacco goods and services. Accordingly, based on the output approach, the study reveals that reduced tobacco consumption will yield net positive gains on national income through increased consumption of non-tobacco goods and services.

Further, the study findings indicate that reduced smoking tobacco consumption will lessen household budget constraints on basic needs, particularly for the poor, as it would free up more resources for basic needs such as food and education. Thus, this empirical study shows that reduced tobacco consumption has a positive effect on both household welfare as well as the national economy through spending the released tobacco expenditures on non-tobacco goods and services. Moreover, it is noteworthy that the above estimates are solely based on the output approach and hence, do not take into account other economic benefits associated with reduced tobacco consumption, such as reduced health care costs, reduced environmental costs, as well as positive gains linked to increased non-tobacco consumption; all of which accrue benefits not just for tobacco users, but for the country as a whole.

1. Introduction

The adverse health effects of tobacco are well established and confirmed by numerous sources. Tobacco consumption has been found to increase the risk of many non-communicable diseases (NCDs) including cancer, heart diseases and respiratory illnesses (The Tobacco Atlas, 2018). According to the World Health Organization (WHO), 8 million people died due to tobacco-related illnesses in 2017 (World Health Organization, 2017). Furthermore, tobacco-related health conditions are chronic illnesses with long term suffering that cause financial strains due to increased health costs. Such direct and indirect costs of tobacco amounted to LKR. 89.37 billion (equivalent to 6.1 per cent of Sri Lanka's government revenue) in 2015 (World Health Organization, 2017); this was higher than the government revenue earned from tobacco taxes in the same year, which was 5.5 per cent (Central bank of Sri Lanka, Various Issues).

Tobacco use impacts the socio-economic well-being of households. A well-researched phenomenon that is observable in households where tobacco spending is present, is a 'crowding out effect' where beneficial products such as education, food and clothing are neglected. Tobacco control policies address this 'crowding out effect' by encouraging the reduction of tobacco use at the household level, which in turn creates a reallocation of household income away from tobacco towards other beneficial products.

Since signing the WHO Framework Convention for Tobacco Control (FCTC) treaty in 2003, Sri Lanka has introduced several tobacco control policies, including tax increases on cigarettes, a ban on sales and promotion of tobacco for minors, a ban on tobacco advertisements, promotions, and sponsorships, a ban on tobacco vending machines, compulsory health warnings on tobacco packaging as well as a ban on smoking in public places, as per the National Authority on Tobacco and Alcohol Act of 2006 (NATA, 2006). Community-based interventions such as tobacco-free villages

and supply-side interventions such as limiting tobacco farming have also been pursued to some extent. These policies have, over the years, been successful in gradually reducing the smoking prevalence rate in the country. However, pockets of smokers remain; for instance, 28 per cent of men still smoke in Sri Lanka (World Health Organization, 2019). As such, Sri Lanka is currently in its last-mile stage of reducing smoking tobacco consumption, which requires well-tailored policies to deal with the remaining stock of smokers in the country.

“28 per cent of men still smoke in Sri Lanka.”

According to the WHO, significant increases in tobacco taxes that are adjusted for and reflect changes in inflation, which render tobacco products unaffordable, are one of the most effective means of controlling smoking tobacco consumption (World Health Organization, 2019). In a recent study by the Institute of Policy Studies of Sri Lanka (IPS), the overall cigarette price elasticity estimated for Sri Lanka was -0.8, which means that if cigarette prices were increased by 10 per cent, consumption would reduce by 8 per cent (Arunatilake, Weerasekera & Thilanka, 2020). This implies that consumers are highly responsive to cigarette price changes, which means that higher taxation of cigarettes has scope to further reduce and control cigarette consumption. Furthermore, banning the sale of single stick cigarettes, restricting sales in proximity to schools are additional policies that are being explored by authorities such as NATA (Hirimuthugodage, 2020).

However, there is significant resistance to tobacco control policies by the tobacco industry. Recent debates in print media/reports argue that because

of high cigarette taxes in Sri Lanka, consumers are shifting to smuggled cigarettes and beedis (rolled-leaf cigarettes), thereby reducing the effectiveness of cigarette taxes and also reducing government revenue and national income (Research Intelligence Unit, 2019; The Island, 2019; Ada Derana, 2018). Smuggled cigarettes and beedis also affect household expenditure; thus, appropriate policies are needed to limit consumption of all types of tobacco products. Whilst it is in the interests of the tobacco industry to exaggerate these arguments, there is a need to investigate these issues further. To contribute to the debate, it is important to estimate whether tobacco control policies accrue overall benefits to the economy, in order to convince policy-makers that these health and economic benefits exceed any losses faced by the tobacco manufacturing sector.

Given this background, the focus of the study is to evaluate the impact of tobacco control policies on national output. Following the Economics of Tobacco Toolkit developed by the World Bank, this study examines the impact of smoking tobacco consumption reduction on the national economy, using the national Input-Output (I-O) tables (Yurekli, Beyer, & Zhang, 2002). Specifically, the net impact resulting from decreased smoking tobacco consumption will be assessed; i.e. whether the resulting decrease in demand in tobacco manufacturing-related sectors is counteracted by an increase in non-tobacco output from saved expenditure on tobacco.

1.1 The Rationale of the Study

Despite the obvious threat of tobacco to human health, many governments have not taken significant action on tobacco control, partly due to concerns about undesirable consequences on national income. The fear of policy-makers regarding the possible negative impact on national income by reduced tobacco production is due to the lack of information. Thus, evidence-based information is necessary for policy-makers when implementing tobacco control policies.

Tobacco control measures are designed to reduce consumer demand for tobacco products. This shift in demand can lead to reduced spending on tobacco products and increased spending on other

goods and services. Thus, income losses in the industries related to tobacco can be countered with income gains in other industries, based on consumer non-tobacco spending. In this context, it is necessary to examine the national income aspect of tobacco control measures when considering efforts to reduce tobacco use.

1.2 Research Objectives

Given this background, the overall objective of this study is to provide evidence-based information on the net benefits of reduced tobacco use on national income, particularly to policy-makers who are hesitant to make policy decisions related to tobacco control. Furthermore, the study aims to identify and quantify those who are negatively affected by tobacco control measures - tobacco farmers, etc., so that appropriate measures can be devised to compensate any potential losers of tobacco control policy changes.

Accordingly, the study will focus on the following specific objectives:

- Evaluate tobacco expenditure and its implications on household budget allocation
- Estimate the net impact of reduced tobacco production on national income
- Identifying and quantifying those who are negatively affected by tobacco control measures

The policy contribution of this study is twofold:

- The findings of this study indicate that tobacco expenditure may negatively affect fulfilling basic needs, particularly among the poor. Accordingly, the study highlights the importance of tobacco control policies to improve household resource allocation for basic needs.
- The study provides policy implications of enhancing tobacco control measures by evaluating the net impact of reduced tobacco consumption on national income. The research empirically proves that the net impact on overall economic output due to decreased tobacco consumption would be positive, through the spending of released tobacco expenditures on non-tobacco goods and services.

2. Background

2.1 Household Level Tobacco Expenditure

Eleven per cent of households in Sri Lanka smoke tobacco.¹ On average, a tobacco-user household spends nearly LKR 2,000 per month on smoking tobacco, constituting 4 per cent of the household budget. (see Table 1). Even the two lowest quintiles spend around LKR 1,000 per month on tobacco. Smoking expenditure results in a 'crowding out effect', whereby household expenditure on other basic needs is foregone due to the resource constraints of poor households. For instance, in all income groups other than the richest quintile, tobacco expenditure is considerably higher than expenditure on health and education (see Table 1).

Household Income and Expenditure Survey (HIES) data reveal that household average expenditure for cigarettes is almost four times higher than that of beedi (see Table 2). Further, the share of cigarette consuming households is

“Even the two lowest quintiles spend around LKR 1,000 per month on tobacco.”

considerably higher than the share of beedi consuming households in Sri Lanka. For instance, more than 65 per cent of tobacco consuming households use cigarettes and this trend has continued from the past.

Further, HIES household-level data reveal that tobacco prevalence has reduced by 6 percentage points over the 2006-2016 period (see Table 2). A reduction in tobacco consumption is more visible

Table 1
Households Level Tobacco Expenditure, by Economic Group

Household (HH) Expenditure Group	% of Tobacco-user HHs	Tobacco Expenditure of Tobacco-user HHs		Average Monthly Expenditure of All HHs (LKR)		
		LKR	As a % of Total Expenditure	Total	Health	Education
Poorest 20%	10	953	4.6	20,553	361	641
2nd Quintile	12	1,086	4.0	27,482	639	989
3rd Quintile	12	1,706	5.0	34,193	947	1,383
4th Quintile	11	2,284	5.1	44,841	1,395	2,025
Richest 20%	11	3,402	3.5	95,928	4,187	4,348
All	11	1,994	4.1	48,373	1,695	2,066

Note: Expenditure groups are constructed based on per capita average monthly expenditure.

Source: Authors' calculations based on HIES 2016 micro-data.

¹ Based on HIES 2016 data, 11 per cent of households incurred expenditure related to smoking and tobacco.

