Research Report

MACROECONOMIC IMPACTS OF TOBACCO USE IN PAKISTAN

Social Policy and Development Centre

December 2018

The University of Illinois at Chicago's (UIC) Institute for Health Research and Policy is funding a global collaboration of economists to develop evidence-based policy support for effective tobacco tax policies in low- and middle-income countries that also have the highest tobacco consumption rates. The global collaboration on the economics of tobacco is facilitated through Tobacconomics, a web-based platform.

UIC is a core partner of the Bloomberg Philanthropies' Initiative to Reduce Tobacco Use. The Bloomberg Philanthropies initiative's main goals are to raise awareness of the harms caused by tobacco and assist low and middle-income countries implement strong tobacco control policies to reduce tobacco use. Over the past ten years, the initiative has supported 59 countries in passing tobacco control laws or policies, reaching nearly 3.5 billion people and saving an estimated 30 million lives.

The Social Policy and Development Centre (SPDC) is funded by the UIC Institute for Health Research and Policy to conduct economic research on tobacco taxation in Pakistan. The views expressed in this report cannot be attributed to, nor do they represent, the views of UIC, the Institute for Health Research and Policy, or Bloomberg Philanthropies.

Graphics and Designing
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Printed in Karachi by The Times Press (Pvt) Ltd.

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Acronyms

CMI	Census of Manufacturing Industries
CPI	Consumer Price Index
FAOSTAT	Food and Agricultural Organization of the United Nations
FBR	Federal Board of Revenue
FED	Federal Excise Duty
FTE	Full-Time Equivalent
GATS	Global Adult Tobacco Survey
GST	General Sale Tax
HIES	Household Integrated Economic Survey
IO	Input-output
KSE	Karachi Stock Exchange
LFS	Labor Force Survey
LSM	Large Scale Manufacturing
PBS	Pakistan Bureau of Statistics
PKR	Pakistani Rupee
WHO	World Trade Organization

I Introduction

Pakistan is among the high-burden countries with respect to the prevalence of tobacco use and its implications for public health. According to GATS (2014), 19.1 percent of adults in Pakistan used tobacco in any form, which may translate into a population of over 22 million adults. Consequently, prevalence of tobacco-related diseases is also high and various estimates indicate that tobacco use is associated with more than 100,000 deaths every year in the country.[1]

Tobacco taxation, widely considered as one of the crucial elements of tobacco control strategy, is being used as a policy measure at the governmental level for tobacco control in Pakistan, which serves a dual objective of public health promotion and revenue generation. The tobacco industry accounts for 2.2 percent of the large-scale manufacturing sector and contributes about 4 percent of the indirect tax revenue of federal government, which mainly comes through federal excise duty.[2] However, the level of taxes on tobacco in the country continues to be below the WHO-recommended level of 70 percent and cigarette prices are among the lowest in the world. Moreover, the structure of federal excise duty is complex and is based on price-tiers that favours low-priced brands, which leads to substitution among brands by the consumers. All of this together, calls for effective tax reforms aiming not only at raising the tax rates but also to make the system uniformed across the price levels.

A number of researches have shown that the demand for cigarettes and some other tobacco products is significantly and negatively correlated with the price in Pakistan[3], implying that tobacco taxation can be used as an effective policy tool for tobacco control in the country. Yet, tobacco taxation remains an under-researched area from various aspects. Particularly, no research is available on the macroeconomic impacts of tobacco use on the other sectors of economy – the forward and backward linkages[4] of the tobacco sector within the supply chain – which are important to estimate the full impact of tobacco taxes on the economy.

Therefore, the main objective of this research is to analyse the macroeconomic impacts of tobacco use in Pakistan. The study estimates the changes in output, income and employment resulting from changes in tobacco use and quantifies the impact of such changes on other economic sectors. It also reviews the existing tax structure, tax rates and tax administration mechanisms with regard to tobacco taxation in Pakistan and proposes policy recommendations on tax structure and administration reforms. The study is primarily based on quantitative methods; however, the analyses are supplemented by interviews of key informant and stakeholders to drive a deeper

[1]Source: As cited by Burki et al (2013) based on global burden of disease data (healthmetricsandevaluation.org/gbd); WHO (2015).