Table 2
Trends of Household Level Tobacco Use, 2006-2016

Household (HH)	2016		2012		2010		2006	
	%	LKR	%	LKR	%	LKR	%	LKR
Cigarettes Consuming HHs	7.6	2,579	7.9	1,791	10.0	1,636	12.4	943.0
Beedi Consuming HHs	4.2	628	4.9	445	5.5	390	6.3	254.2
Cigarette/Beedi Consuming HHs	11.1	1,994	12.2	1,342	14.7	1,261	17.5	762.4
Tobacco Expenditure as a % of Monthly Expenditure		4.1		3.6		4.5		3.8

Note: Tobacco expenditure is calculated for a specific type of tobacco using households.

Source: Authors' own calculations based on HIES 2016, 2012-2013, 2009-2010 and 2006-2007 micro-data.

among cigarette consuming households, where the share of cigarette consuming households has reduced by around 5 percentage points, while the respective reduction of beedi consuming households is around 2 percentage points, during the same period. As such, this trend observed from data does not support the argument that cigarette smokers shift from cigarettes to beedi due to price increases of cigarettes.

2.2 Tobacco Industry in Sri Lanka

The Ceylon Tobacco Company (CTC), a subsidiary of the multinational company British American Tobacco (BAT), is Sri Lanka's monopoly cigarette producer. As the sole producers of cigarettes in the country, the company represents the entire formal industry. The CTC produces cigarettes of different brands and lengths, and these are currently taxed by the government under a five-tier tax structure based on the length of cigarettes.

Outside the formal production of cigarettes and cigars, informal products such as beedi and chewing betel are consumed in Sri Lanka. Although CTC reports the market share of beedi to be significant, nationally representative HIES data reveal that in 2016, around 65 per cent of tobacco using households consumed cigarettes. Furthermore, the shares of households consuming cigarettes and those consuming beedi have declined over time, as discussed in the previous section. The literature notes that a well-documented tactic employed by tobacco

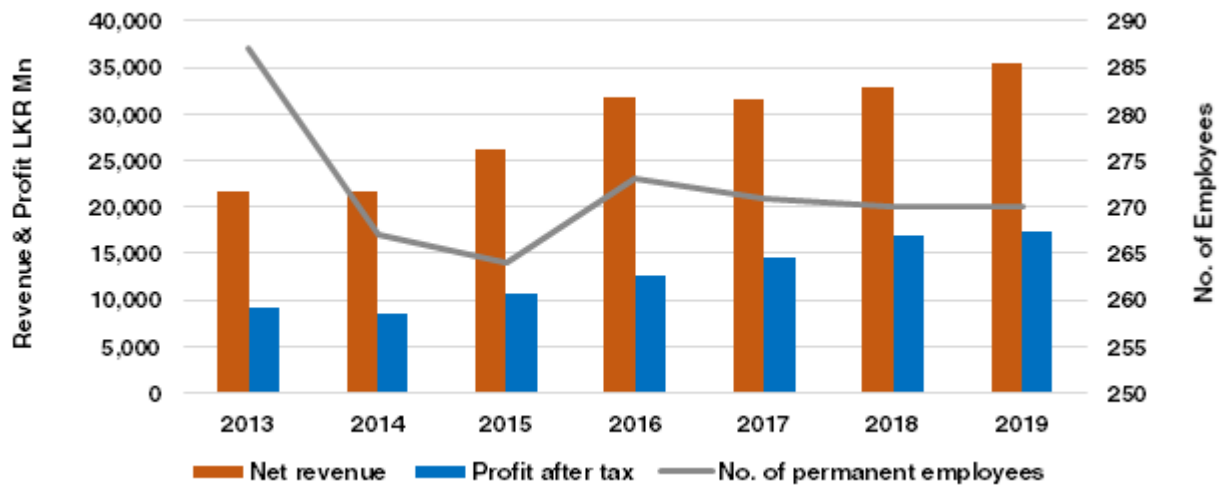
companies worldwide is to heighten the perception of illicit trade of tobacco, when governments decide to implement tobacco taxation or, tobacco control policies in general; nevertheless, multiple empirical studies across countries worldwide refute this claim (World Bank, 2019).

Performance indicators of the CTC (Figure 1) show that the company has been generating a net revenue and profit that has been gradually increasing over time, despite increases in cigarette taxation that have occurred in the same period. This is because cigarette prices have been raised in response to tax increases.

2.2.1 Employment in the Tobacco Industry

According to estimates by the Department of Agriculture, the number of tobacco farmers in the country was around 3,000 in 2016 (Department of Agriculture Sri Lanka, 2019). Similarly, the Department of Census and Statistics (DCS) data from national I-O tables suggest that, 5,329 persons are employed in the tobacco manufacturing sector. Furthermore, as of 2019, the number of permanent employees of CTC stood at 270. However, the tobacco industry documents that the employment contribution of the tobacco sector is significantly higher. For instance, the CTC reportedly supports over 20,000 tobacco farmer livelihoods (CTC, 2019). The tobacco industry argues that tobacco control measures will, therefore, result in a loss of jobs. Those most susceptible to a negative impact due to a

Figure 1
CTC Performance Indicators



Source: CTC Annual Reports, various years.

reduction in tobacco consumption are those who work in tobacco product manufacturing, tobacco farming, leaf marketing and processing (Yurekli, Beyer, & Zhang, 2002). However, around 8,500 workers are employed in the two key tobacco-related sectors belonging to the tobacco industry- i.e. tobacco manufacturing and farming.

However, according to the findings of a forthcoming IPS study, tobacco farming does not necessarily constitute full-time work and hence, farmers do not rely solely on tobacco to earn a living (Thibbotuwawa, Hirimuthugodage, & Dissanayake, Forthcoming). For instance, most tobacco farmers are engaged in paddy farming as well as cultivating other vegetables/crops. Thus, if given a profitable alternative, they are ready to shift away from tobacco farming. Further, around 60 per cent of contract tobacco farmers (who were purposively surveyed in tobacco-growing areas) were willing to shift to, or were considering shifting to another crop in future. Moreover, the IPS study reveals that there are many value chain actors engaged in the tobacco industry such as growers, collectors, transporters, barn owners etc. Several of these actors were involved in tobacco-related activities as part-time jobs while engaging in other income-earning activities. In this context, workers attached to the tobacco cultivation and tobacco distribution sectors are flexible and can switch jobs without much effort.

“Most tobacco farmers are engaged in paddy farming as well as cultivating other vegetables/crops. Thus, if given a profitable alternative, they are ready to shift away from tobacco farming.”

2.3 Tobacco Control Policies

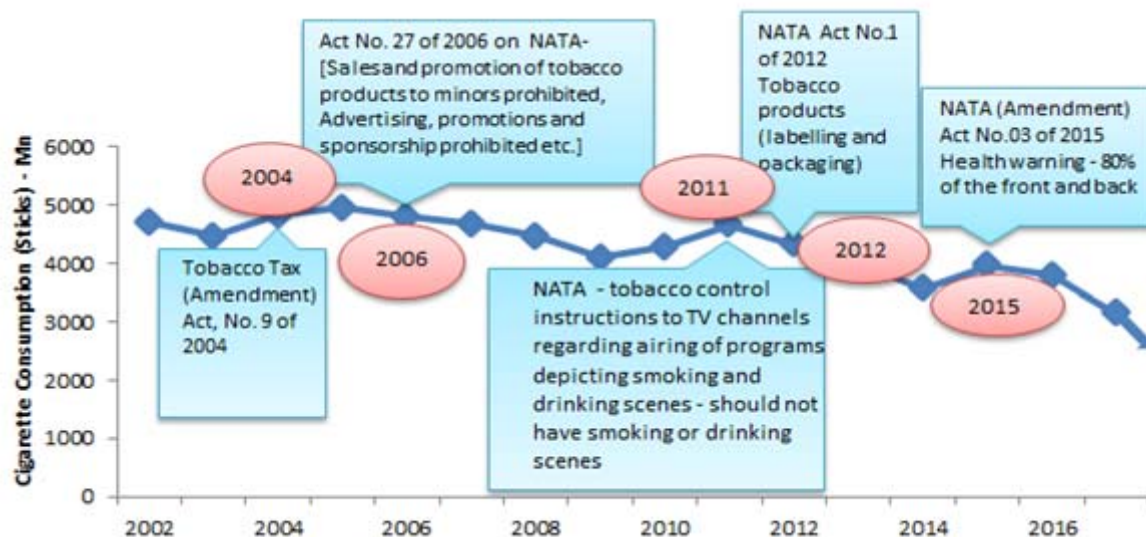
Currently, tobacco regulation is governed by the NATA Act of 2006 (amended in 2015). With the passing of the NATA Act in 2006 and the ratification of the FCTC convention, significant progress was made in tobacco control with some milestone policies being enacted in Sri Lanka. Sales and promotion of tobacco products to minors (below 21 years), advertising, promotions, sponsorships, and smoking in public places were all prohibited, and health warnings on cigarette packs were made compulsory. In 2016, the manufacture, importation, and sale of smokeless tobacco products, e-cigarettes containing tobacco, and cigarettes that are flavoured, coloured, or sweetened were banned (Arunatilake, Weerasekera, & Thilanka, 2020).