[2] Source: Federal Board of Revenue, Ministry of Finance, Government of Pakistan.

[3] For instance, Burki et al (2013), Mushtaq et al (2011), Qasim (2015) and Cevik (2016).

[4] An industry uses the input of other sectors of the economy in production process, which is referred to as 'backward linkages'. Output of this industry can also be used by other sectors in their production process, referred to as "forward linkages".

understanding of the issues. The study only focuses on cigarette manufacturing since there is no excise duty on smokeless tobacco products.

The study brings forward important insights about the tobacco taxation and the macroeconomic implications of tobacco consumption in the country. The findings show a small contribution of the sector into the national economy of Pakistan. For instance, despite being one of the largest tobacco growing countries, tobacco is not a major crop in Pakistan and accounts for only less than half per cent of the total value of agricultural produce and only 0.2 per cent of the total area under cultivation. Likewise, cigarette industry is not a major contributor in the manufacturing sector and GDP, with one percent share in total value-added of large-scale manufacturing and less than a half percent in industrial employment.

The study also reveals that due to the recent changes in the tobacco tax policy – introduction of a three-tier excise duty structure along with the reduction in average tax rate – potential revenue loss in 2017-18 was Rs 43 billion (1 percent of total tax revenue). Regarding macroeconomic implications, the findings suggest that redistribution of the expenditures from cigarette to food and education will produce more output, income and employment in the economy. Thus the reduction in consumption of cigarettes has an overall positive impact on the economy.

The report is organized in five sections. Section II briefly describes the tobacco sector and its contribution to the economy, including tobacco cropping, cigarette manufacturing and employment, and patterns of tobacco consumption. Section III reviews recent changes in the tobacco tax policy and their implications for prices and consumption of cigarettes and government revenues. Section IV provides estimates of the macroeconomic impacts of change in tobacco use on various sectors of economy while Section V presents simulation analysis of redirecting expenditures on tobacco consumption to other commodities. Section VI provides summary of conclusions and policy recommendations.

II A Brief Profile of Tobacco Sector in Pakistan

Pakistan ranked 9th in the world in raw tobacco production in 2016.[5] However, despite being one of the largest tobacco growing countries, tobacco remains a relatively minor crop in the agriculture sector of Pakistan, both in terms of area under cultivation and value of production. Currently, tobacco crop accounts for only 0.42 percent of the total value of agricultural produce.

The area under the tobacco crop has not exceeded 0.25 per cent of the total land under cultivation during the last two decades. As shown in Table 1, an area of 56,000 hectares was devoted for tobacco cultivation in 1999-00, which declined to 47,000 hectares in 2017-18. Although it remained fluctuating till 2014-15, a consistent declining trend was observed in recent years. Correspondingly, percentage share of tobacco in total cropped area also declined from 0.25 to 0.2 during the same period.

Currently, Pakistan produces 100,000 tonnes of raw tobacco. On average, the level of raw tobacco production in the country remained slightly over 100,000 tonnes during 1999-00 and 2017-18. It peaked in 2013-14 (130,000 tonnes) and showed a downward trend thereafter. The decrease in production somewhat corresponds to the decrease in the area under cultivation. The level of farm employment is also low in the sector. According to estimates based on Pakistan's Labor Force Survey 2014-15, only 8,200 people are employed in the growing of tobacco, which constitutes only 0.03 percent of the total agriculture employment in the country.

Table 1: Area under cultivation and tobacco production

Year	Total cropped area (million hectares)	Area under tobacco (000 hectares)	Share of area under tobacco cultivation (%)	Production of tobacco '000' Tonnes
1999-00	22.7	56	0.25	108
2004-05	22.8	50	0.22	101
2009-10	23.9	56	0.23	119
2010-11	22.7	51	0.22	103
2011-12	22.5	46	0.20	098
2012-13	22.6	50	0.22	108
2013-14	22.2	49	0.22	130
2014-15	23.3	54	0.23	120
2015-16	23.7	53	0.22	116
2016-17	23.3	47	0.20	100
2017-18	23.3	47	0.20	100

Source: Economic Survey of Pakistan, Finance Division, Government of Pakistan.

[5] FAOSTAT, Food and Agricultural Organization of the United Nations. 2016. Available at: http://faostat.fao.org/site/291/default.aspx. Accessed September 12, 2018.

CIGARETTE MANUFACTURING

Similar to tobacco cropping, the contribution of cigarette industry in the economy is also small in terms of output and employment. Estimates show that the share of the cigarette industry in total industrial output (in terms of value of production) was only 1.11 percent in 2017-18; it has decreased from 1.63 percent in 2010-11 (Table 2). Correspondingly, the share of cigarette industry in the overall employment also declined from 0.5 percent in 2010-11 to 0.3 percent in 2017-18. According to the estimates based on the Pakistan Labor Force Survey 2014-15, only 23,000 people were employed in this sector, which includes both formal and informal manufacturing of cigarettes.

Table 2: Share of cigarette industry in the production and employment

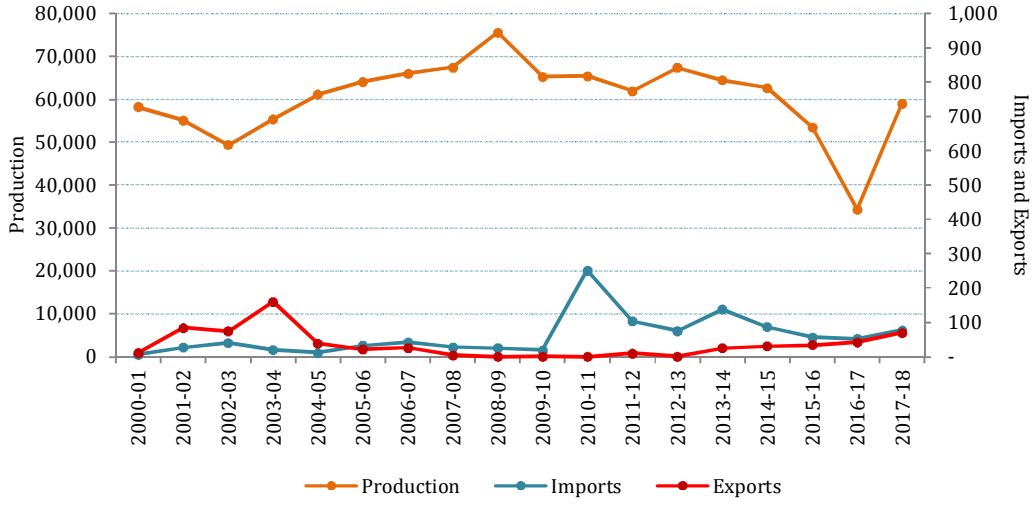
	Share in industrial production[a]	Share in industrial employment
2010-11	1.63	0.5
2014-15	1.37	0.3
2017-18	1.11	-

[a]At constant factor cost of 2005-06.
Source: Economic Survey of Pakistan and Labor Force Survey of Pakistan. (see Annexure-I for calculations)

Figure 1 provides trend of the domestic production of cigarettes along with imports and exports from 2000-01 to 2017-18. Domestic production of cigarettes increased from 49 billion sticks in 2002-03 to 75.6 billion sticks in 2008-09, which thereafter followed a declining trend till 2016-17 and dropped to 34.3 billion sticks. It increased again in 2017-18 by 72 percent to reach 59 billion stick. This surge was associated with reduction of tax rate (as discussed later in this section). The imports increased from 5.8 million sticks in 2000-01 to 90.6 million sticks in 2017-18 while exports have also shown an increase from 11.8 million sticks to 73.5 million. However, it is important to note that the quantity of imports/exports is negligible relative to domestic production.