In terms of taxation policy, Sri Lanka has been taxing tobacco since 1953, wherein in the initial stages, taxation was limited to unmanufactured tobacco. In 1990, under the Excise (Special Provision) Act, No. 13 of 1989, a tax on cigarettes was introduced (Arunatilake, Weerasekera, & Thilanka, 2020). The nature of this tax has

changed over time; initially, the tax was imposed on the number of cigarettes, regardless of its length and size. From 1995 onwards, the tax on cigarettes has been differentiated by length; such that cigarettes are now taxed based on a five-tier length-based structure. From 1999 onwards, tobacco taxation was extended to cover all forms of tobacco including cigarettes, cigars, beedis and pipe tobacco (Arunatilake & Opatha, 2003).

Figure 2 maps tobacco control policies that have been implemented by the government against cigarette consumption, which shows an associated decline over time. While these policies have been effective in reducing cigarette consumption and although significant headway has been made in almost halving Sri Lanka's smoking prevalence rate which stood at 30 per cent in the 1990s, the harm and the cost burden from smoking is still high among certain population groups. Reducing the smoking prevalence rate in the country to under 10 per cent will be beneficial for the economy, due to the reduction in high health costs and lost productivity costs which are caused by tobacco-related illness, as noted previously.

Figure 2
Mapping Policy Changes Against Consumption Data



Source: Arunatilake, N., Weerasekera, H., & Thilanka, C. (2020). *Elasticity Estimates for Cigarettes in Sri Lanka*. Colombo: Institute of Policy Studies of Sri Lanka.

3. Literature Review

The literature identifies a two-step channel for the impact of tobacco control policies on national output and employment. First, tobacco control policies encourage smoking tobacco consumption reduction at the household level, which in turn creates a reallocation of household income away from tobacco, towards other products. Second, this reallocation of household income impacts national income and employment at the macro level. This nexus has been reviewed extensively in the literature, largely owing to the debate on potential job losses in the tobacco industry resulting from national smoking tobacco consumption reduction strategies.

Globally, there tend to be two opposing views on tobacco control which influences the debate on the impact of tobacco control policies on households, national output and employment. The anti-tobacco lobby which includes policymakers, tobacco control activists, and health care professionals, believes that tobacco control measures should be reinforced to decrease smoking tobacco consumption and its consequences. In contrast, cigarette producing companies claim that tobacco control measures including high taxation of tobacco products negatively impact employment and substantially reduce the tax revenue contributed by the tobacco industry to the government budget; this type of debate is commonplace in countries where tobacco companies operate (Hien, Long, & Toan, 2014).

3.1 Impact on Households from the Reduction in Tobacco Use

When tobacco spending is present in the household, a 'crowding out effect' occurs where beneficial products such as education, food and clothing are neglected. This effect is well documented in the literature for developing economies such as Bangladesh (Husain, Datta, Virk-Baker, Parascandola, & Khondker, 2018), Turkey (San & Chaloupka, 2016), Cambodia (John,

Ross, & Blecher, 2012) and China (Xin, et al., 2009).

A very recent study in Pakistan (Social Policy and Development Centre, 2020) estimated the impact of tobacco use on consumption patterns of households which complemented existing literature on the 'crowding out effect' of tobacco expenditures in developing economies. It found that a reduction in tobacco expenditure affected intra-household resource allocation as follows: an increase in household spending on basic food items, health, education, housing, household durables, leisure and other commodities is noted, where the 'crowding out effect' is more prominent in education and basic food among lower-income households, while education and housing are more affected among higher-income households. The simulation analysis conducted suggested that a reduction in tobacco expenditures by 50 per cent, would increase aggregate spending on the above-mentioned commodity groups by about 18 per cent (Social Policy and Development Centre, 2020).

3.2 Impact on National Output and Employment

Many published studies consider the economic impact of reductions in tobacco use from tax increases and/or other tobacco control measures. The most common approaches employed to do so are the (1) static input-output approach and (2) dynamic regional economic modelling. The sections that follow review studies that consider the tobacco control-consumption-national output/employment nexus using one of the above-mentioned approaches.

A pioneering study on this was conducted in Michigan, United States of America (USA) by Warner and Fulton (1994) by employing a dynamic regional economic model. Here, they modelled that when the rate of consumption decline from 1992 to 2005 doubled, and when expenditure was allocated by the average expenditure pattern and government spending was reduced, the economy

experienced net job gains of 300 in 1992 and 880 by 2005 (Warner & Fulton, 1994). Similarly, Warner (1996) applies the same to regional economies and finds that net job gains with the consumption decline are 78 in 1993 and 19,719 by 2000 (Warner E., 1996). In both cases, the findings show lower net job gains compared to the scenario without consumption decline; however, it is still net job gains that are accrued rather than job losses.

A similar approach is employed by Barkey (2005) in Indiana, USA. In the model, domestic consumption expenditures and tobacco production in 2003 were eliminated, expenditures were allocated by the average expenditure pattern, tobacco-induced health care expenditures were released and reallocated and excess mortality caused by tobacco use was accounted for. This resulted in a net gain of 178,200 jobs in 2050 at the end of the simulation period. Milestones of these job gains were 50,700 jobs in 2010; 97,000 jobs in 2020; 132,000 jobs in 2030; and 159,400 jobs in 2040 (Barkey, 2005).

The static input-output model is employed in several (and in more recent) studies. Looking at examples in Europe and the Americas; in the United Kingdom, Buck, et al. (1995) modelled a 40 per cent decline in tobacco product expenditures, where expenditures were allocated by the average expenditure patterns of recent quitters, non-smokers, and former smokers. This resulted in a net gain of 155,542 jobs; or 115,688 full-time equivalent jobs in 1990 based on recent quitter expenditure and the same government spending (Buck & Godfrey, 1996). Similarly, in Canada, Irvine and Sims (1997) modelled a 20 per cent decline in tobacco product expenditures, where expenditures were allocated by the average expenditure pattern and government spending was reduced. However, this study observed a net loss of 6,129 jobs in 1995 (Irvine & Sims, 1997).

Turning to the African region, in South Africa, Van der Merwe and Abedian (1999) apply the same static input-output modelling approach where domestic consumption expenditures were eliminated, the rate of consumption decline in 1995 doubled, expenditures were allocated by average expenditure pattern and government

spending was reduced or kept at the same level by increasing other taxes. The study found that a net gain of 50,236 jobs occurred in 1995 by eliminating tobacco-related expenditures, with consumers acting as recent quitters (Merwe & Abedian, 1999). Similarly, in Egypt, Nassar (2003) modelled a 10 per cent increase in cigarette prices and a one-unit increase of education level, as a proxy for non-price tobacco control measures. Expenditures were allocated by the average expenditure pattern and because of increases in other taxes, no change in government spending occurred. A net gain of 6,108,517 jobs for the price increase measure and a net gain of 6,000,134 jobs under non-price measures were observed in the year 1997 (Nassar, 2003).

Turning to examples from Asia, in Bangladesh Van der Merwe (1998) modelled domestic consumption expenditures for tobacco products and beedis in 1994. The average input-output pattern changed, and the entire tobacco production was shifted towards alternative agricultural products. Due to increases in other taxes, no change in government spending occurred. As a result, a net gain of 10,989,192 jobs was observed in 1994 (Merwe R. V., 1998). Similarly, in Indonesia, Ahsan and Wiyono (2007) modelled percentage increases of 25 per cent, 50 per cent and 100 per cent in cigarette taxation, whilst expenditures were allocated by the average expenditure pattern. A net gain of 84,340 jobs was observed with a 25 per cent tax increase, while a net gain of 140,567 jobs and 281,135 jobs was observed with a 50 per cent and 100 per cent tax increase, respectively (Ahsan & Wiyono, 2007).

Moreover, the international literature points towards a tendency for job gains from reduced smoking tobacco consumption as a result of tobacco control policies. While the literature largely focusses on employment effects, fewer studies estimate the impact of smoking tobacco consumption reduction on output, as follows.

A recent study in Bangladesh found that reducing tobacco use is economically beneficial to the country's GDP. Using a social accounting matrix multiplier model, the study simulates three 'tobacco-free economy' scenarios by diverting

demand from tobacco products into other sectors of the economy and quantifying the economy-wide impact. Compared to the baseline values, the total sectoral output increases by 0.92, 1.3 and 0.75 per cent. The corresponding increases in GDP are 1.57, 1.75 and 1.75 per cent. Similarly, total household income increases by 1.40, 1.58 and 1.55 per cent (Husain & Khondker, 2016).

Another study based in Vietnam found that implementing tobacco control policies will lead to reducing smoking prevalence such that a 20-

percentage point increase in tobacco tax will increase national output by 0.09 per cent (VND 1,979.3 billion) and employment by 0.12 per cent (60,278 jobs). Similarly, a 40-percentage point increase in tobacco tax will increase the national output by 0.18 per cent (VND 3,958.5 billion) and employment by 0.24 per cent (120,556 jobs). The study identified 21 out of 22 economic sectors accruing net positive gains from tobacco control policies in terms of output and employment (Hien, Long, & Toan, 2014).

4. Data and Methodology

This section discusses the data sources and the methodology used for analysis. The research methodology includes the theoretical framework and methodology applied in the study.