It is interesting to note that the production of raw tobacco by agriculture sector and production of manufactured cigarettes do not appear to have followed a similar trend, particularly in the absence of significant imports.

Figure 1: Domestic production, imports and exports of cigarettes (million sticks)



Source: Economic Survey of Pakistan, Pakistan Bureau of Statistics

CIGARETTE CONSUMPTION

Per capita consumption and price of cigarettes in Pakistan during 2009-10 and 2017-18 is presented in Table 3. Total consumption of cigarettes is estimated by using following identity:

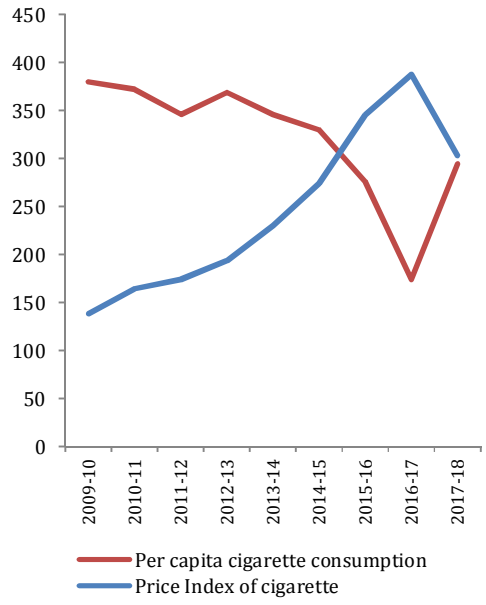
Consumption of cigarettes = Domestic production of cigarettes – exports + imports

Dividing the total consumption of cigarettes by total population gives us the per capita consumption of cigarettes. The result shows that per capita consumption of cigarettes has decreased from 380 cigarettes in 2009-10 to 174 cigarettes in 2016-17. One of the reasons for this decline in the consumption is consistent increases in tobacco prices. However, cigarette consumption increased again in 2017-18 to 294 cigarettes per capita, which can be attributed to decrease in the prices of cigarettes – the price index fell by 84 points in one year.

The relationship between per capita consumption and the price level is depicted in Figure 2 by comparing the average annual growth rates of the two for different periods between 2000 and 2018. During 2000 and 2010, per capita consumption of cigarettes increased by 1.7 percent per annum while prices increased by 8.9 percent. However, during 2010-2017, consumption dropped by 9.5 percent while prices increased by 16 percent. In 2018, the consumption observed a growth of 68.8 percent when the price level declined by 21.7 percent. This clearly shows that price increases have a strong impact on the level of consumption of cigarettes in the country. The decline in tobacco consumption is also evident from Household Integrated Economic Survey (HIES) of the Pakistan Bureau of Statistics (as discussed in the following paragraphs).

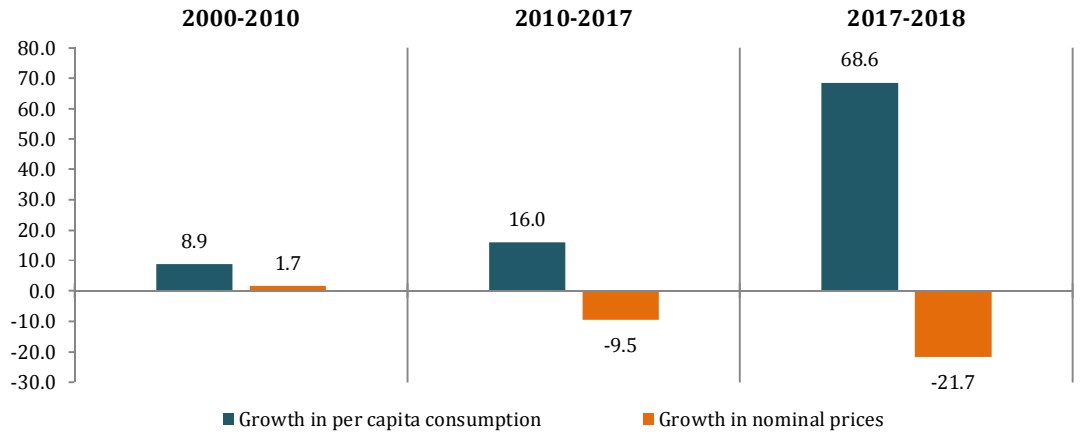
Table 3: Relationship between price of cigarette and per capita consumption

Years	Population	Consumption of cigarettes	Per capita cigarette consumption	Price Index of cigarette
	Million	Billion sticks	Numbers	2007-08=100
2009-10	171.7	65.3	380	138.1
2010-11	175.3	65.6	372	164.0
2011-12	178.9	62.0	346	173.9
2012-13	182.5	67.5	369	193.3
2013-14	186.2	64.6	346	229.8
2014-15	189.9	62.7	330	274.0
2015-16	193.6	53.5	276	345.1
2016-17	197.3	34.4	174	387.6
2017-18	201.0	59.1	294	303.4



Source: Economic Survey of Pakistan.

Figure 2: Average annual growth rate of cigarette consumption and price of cigarettes in Pakistan (2000 to 2018)



Source: Economic Survey of Pakistan, Pakistan Bureau of Statistics

According to estimates based on the HIES 2015-16, on an average, households in Pakistan spend 2.7 percent of their consumption expenditures on tobacco and tobacco products (Table 4). This proportion is somewhat higher for rural than for urban households. Expenditure by income groups indicates a higher expenditure on tobacco products by low and middle-income households.

Table 4: Distribution of monthly consumption expenditure per household on tobacco products as percentage of monthly expenditures

Quintiles	Total	Urban	Rural
1st Quintile	3.16	2.76	3.22
2nd Quintile	3.06	3.15	3.03
3rd Quintile	2.93	2.98	2.91
4th Quintile	2.81	2.72	2.88
5th Quintile	2.22	2.04	2.54
Total	**2.70**	**2.42**	**2.90**

Source: Estimates based on HIES data.

Further, the HIES data shows that during 2010-11 and 2015-16 per capita expenditure on cigarettes in real terms decreased by 8.8 percent (Table 5). The main reason for this decline in consumption seems to be the prices of cigarettes, which increased by 16 percent during the same period. This supports the findings of the time series data. The data shows a relatively higher decrease for low and upper middle-income group.

Table 5: Per capita monthly expenditures on cigarette by income group

Quintiles	Per capita monthly expenditure (nominal)		Per capita monthly expenditure (real at 2010-11 prices)		Average annual growth rate 2010-11 to 2015-16 (%)
	2010-11	2015-16	2010-11	2015-16	
1st Quintile	20.44	29.02	20.44	13.8	-7.57
2nd Quintile	27.05	34.66	27.05	16.5	-9.45
3rd Quintile	31.15	39.21	31.15	18.6	-9.77
4th Quintile	36.79	47.39	36.79	22.5	-9.35
5th Quintile	45.01	63.3	45.01	30.1	-7.75
Total	**32.09**	**42.71**	**32.09**	**20.3**	-8.76
Cigarette Price Index (2010-11 =100)	100.0	210.5			16.05

Source: HIES, 2010-11 and 2015-16, Economic Survey, Government of Pakistan.

III Tobacco Taxes and Prices

In addition to government's objective of discouraging smoking for promoting public health, tobacco taxation in Pakistan also serves the purpose of revenue generation. Particularly, after the ban on consumption of alcohol in 1976, cigarettes acquired more prominence as a source of revenue for the federal government. While efforts have consistently been made to enhance revenues from tobacco sector, fiscal policy is yet to be used effectively for curbing the consumption of tobacco and its products.