4.1 Theoretical Framework

Taking into consideration the methodological approaches discussed under Section 3, this study employs the static input-output approach, due to the relative ease of simulating the impact with limited data. The study uses the theoretical framework of the World Bank Economics of Tobacco Toolkit developed by Yurekli, et al. (2002). This tool provides guidance on estimating the impact of reduced smoking tobacco consumption on national output.

Figure 3 presents the framework for estimating the impacts of reduced smoking tobacco consumption on the national economy.

To calculate the impact of a decrease in smoking tobacco consumption on the national economy, the following three main estimation steps are required:

- Calculate the reduction in outputs resulting from the fall in demand for tobacco products.
- Estimate the increase in outputs from the increases in demand for other goods and services.

- Calculate the net change in outputs due to the change in final demand, as the difference of the two.

4.2 Data

Household Income and Expenditure Survey (HIES)

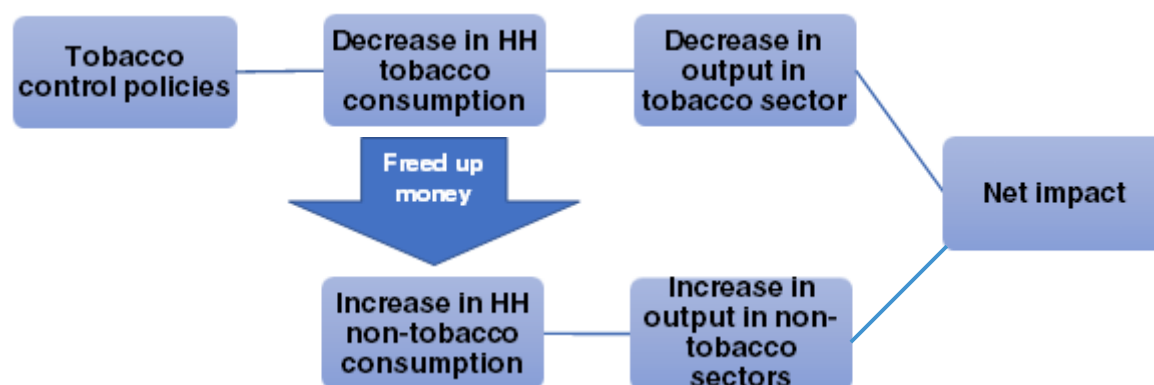
The HIES 2016 conducted by the DCS is a nationally representative survey consisting of 27,500 households. It provides information on consumption expenditures of more than 400 commodities including tobacco products at the household level. The study uses the HIES data to analyse the implications of tobacco expenditure on household budget allocations for basic needs.

Input-Output (I-O) Table

The I-O table is an accounting framework that shows the interdependence among economic sectors in a given period. The I-O table is in the form of a matrix in which each column shows the composition of input required by a particular industry from other sectors, to produce its output. Rows of the transaction matrix display the distribution of a particular industry's output throughout the economy.

The I-O tables provide a powerful tool for analysing the industrial structure of an economy. It

Figure 3
Study Framework



Source: Authors' illustration based on, Ahsan, A., & Wiyono, N. H. (2007). *An Analysis of the Impact of Higher Cigarette Prices on Employment in Indonesia*. South East Asia Tobacco Control Alliance, University of Indonesia.

is a means of examining relationships within an economy, both between industries as well as between industries and final consumers. The I-O tables capture all the money market transactions for consumption in a given period of time. Based on some assumptions, the resulting mathematical formulae allow examining the effect of a change in one or several economic activities on the entire economy in a given country.

This study involves the inter-industry transaction matrix, which provides the flow of goods and services between all the individual sectors of an economy in a given year. Accordingly, the study uses Sri Lankan competitive type symmetric I-O table (SIOT) - i.e. the industry by industry I-O table (127 x 127) for the year 2010.

4.3 Methodology

4.3.1 Theory of the Input-Output Analysis

The study follows the theory of I-O analysis developed by (Yurekli, Beyer, & Zhang, 2002) as described below.

Let X_i = total output of industry i

where X_{ij} = total amount of the product of industry i used by industry j

Y_i = total amount of leftover for final demand (consumption apart from other producing industries)

Let $a_{ij} = X_{ij} \div X_j$

Then $Y_i = X_j - \sum_i a_{ij} \times X_j$

Let A = matrix of a_{ij}

X = vector of industry outputs

Y = vector of final demand

I = identity matrix

Then $X = (1 - A)^{-1} \times Y$

where $(1 - A)^{-1}$ is called Leontief Inverse. This relationship is also held in the form of changes:

$$\Delta X = (1 - A)^{-1} \times \Delta Y$$

4.3.2 Methodology Application

Impact of Tobacco Spending on Household Budget Allocation

The study uses HIES 2016 data to investigate the impact of tobacco spending on household budget allocation. If a household reported expenditure on any smoking tobacco product — cigarettes, cigars or beedi, that household is categorised as a tobacco-user household. In terms of income, the bottom 40 per cent are categorised as lower-income households. For analytical purposes, expenditure items are segregated into the following major consumption categories:

Food	Clothing
Tobacco	Communication & recreation
Housing and Energy	Nondurable & durable goods
Health	Liquor
Education	Other
Transport	Ad hoc expenses

Impacts of Reduced Smoking Tobacco Consumption on the National Economy.

This analysis involves the following key steps:

- Reduced tobacco production: this study is carried out under the hypothetical scenario of 20 per cent smoking tobacco consumption reduction. Accordingly, as the first step, the above tobacco production reduction is applied for all the tobacco manufacturing-related sectors.
- Then total impact on an economy is the sum of a series of direct and indirect impacts due to reduced tobacco production. The total requirement matrix, also referred to as the Leontief inverse table, contains both the direct and indirect requirements. The decrease in national income as a result of reducing tobacco production is estimated by using the total requirement matrix.

$$\Delta X_t = (1 - A)^{-1} \times \Delta Y_t$$

- As discussed in the study framework, spending the released tobacco expenditures lead to an increase in demand for non-tobacco goods and services. The study assumes that money released from tobacco purchases is spent on

non-tobacco goods and services under two scenarios i) in proportion to the food and non-food consumption pattern of the HIES survey, ii) equally spending among all non-tobacco goods and services.

- Again, the study applies the total requirement matrix to estimate the increase in output as a result of increased demand for non-tobacco goods and services.

$$\Delta X_n = (1 - A)^{-1} \times \Delta Y_n$$

- Finally, the study calculates the net effect on economic output due to changing consumer spending from tobacco to non-tobacco goods and services.

4.4 Limitations

According to Yurekli et al. (2002), I-O analysis carries some limitations. It is a static analysis and cannot show how the economy adjusts over time. Further, the I-O analysis is demand-driven, and assumes constant returns to scale, which may change in the real-world. Further, this study assumes that money released from tobacco spending that will be spent on non-tobacco goods and services, and other possible avenues of allocating the released money such as household savings, are not captured. Despite these limitations, the simplicity and availability of the data needed by the methodology still make the I-O analysis the most widely-used approach for examining the income and employment impact of tobacco control policies.

5. Results

5.1 Impact of Tobacco Spending on Household Budget

As discussed under the methodology application section, the study considers household expenditures on cigarettes or beedi reported in the HIES data as smoking tobacco consuming households. On average, a tobacco-user household spends nearly LKR 2,000 per month on tobacco, constituting 4 per cent of the household budget. Spending on smoking can drive out other critical expenditures, including basic needs.

This 'crowding out effect' is the greatest for poor families, affecting not only the smoker but the rest

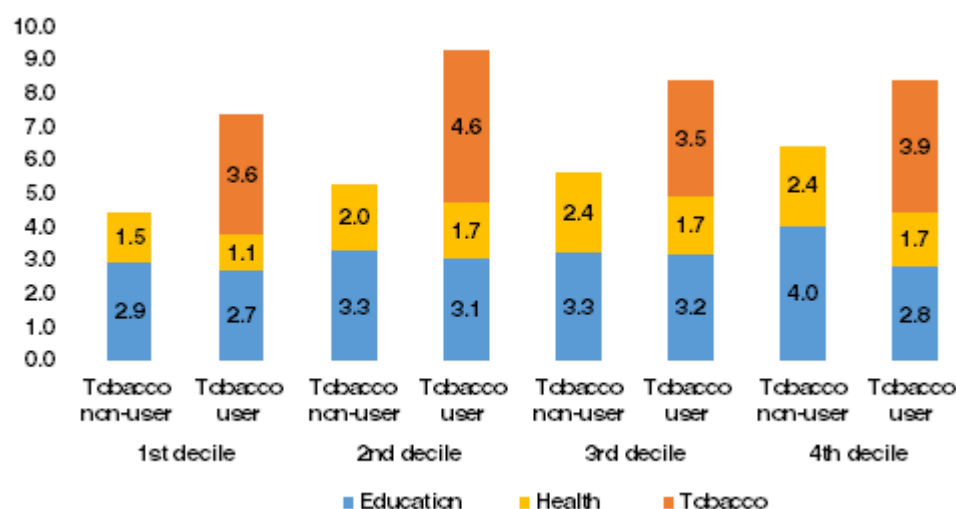
of the family as well. For instance, poor families spend a larger proportion of their income - nearly 60-70 per cent of the household budget - on food, reflecting the budget constraints for other basic needs such as education, health and housing (see Table 3). If these households spend a considerable amount of their remaining budget on tobacco, then the budget constraints for other basic needs may further escalate. For instance, results clearly show that in lower-income households, health and education spending are negatively affected by tobacco expenditures (see Figure 4). Education and health, which have a direct bearing on household welfare, receive low priority due to resource constraints.