TOBACCO TAXATION IN PAKISTAN

In Pakistan, the government levies a variety of taxes on cigarettes and tobacco products (Table 6). There is a tobacco development cess levied by provincial governments on the output from cultivation of tobacco. The tobacco development cess is a relatively small source of revenue due to small production base. The Federal Excise Duty (FED) on cigarettes is the largest source of revenue from the tobacco sector. The FED accounts for almost 80 percent of the revenue from the sector. The second largest revenue source is the domestic sales tax on the production of cigarettes.

Table 6: Various indirect taxes imposed on the tobacco in Pakistan

Tax Name	Stage	Collecting Authority
Federal Excise duty	Retail price	Federal Board of Revenue
General Sale Tax on Goods (GST)	Retail price	Federal Board of Revenue
Custom Duty	Import value	Federal Board of Revenue
Regulatory duty	Import value	Federal Board of Revenue
Tobacco Development Cess	Tobacco crop production	Provincial Tax Authorities

Source: FBR; Budget documents of provincial governments.

Table 7: Contribution of tobacco taxes to indirect tax revenues

Year	Federal Excise Duty		General Sales Tax (domestic)		Total	
	Rs Billion	% contribution	Rs Billion	% contribution	Rs Billion	% contribution
2009-10	44.6	5.6	10.9	1.4	55.5	6.9
2010-11	46.8	4.9	11.5	1.2	58.3	6.1
2011-12	53.2	4.7	12.5	1.1	65.7	5.7
2012-13	61.7	5.1	14.5	1.2	76.2	6.3
2013-14	71.4	5.2	17.7	1.3	89.1	6.5
2014-15	81.9	5.3	21.0	1.4	102.9	6.6
2015-16	90.5	4.8	23.8	1.3	114.3	6.0
2016-17[6]	66.4	3.3	17.4	0.9	83.8	4.2
2017-18[7]	69.3	3.0	18.2	0.8	87.5	3.8

Source: FBR Yearbook, Federal Board of Revenue, Government of Pakistan, various issues

[6] Retrieved from https://fp.brecorder.com/2018/09/20180902403968/

[7] ibid

The contribution of tobacco taxes to total indirect tax revenue is given in Table 7, which shows a declining trend where the combined share of two major taxes (FED and GST) decreased from 6.9 percent in 2009-10 to 3.8 percent in 2017-18. The drop is mainly due to FED which showed a decline of 2.6 percentage points. The revenues in rupee terms also fell significantly after 2015-16 both from FED and GST. The remaining part of this section focuses on the structure of FED, the recent changes in the tax rates and its implications for the prices and revenues.

STRUCTURE OF FEDERAL EXCISE DUTY

The structure of federal excise duty on cigarettes in Pakistan has historically been a complicated mix of a specific tax on low-priced brands, an *ad valorem* tax on high priced brands, and a combined specific and *ad valo*rem tax on mid-priced brands.[8] In 2013, the *ad valorem* tax was withdrawn with the introduction of a two-tier structure of specific taxes based on range of retail prices (exclusive of GST). Until 2016-17, the two-tier system remained intact with annual upward revision of tax rates of both tiers. Overall, rate for Tier 1 increased by 75 percent (from Rs 880 to Rs 1,536 per 1000 sticks) during 2013-2017, while the tax rate increase for Tier 2 was 46 percent.

In 2017, the federal government introduced a three-tier excise duty structure for cigarettes – with a new tier for the low-priced brands (Table 8). The reason for this move, as stated by the government, was to eliminate the illicit trade of cigarettes by reducing the price differential for the lowest tier and enhancing revenue by increasing the share of duty-paid cigarettes. The Federal Finance Minister, in his budget speech of 2017-18 said:

> *" …in order to enhance duty from this non-essential sector, to discourage cigarette smoking and to arrest the declining revenue trends from this sector, the rate of duty is enhanced on the existing tiers of the cigarettes. Moreover, a new tier is being introduced this year to document and curb the menace of illicit trade of sub-standard low-priced cigarettes."*[9]

Table 8: Structure of federal excise duty on cigarettes

Tier/Price per thousand sticks	FED Rate
2013-14	
Tier 1: ≤ Rs 2,286	Rs 880
Tier 2: > Rs 2,286	Rs 2,350
2014-15	
Tier 1: ≤ Rs 2,706	Rs 1,085
Tier 2: > Rs 2,706	Rs 2,632
2015-16	
Tier 1: ≤ Rs 3,600	Rs 1,420
Tier 2: > Rs 3,600	Rs 3,155
2016-17	
Tier 1: ≤ Rs 4,000	Rs 1,536
Tier 2: > Rs 4,000	Rs 3,436
2017-18	
Tier 1: ≤ Rs 2,950	Rs 800
Tier 2: > Rs 2,950 ≤ Rs 4,500	Rs 1,670
Tier 3: > Rs 4,500	Rs 3,740
2018-19	
Tier 1: ≤ Rs 2,950	Rs 848
Tier 2: > Rs 2,950 ≤ Rs 4,500	Rs 1,770
Tier 3: > Rs 4,500	Rs 3,964

Source: FBR

Further, according to a news report, published in daily *Business Recorder,* which referred to FBR documents: "… the decline in market share of duty-paying legitimate cigarette industry is evident from the following data of cigarettes sold by two major multinational companies which contribute almost 98% of the tax revenues from tobacco industry: During the period of 2015-16, 54,177 million sticks were sold and during the period 2016-17, 29,278 million sticks were sold.[10] To help

[8] Burki et al (2013)

[9] Federal Budget Speech 2017-18, Ministry of Finance, Government of Pakistan.

[10] These figures may not match with those presented in Table 3 because: a) data sources of the two are different and b) figures given in Table 3 are adjusted for imports and exports.

the legitimate cigarette industry regain its lost volumes that tax evading sector has taken and the government its lost revenue, a third tier of federal excise duty was introduced through Finance Act, 2017 prescribing federal excise duty @ Rs 800 per thousand cigarettes which has enabled duty paying cigarette industry to sell their lower brands at around Rs 48 per 20 cigarettes packet, still significantly higher than cigarettes marketed by non-duty paying segment of cigarette industry. Introduction of third tier has helped the government recoup its lost revenues indicated from the fact that during period of 2017-18, 57,955 million sticks were sold and FED & sales tax revenue was Rs 87,529 million."[11] These claims do not hold true as discussed in the following paragraphs.

As shown earlier, a significant decline was observed in the overall price index of cigarettes in 2017-18. Table 9 gives the effective rates[12] of excise duty for the lowest tier of cigarettes in Pakistan for 2014 and 2018. It appears that the effective (or average) tax rate for the low-priced cigarette decreased from 40.1 percent in June 2014, to 28.7 percent in April 2018. This fall in the excise duty led to a decrease in the price of cigarettes in Pakistan.

Table 9: The effective excise duty rate for the lowest tier

	Jun-14	Apr-18
Retail Price for Lowest Tier (PKR)	2,706	2,950
Excise Duty for Lowest Tier (PKR)	1,085	848
Effective Excise Duty (%)	**40.1**	**28.7**

In order to estimate the incidence of excise duty on different local brands, we have computed the effective excise duty for four cigarette brands namely Morven Gold, K2, Capstan and Gold Leaf. The first brand can be termed as low-priced, the following two as mid-priced and the last one as high-priced. It is important to note that for the low-priced brand (Morven Gold), the effective rate of duty was more than 50 percent in 2014 which was decreased to less than 30 percent in 2017. For K2, it remained same around 70 percent and for Capstan the duty increased from 67 percent to 72 percent during the same period. For Gold Leaf, the duty declined from 58 percent in 2014 to 54.5 percent in 2017. It is clear that for the low-priced brand (Morven Gold), the effective duty rate has decreased significantly.