Table 3
Household Expenditure Allocation to Major Consumption Categories (%)

	1st Decile		2nd Decile		3rd Decile		4th Decile	
	TB Non-user HH	TB User HH	TB Non-user HH	TB User HH	TB Non-user HH	TB User HH	TB Non-user HH	TB User HH
Food	71.1	68.8	67.3	62.7	63.1	60.2	60.4	57.3
Tobacco (TB)	0.0	3.6	0.0	4.6	0.0	3.5	0.0	3.9
Housing Rent & Energy	5.4	4.4	5.1	4.2	5.0	4.3	5.0	4.1
Health	1.5	1.1	2.0	1.7	2.4	1.7	2.4	1.7
Education	2.9	2.7	3.3	3.1	3.3	3.2	4.0	2.8
Transport	4.4	3.0	5.6	4.6	6.7	4.9	7.0	6.1
Clothing	3.4	3.1	3.7	3.6	3.9	3.8	4.1	3.5
Communication & Recreation	4.0	3.9	3.8	3.6	3.8	3.7	3.6	3.4
Non Durable & Durable Goods	2.8	2.7	3.3	3.0	3.8	3.9	4.3	4.7
Liquor	0.8	2.8	0.7	3.6	0.8	3.7	1.0	5.1
Other	2.6	2.4	3.7	4.0	5.0	4.5	5.7	5.0
Ad hoc Expenses	1.0	1.4	1.5	1.3	2.2	2.6	2.5	2.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations based on HIES 2016 micro-data.

Figure 4
Share of Expenditure on Tobacco, Health and Education (%) by Tobacco Using Status of the Household Members



Source: Authors' calculations based on HIES 2016 micro-data.

The poorest 40 per cent of tobacco-user households allocate a significantly lower budget share to health (1.6 per cent), education (3 per cent) and housing (4.2 per cent) than that of tobacco non-user households who spend 2.2, 3.5 and 5.1 per cent, respectively (see Table 4). These statistics show how household budget allocation is negatively affected by tobacco expenditures. Moreover, among lower-income households, tobacco users spend less on education (LKR 788), health (LKR 426) and housing (LKR 1,124) than the same economic group of tobacco non-user households, whose respective spending are LKR 834, LKR 521 and LKR 1,218. More importantly, overall tobacco-user households spend an even greater share of their budget allocation for tobacco (4.0 per cent) than education (3.2 per cent), health (2.7 per cent) and housing (3.5 per cent) spending (see Table 4). This information suggests that if tobacco users were to stop smoking, they would spend more money on themselves and their family's basic needs - i.e. on food, health, education and housing.

Further, tobacco-users are at a much higher risk of falling sick and dying prematurely due to tobacco-related NCDs such as cancers, heart attacks and respiratory diseases. Tobacco-related illness can cause severe financial strains - pushing families into poverty by depriving them of much-needed

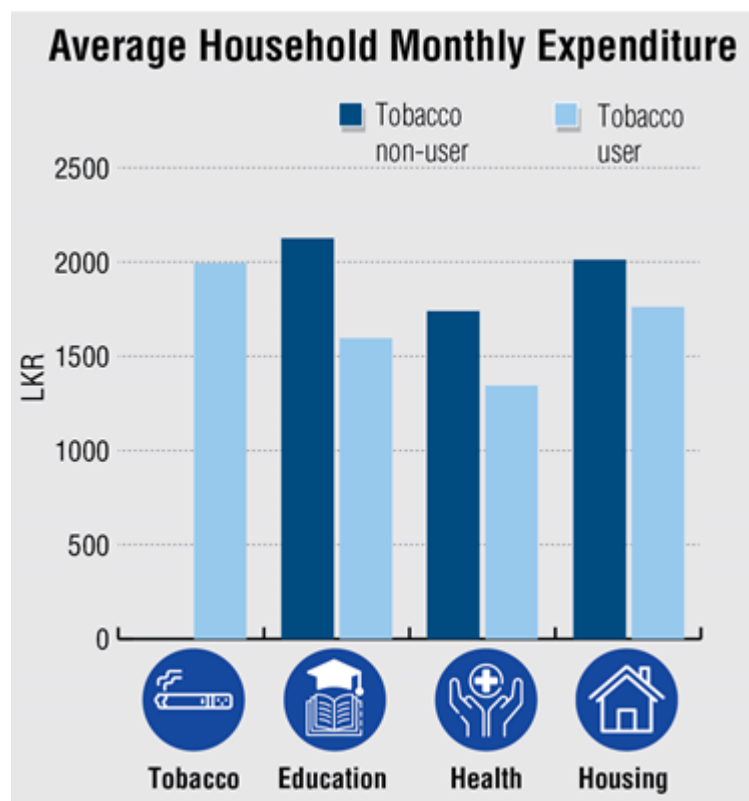
income and imposing additional costs for health care in the long-run. Smoking, therefore, is not only unhealthy but costly.

“If tobacco users were to stop smoking, they would spend more money on themselves and their family's basic needs - i.e. on food, health, education and housing.”

Table 4
Average Household Monthly Expenditure and Proportion of Expenditure by Household Smoking Status

	Overall				Poorest 40%			
	Tobacco Non-user		Tobacco User		Tobacco Non-user		Tobacco User	
	LKR	%	LKR	%	LKR	%	LKR	%
Food	19,288	40.0	20,102	40.4	15,476	64.5	16,249	61.1
Tobacco	-	0.0	1,994	4.0	-	0.0	1,029	3.9
Housing & Energy	2,012	4.2	1,761	3.5	1,218	5.1	1,124	4.2
Health	1,739	3.6	1,344	2.7	521	2.2	426	1.6
Education	2,125	4.4	1,596	3.2	834	3.5	788	3.0
Transport	4,508	9.4	4,079	8.2	1,483	6.2	1,311	4.9
Clothing	1,581	3.3	1,564	3.1	929	3.9	950	3.6
Communication & Recreation	2,011	4.2	1,830	3.7	904	3.8	961	3.6
Non Durable & Durable Goods	3,822	7.9	3,195	6.4	887	3.7	999	3.8
Liquor	347	0.7	2,261	4.5	205	0.9	1,063	4.0
Other	5,924	12.3	5,811	11.7	1,083	4.5	1,123	4.2
Ad Hoc expenses	4,840	10.0	4,234	8.5	459	1.9	551	2.1
Monthly Expenditure	48,198	100	49,772	100	24,001	100	26,576	100

Source: Authors' calculations based on HIES 2016 micro-data.



5.2 Contribution of Tobacco to the National Economy

When formulating tobacco control policies, the analysis of key sectors which are involved in the tobacco industry is important because of its role in the economic growth and diversification of the industrial structure of the economy. Accordingly, this section analyses the contribution of the tobacco industry to the national economy.

5.2.1 Position of 'Manufacture of Tobacco Products' and 'Tobacco Farming' Sectors

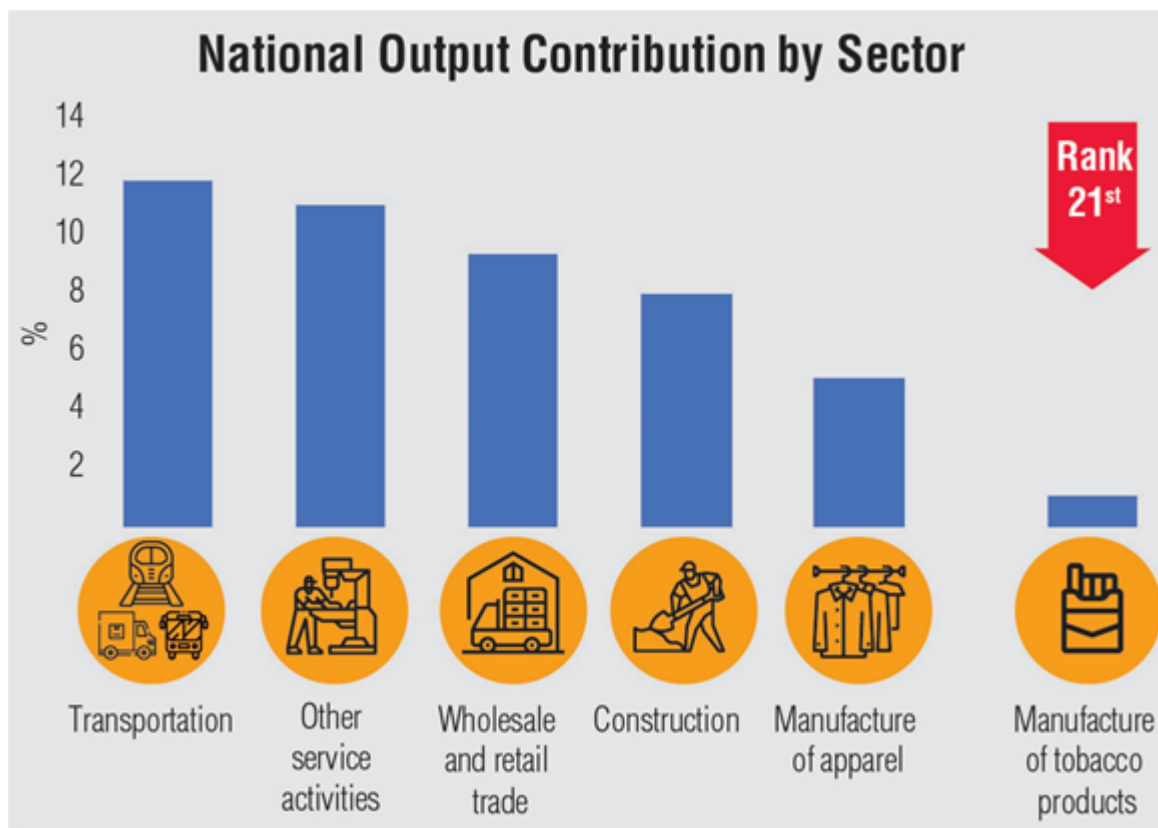
Based on the latest available national I-O tables (2010) for Sri Lanka, the output from the 'manufacture of tobacco products' and 'tobacco farming' sectors does not represent a significant

portion of total economic output. The two-key tobacco-related sectors - 'manufacture of tobacco products' and 'tobacco farming' are not among the top-ranked sectors in the Sri Lankan economy. Sectors are ranked based on the share of output contributed by each sector, as a percentage of total output of all sectors. Among the 127 sectors, manufacturing of the tobacco sector takes 21st place (see Table 5). The combined output from these two sectors - 'manufacture of tobacco products' and 'tobacco farming' was only 1.1 per cent of the total output (1.08 per cent for tobacco manufacturing and 0.01 per cent for tobacco farming). Also, in terms of GDP by sector, the contribution of 'manufacture of tobacco' and 'tobacco farming' is not substantial; both these sectors account for only 1.9 per cent of total GDP.

Table 5
Total Output by Sector (LKR Millions)

I-O Sectors	Output	% of Output	Rank
Transportation	1,171,067	11.94	1
Other Service Activities	1,085,319	11.07	2
Wholesale and Retail Trade	923,192	9.41	3
Construction	791,416	8.07	4
Manufacture of Wearing Apparel	501,228	5.11	5
Public Administration and Defence	407,727	4.16	6
Manufacture of Other Food Products	388,449	3.96	7
Real Estate Activities	382,846	3.90	8
Financial Service Activities	331,177	3.38	9
Accommodation, Food & Beverages Serving Activities	171,631	1.75	10
.			
.			
Manufacture of Tobacco Products	106,059	1.08	21
.			
.			
Growing of Tobacco	828	0.01	114
Total Output	9,807,278		

Source: Authors' calculations based on I-O Tables.



“The contribution of 'manufacture of tobacco' and 'tobacco farming' is not substantial; both these sectors account for only 1.9 per cent of total GDP.”

5.2.2 Tobacco Manufacturing Industry Composition based on I-O Tables

Based on national I-O tables, the tobacco manufacturing industry yields inputs from four other sectors, as listed in Table 6. The tobacco growing industry which supplies the primary raw material tobacco, accounts for the highest share of inputs at 47 per cent. Wholesale and retail trade and transport sectors each contribute a share of inputs as low as 6 per cent. Furthermore, data from I-O tables depicted in Table 7 suggest that the value addition of the sector is LKR 100 billion, which is approximately 95 per cent of its total inputs. This implies that the impact of the reduction in tobacco production is minimal to other related sectors.

Table 6
Inputs for Tobacco Production

	Inputs for Tobacco Manufacturing (%)
Growing of Tobacco	47
Manufacture of Tobacco Products	23
Growing Other Cereals	8
Wholesale and Retail Trade	6
Transport	6

Source: DCS, Sri Lanka I-O Tables 2010.

Table 7
Tobacco Manufacturing Sector Composition

Item Group	Manufacture of Tobacco Products (LKR Millions)
Total Intermediate Consumption	4,747.8
Total Gross Value Added (GVA)	100,927.1
Total Inputs	106,058.9
Employment	5,329

Source: DCS, Sri Lanka I-O Tables 2010.

5.3 Impact of Tobacco Control on National Output

Tobacco control measures are designed to reduce consumer demand for tobacco products. This demand reduction can lead to reduced spending on tobacco products and increased spending on other goods and services. Therefore, this shift in demand will create a negative impact on tobacco-related industries while creating a positive impact on other goods and services; thus, finally impacting national income. This section presents the estimated results of the net impact of reduced smoking tobacco consumption on the national economy, under the hypothetical scenario of a 20 per cent reduction in smoking tobacco consumption. The results of these analyses are presented in Tables 8 and 9.

The study applied the 20 per cent decrease in smoking tobacco consumption on manufacture of tobacco products, corresponding to I-O table sector number 1,200 (see Annex Table A1). The direct effect due to this consumption reduction is calculated to be LKR 950 million. Next, as discussed under the methodology application, through the application of the concept of an output multiplier effect,² the impact of the decrease in cigarette consumption on economic output is calculated. Accordingly, the study finds that a 20 per cent reduction in smoking tobacco consumption will lead to a decrease in national output by LKR 1,304 million.

Thereafter, to capture the impact of switching from consumption of cigarettes to consumption of other goods and services, the LKR 950 million amount

² 'Output multiplier effect' is a summary measure of the magnitude of the leverage that changes in one industry, and the impact it has on other industries.

released from tobacco purchases is allocated to other non-tobacco goods and services. As discussed under the methodology section of this study, two scenarios are applied to allocate the released money among other non-tobacco sectors.

Scenario 1: Following the HIES Food and Non-food Distribution

Under the first scenario, the study assumes that the money released from tobacco expenditure due to reduced spending will follow the food and non-food expenditure pattern of HIES when spending on non-tobacco goods and services. According to HIES 2016 data, the composition of average household expenditures was 42 per cent for food items and 58 per cent for non-food items. The national I-O table contains 31 food-related sectors and 94 non-food related sectors, excluding tobacco manufacturing and tobacco farming.

Accordingly, each of these 31 food-related sectors is allocated 1.34 per cent (42 per cent of household food expenditures segregated to 31 sectors) of released tobacco spending. Applying the same logic to non-food-related sectors, 0.62 per cent of released money is allocated to each of the 94 non-food related sectors (58 per cent of non-food expenditure, segregated to 94 non-food related sectors). Accordingly, in money terms, LKR 12.8 million is allocated to each food-related sector, while LKR 5.9 million is allocated to each non-food sector, amounting to a total of LKR 950 million (the money released from household tobacco expenditure).

Then, by reapplying output multipliers, the impact of this increase in non-tobacco spending is calculated (resulting from decreased smoking tobacco consumption) on national output.

Accordingly, the study estimated that the output will increase by LKR 1,667 million, due to the increase in consumption of non-tobacco goods and services (see Table 8). Thus, the total net impact on national output due to a 20 per cent reduction in smoking tobacco consumption, is positive.

Scenario 2: Equal Distribution among I-O Sectors

Under the second scenario, released money from tobacco spending is equally allocated to all the non-tobacco goods and service sectors. The I-O table contains 125 sectors, excluding tobacco manufacturing and tobacco farming. Accordingly, each of these 125 sectors is increased by 0.8 per cent of released money, such that the released money is equally distributed among non-tobacco sectors. Expressed in money terms, LKR 7.6 million is allocated to each of those 125 sectors, amounting to LKR 950 million (resulting from decreased smoking tobacco consumption) (see Table 9). Then, as before, by applying the output multiplier, the study estimates the impact of this increase in non-tobacco spending on national output to be LKR 1,687 million. Accordingly, the net impact of a 20 per cent reduction in smoking tobacco consumption on the national economy, is positive in terms of output.

Table 8
The Impact of Reduced Tobacco Production on National Output: Scenario 1*

(Unit LKR Millions)

	20 % Reduction of Tobacco Production	Decrease in Output Due to Reduced Tobacco Production	Increased HH Non- tobacco Spending (Scenario 1*)	Increase in Output Due to Increased Non-tobacco Production	The Net Change in Output
Agriculture, Forestry and Fishing	-92.2	-124.0	266.3	366.3	242.3
Growing of Tobacco	-446.1	-450.7	0.0	0.0	-450.7
Mining and Quarrying	-0.1	-22.5	5.9	46.5	24.0
Electricity & Water	-32.7	-41.1	11.8	38.2	-2.9
Food Manufacturing	-4.5	-11.8	165.1	216.2	204.4
Other Manufacturing	-21.7	-178.1	371.3	669.8	491.8
Manufacture of Tobacco Products	-214.3	-216.4	0.0	0.0	-216.4
Construction	-2.6	-3.4	5.9	8.0	4.5
Wholesale and Retail Trade	-60.1	-88.3	5.9	76.6	-11.7
Accommodation	-0.1	-1.0	5.9	7.2	6.3
Transport	-57.4	-87.2	11.8	60.3	-26.9
Postal, Banking, Insurance & Real Estate	-4.9	-26.0	35.4	64.3	38.4
Professional Services	-7.1	-20.6	29.5	56.3	35.7
Public Administration	0.0	0.0	5.9	6.4	6.4
Education	0.0	0.0	5.9	5.9	5.9
Health	0.0	-0.1	5.9	6.1	6.0
Other Services	-5.9	-32.4	17.7	39.0	6.6
Total	-950	-1,304	950	1,667	364

Note: Scenario 1 -assumes that the money released from tobacco expenditure will follow the food and non-food expenditure pattern of HIES when spending on non-tobacco goods and services.

Source: Authors' own calculations based on I-O tables.

Table 9**The Impact of Reduced Tobacco Production on National Output: Scenario 2*****(Unit LKR Millions)*

	20 % Reduction of Tobacco Production	The Decrease in Output Due to Reduction in Tobacco Production	Increased Non-tobacco Spending (Scenario 2**)	Increase in Output Due to Increased Non-tobacco Production	The Net Change in Output
Agriculture, Forestry and Fishing	-92.2	-124.0	266.3	366.3	242.3
Growing of Tobacco	-446.1	-450.7	0.0	0.0	-450.7
Mining and Quarrying	-0.1	-22.5	5.9	46.5	24.0
Electricity & Water	-32.7	-41.1	11.8	38.2	-2.9
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Manufacture of Tobacco Products	-214.3	-216.4	0.0	0.0	-216.4
Construction	-2.6	-3.4	5.9	8.0	4.5
Wholesale and Retail Trade	-60.1	-88.3	5.9	76.6	-11.7
Accommodation	-0.1	-1.0	5.9	7.2	6.3
Transport	-57.4	-87.2	11.8	60.3	-26.9
Postal, Banking, Insurance & Real Estate	-4.9	-26.0	35.4	64.3	38.4
Professional Services	-7.1	-20.6	29.5	56.3	35.7
Public Administration	0.0	0.0	5.9	6.4	6.4
Education	0.0	0.0	5.9	5.9	5.9
Health	0.0	-0.1	5.9	6.1	6.0
Other Services	-5.9	-32.4	17.7	39.0	6.6
Total	-950	-1,304	950	1,667	364

Note: Scenario 2 - assumes that money released from tobacco spending is equally allocated to all the non-tobacco goods and services.

Source: Authors' own calculations based on I-O table.

As described above, under both scenarios, the total net impact on the economy due to a decrease in smoking tobacco consumption would be positive in terms of output produced by all sectors of the economy. Decreasing smoking tobacco consumption by 20 per cent would increase economic output by LKR 550 million (see Table 10). Further, the reduced tobacco

consumption will result in a 30 per cent net benefit due to spending of freed up money on the other non-tobacco goods and services.

Table 10
Net Changes in Output (2019 Prices)

(Unit LKR Millions)

	Scenario-1	Scenario-2
The Decrease in Tobacco-Related Output	1,974	1,974
Increase in Non-tobacco Related Output	2,524	2,554
Net Impact	551	580
Percentage Difference (%)	28	29

Source: Authors' own calculations.

5.4 Impact of Tobacco Control on Tobacco-Related Industries

Based on the I-O analysis, 120 sectors have a net positive output impact; conversely, there are only seven sectors with a net negative output impact (see Annex Table A1). Of the sectors impacted negatively, the key sectors are tobacco farming

(LKR 450.7 million) and manufacture of tobacco products (LKR 216.4 million). Apart from these, growing of other cereals, the manufacture of fertiliser and pesticides, wholesale and retail trade and transportation sectors have a trivial negative impact due to the reduction of smoking tobacco consumption (see Annex Table A1).

6. Discussion and Policy Implications

How Reduced Tobacco Consumption Benefits the Household

The findings of this study show that spending on tobacco results in households foregoing other critical expenditures on basic needs not limited to food, health and education. For instance, among the poor, tobacco-user households allocate a significantly lower budget share on food, health, education, housing, clothing and transport than that allocated by tobacco non-user households. More importantly, all tobacco-user households spend a greater share of their budget allocation for tobacco than education, health and housing. As such, this study indicates that tobacco control policies aimed at reducing the demand for tobacco products would lessen household budget constraints, particularly for the poor, as it would free up fiscal space for basic needs. Further, household tobacco spending will yield losses in the future, unlike investing spending on education and health, which yield returns in the future.

The Impact of Tobacco Control on the Economy

The national I-O table shows that the two key tobacco-related sectors - the manufacture of tobacco and tobacco farming - are not of high importance to the economy in terms of output when compared with other sectors in the economy. In terms of GDP, the contributions of these sectors are not substantial.

This study reveals that the net impact on the overall economic output, due to decreased tobacco consumption would be positive, through spending the released tobacco expenditures on non-tobacco sectors. Based on analytical assumptions, study findings provide empirical evidence that reduced tobacco consumption will reduce output in the tobacco industry; however, this reduction in the tobacco sector will be more than compensated by the increased output in other non-tobacco sectors. For instance, decreasing tobacco consumption by 20 per cent would result in a 30 per cent net benefit

“Decreasing tobacco consumption by 20 per cent would result in a 30 per cent net benefit to national income, through increased consumption of non-tobacco goods and services.”

to national income, through increased consumption of non-tobacco goods and services. This means that the manufacture of tobacco does not generate output as efficiently as other sectors that have higher multipliers in the Sri Lankan economy. Accordingly, this study provides evidence-based information to support tobacco control in Sri Lanka- i.e. money is better invested in sectors with higher multipliers.

Further, background information supports that the impact on the labour market from reduced tobacco consumption would not be substantial. For instance, based on official estimates, the total number of workers attached to tobacco manufacturing and tobacco farmers are around 8,500. A forthcoming IPS study reveals that tobacco farmers do not rely solely on tobacco to earn a living and hence, are willing to shift to alternative crops (Thibbotuwawa, Hirimuthugodage, & Dissanayake, Forthcoming). Since the reduction in tobacco consumption does not occur overnight but gradually over time, the

subsequent gradual phase-out of tobacco farming can be managed or funded to effectively minimise the direct impact on individual farmers. The Ministry of Agriculture has already implemented programmes to shift tobacco farmers towards other crops, where significant numbers have been involved in the shift.

To conclude, this study offers empirical evidence that the net impact on overall economic output due to decreased tobacco consumption would be positive, through the spending of released tobacco expenditures on non-tobacco goods and services. Further, study findings indicate that implementing tobacco control policies to reduce smoking will enhance household welfare, particularly for the poor, as it would free up more resources for basic needs such as food and education, which is also a positive gain for the overall economy. Accordingly, the results of this empirical study demonstrate that reducing tobacco spending has a positive effect on both household welfare as well as national income, through spending the released tobacco expenditures on non-tobacco goods and services. This is important information for policy-makers and legislators in formulating effective tobacco control policies in Sri Lanka. Moreover, it should be noted that the above estimates are solely based on the output approach and hence, do not take into account other economic benefits due to reduced tobacco consumption, such as reduced health care costs, reduced environmental costs, as well as positive gains due to increased non-tobacco consumption; all of which accrue benefits not just for tobacco users, but for the country as a whole.

“The results of this empirical study demonstrate that reducing tobacco spending has a positive effect on both household welfare as well as national income, through spending the released tobacco expenditures on non-tobacco goods and services.”

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Annexure

Table A1
Net Impact of 20 per cent Tobacco Reduction on Output, by I-O sectors

I-O Sector		Scenario-1	Scenario-2
0111	Growing of cereals (except rice), leguminous crops and oilseeds	-69.0	-76.6
0112	Growing of rice	25.0	15.4
0113	Growing of vegetables and melons, roots and tubers	19.9	11.2
0119	Growing of other non-perennial crops	3.9	-1.3
0129	Growing of other perennial crops	13.4	7.8
0122	Growing of tropical and subtropical fruits	16.5	9.8
0123-0124	Growing of citrus fruits, Pome fruits & stone fruits	14.5	8.6
0121,0125	Growing of Grapes, other tree, bush fruits and nuts	12.8	7.6
0126	Growing of oleaginous fruits	17.1	10.4
0127	Growing of beverage crops Coffee – Cocoa	16.4	9.8
0127	Growing of beverage crops Tea	16.5	10.0
0123-0125 +0128-0129	Growing of spices, aromatic, drug and pharmaceutical crops	8.5	2.4
0114	Growing of sugar cane	22.1	13.2
0129	Growing of rubber	13.1	16.9
0115	Growing of tobacco	-450.7	-450.7
0130	Plant propagation	11.8	6.6
0141	Livestock	19.9	11.9
0141	Milk production	14.0	8.3
0146	Egg production	13.1	7.9
0161	Agriculture supporting activities	14.2	7.6
0210	Forestry and logging	7.4	9.7
0220	Firewood	4.4	6.0
0230	NWFP	6.1	7.8
0311-0312	Fishing	20.6	12.8
07-08	Mining & quarrying	24.0	31.6
3510	Electric power generation, transmission and distribution	-8.6	-3.3
3600	Water collection, treatment and supply	5.7	7.7
1010	Processing and preserving of meat	13.6	8.3
1020	Processing and preserving of fish, crustaceans and molluscs	13.3	8.0
1030	Processing and preserving of fruit and vegetables	12.8	7.6
1040	Manufacture of vegetable and animal oils and fats	13.3	8.1
1050	Manufacture of dairy products	18.0	10.6
1061	Manufacture of grain mill products	23.3	14.0
1080	Manufacture of prepared animal feeds	18.6	15.1
1071	Manufacture of bakery products	13.0	7.8

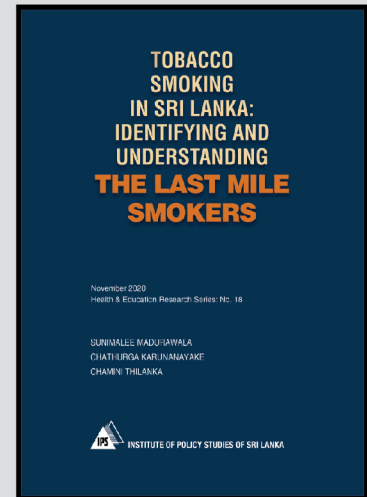
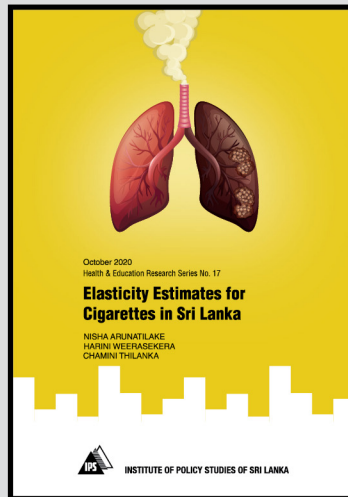
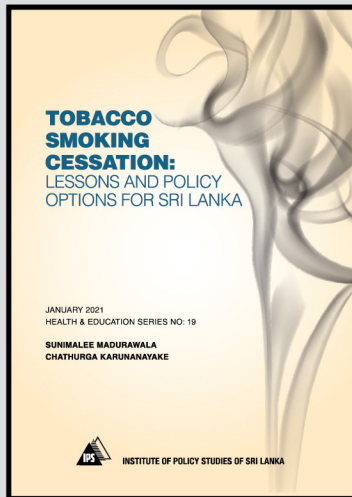
I-O Sector		Scenario-1	Scenario-2
1072	Manufacture of sugar	13.5	8.1
1073	Manufacture of cocoa, chocolate and sugar confectionery	14.4	8.6
1074	Manufacture of macaroni, noodles, couscous and similar farinaceous products	12.8	7.6
1079	Manufacture of other food products	17.9	11.1
1101-1102	Distilling, rectifying and blending of spirits & manufacture of wines	7.3	9.4
1104	Manufacture of soft drinks; production of mineral waters and other bottled waters	12.7	7.5
1200	Manufacture of tobacco products	-216.4	216.4
1311-1312	Preparation and spinning of textile fibres & weaving of textiles	18.7	24.2
1313	Finishing of textiles	6.7	8.7
1392	Manufacture of made-up textile articles, except apparel	6.0	7.8
1393	Manufacture of carpets and rugs	5.9	7.6
1394	Manufacture of cordage, rope, twine and netting	6.2	7.9
1399	Manufacture of other textiles	6.6	8.5
1410	Manufacture of wearing apparel, except fur apparel	7.6	10.1
1512	Manufacture of luggage, handbags and the like, saddler and harness	6.6	8.5
1520	Manufacture of footwear	7.5	9.7
16	Manufacture of wood and products of wood and cork, except furniture;	6.2	8.7
1701	Manufacture of pulp, paper and paperboard	14.1	19.8
18	Printing and reproduction of recorded media	5.5	8.2
19	Manufacture of refined petroleum products	9.2	12.9
2011	Manufacture of basic chemicals	20.3	24.2
2012	Manufacture of fertilisers and nitrogen compounds, pesticides	-27.0	-36.5
2013	Manufacture of plastics and synthetic rubber in primary forms	10.4	13.2
2022	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	6.2	8.1
21	Manufacture of pharmaceuticals, medicinal chemical and botanical products	6.4	8.1
2023	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes	9.5	12.4
2029	Manufacture of other chemical products	6.8	8.8
2211	Manufacture of rubber tires and tubes; retreading and rebuilding of rubber tires	5.6	7.4
2219	Manufacture of other rubber products	10.8	14.0
2220	Manufacture of plastics products	14.6	18.0
2310	Manufacture of glass and glass products	6.4	8.3
2393	Manufacture of other porcelain and ceramic products	6.0	7.7
2391	Manufacture of refractory products	6.2	8.0
2394	Manufacture of cement, lime and plaster	9.1	11.8

I-O Sector		Scenario-1	Scenario-2
2395	Manufacture of articles of concrete, cement and plaster	7.0	9.1
2396	Cutting, shaping and finishing of stone	6.9	8.9
2399	Manufacture of other non-metallic mineral products	8.3	10.6
31	Manufacture of furniture	6.0	7.7
3211	Manufacture of jeweller and related articles	5.8	7.6
3220	Manufacture of musical instruments	5.9	7.6
3230	Manufacture of sports goods	5.9	7.6
3240	Manufacture of games and toys	5.9	7.6
3212+3290	Manufacture of imitation jewellery, related articles & other manufacturing	6.1	8.0
2410	Manufacture of basic iron and steel	28.7	37.1
2431	Casting of iron and steel	22.9	29.6
2420	Manufacture of basic precious and other non-ferrous metals	7.1	9.2
2511	Manufacture of structural metal products	8.4	10.9
2512	Manufacture of tanks, reservoirs and containers of metal	5.9	7.6
2593+2599	Manufacture of cutlery, hand tools, general hardware & other fabricated metal products	18.1	23.2
2811	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	6.4	8.3
2812-2813	Manufacture of fluid power equipment & other pumps, compressors, taps and valves	6.2	8.0
2819	Manufacture of other general-purpose machinery	6.7	8.6
2821	Manufacture of agricultural and forestry machinery	5.9	7.6
2823	Manufacture of machinery for metallurgy	5.9	7.6
2824	Manufacture of machinery for mining, quarrying and construction	5.9	7.6
2825	Manufacture of machinery for food, beverage and tobacco processing	5.9	7.6
2826	Manufacture of machinery for textile, apparel and leather production	5.9	7.6
2750	Manufacture of domestic appliances	5.9	7.6
2829	Manufacture of other special-purpose machinery	5.9	7.6
2620	Manufacture of computers and peripheral equipment	6.8	8.9
2710	Manufacture of electric motors, generators, transformers and electricity distribution	8.3	10.7
2732	Manufacture of other electronic and electric wires and cables	8.4	10.9
2720	Manufacture of batteries and accumulators	7.8	10.0
2733+2740+2790	Manufacture of electric lighting equipment & wiring and wiring devices	13.4	17.4
2630+2640	Manufacture of communication equipment & consumer electronics	6.6	8.6
2660+2670	Manufacture of irradiation, electromedical and electrotherapeutic equipment & optical instruments and photographic equipment	6.1	7.8
29	Manufacture of motor vehicles, trailers and semi-trailers	6.8	8.8
3011	Building of ships and floating structures	7.0	9.0

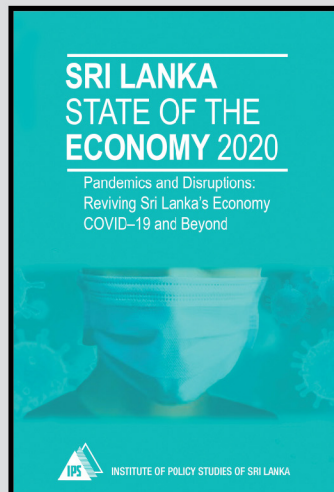
I-O Sector		Scenario-1	Scenario-2
3012	Building of pleasure and sporting boats	5.9	7.6
3091-3099	Manufacture of transport equipment	7.1	9.2
41	Construction	4.5	6.6
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	-11.7	-9.9
55,56	Accommodation, food & beverages serving activities	6.3	8.2
49-51	Transportation	-32.7	-29.1
52	Warehousing and support activities for transportation	5.8	7.7
53	Postal and courier activities	6.6	8.6
64	Financial service activities, except insurance and pension funding	8.6	11.8
65	Insurance, reinsurance and pension funding, except compulsory social security	4.0	6.6
661	Activities auxiliary to financial service activities, except insurance and pension funding	5.9	7.7
68	Real estate activities	7.4	10.0
77	Rental and leasing activities	5.7	7.6
72	Scientific research and development	5.9	7.6
69-70	Legal and accounting activities	8.2	10.8
71+73-75 &58	Publishing activities, architectural and engineering activities; technical testing and analysis, advertising and market research other professional, scientific and technical activities and veterinary activities	7.3	10.5
60-63	Programming and broadcasting activities, Telecommunications, Computer programming, consultancy and related activities	7.9	11.3
78-82	Administrative and support service activities	6.4	8.4
84	Public administration and defence; compulsory social security	6.4	8.3
85	Education	5.9	7.6
86-88	Human health and social work activities	6.0	7.8
37 & 38	Sewerage and waste collection	4.2	6.2
R+59+1820	Creative, arts and entertainment activities, motion picture, video & television programmed production, sound recording, music publishing activities & reproduction of recorded media	6.0	7.7
S +33	Other service activities	-3.6	0.5
	Total	363.7	383.2

Source: Authors' calculations based on I-O Tables.

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