RELATIONSHIP BETWEEN TAX REVENUE, PRODUCTION AND PRICE LEVEL

Tax revenue is linked both to production quantity and the price level. In order to understand what explains the changes in tax revenue, we analyzed the growth rates of tax revenue, production and price level of cigarettes in Pakistan from 2010-11 to 2017-18 (Table 10). During 2010-11 to 2016-17, the tax revenue from cigarette has shown an average growth rate of 7.2 percent per annum, where production has shown a negative growth rate of 7.7 percent and nominal and real price of cigarettes has shown a positive growth of 16 percent and 8.2 percent, respectively. This indicates that during this period the increase in tax revenue was due to an increase in the price of cigarettes. Reduction in domestic production of cigarettes indicates a decrease in the consumption of cigarettes, as mentioned earlier. In 2016-17, the tax revenue from cigarette declined by 26.7 percent due to a decrease in the production of cigarettes by 35.8 percent. In the same year, nominal prices increased by 12.3 percent.

[11] Retrieved from: https://fp.brecorder.com/2018/09/20180902403968/

[12] These are average tax rates calculated by dividing the revenue by the retail price.

Figure 3: Effective excise duty, price for local cigarette brands

Source: Pakistan Bureau of Statistics, FBR.

In 2017-18, however, the numbers indicate that the three-tier structure failed to generate additional tax revenue, which is contrary to the government's claim. Domestic production increased by 72 percent, while tax revenue increased by only 4.5 percent. The introduction of a three-tier structure actually led to a decrease in the effective rate of excise duty, as estimates show that the tax rate decreased by 11.7 percent. This decrease in tax rate not only led to the reduction in the price of cigarettes but also resulted in shrinking the growth in tax revenue (see Table 11).

Table 10: Year-wise growth rate of tax revenue, production, prices of cigarettes in Pakistan

Years	Tax revenue	Production	Nominal price of cigarettes	Real price of cigarettes
2010-11	4.92	0.17	18.74	4.47
2011-12	12.74	-5.27	6.05	-4.47
2012-13	15.97	8.75	11.13	3.52
2013-14	16.89	-4.30	18.89	9.45
2014-15	15.55	-2.81	19.25	14.08
2015-16	11.07	-14.59	25.95	22.46
2016-17	-26.72	-35.84	12.29	7.81
2017-18	4.49	71.98	-22.18	-25.24
ACGR 2010-11 to 2016-17	7.20	-7.70	16.04	8.19
ACGR 2010-11 to 2017-18	6.86	2.26	11.27	4.01

Note: Calculations are based on the following data sources:
1) FBR Yearbook, Federal Board of Revenue, Government of Pakistan, various issues
2) Economic Survey, Government of Pakistan, various issues

Table 11: Effective rate of federal excise duty

Years	Excise Duty (Rs Million) A	Production (Million Sticks) B	Production at 2005-06 prices (Rs Million) C	Cigarette Price (2005-06=100) D	Production at current prices (Rs Million) E= C*D	Effective tax rate (%) F=A/E*100
2000-01	16,005	58,259	46,952	69.3	32,535	49.2
2001-02	16,242	55,100	44,406	80.5	35,746	45.4
2002-03	16,995	49,365	39,784	83.8	33,346	51.0
2003-04	18,088	55,399	44,647	84.1	37,545	48.2
2004-05	21,609	61,097	49,239	95.4	46,991	46.0
2005-06	22,887	64,137	51,689	100.0	51,689	44.3
2006-07	28,353	65,980	53,174	110.4	58,690	48.3
2007-08	28,472	67,446	54,355	115.9	63,001	45.2
2008-09	36,797	75,609	60,934	126.0	76,779	47.9
2009-10	44,615	65,292	52,620	160.1	84,235	53.0
2010-11	46,754	65,403	52,709	190.1	100,188	46.7
2011-12	53,176	61,954	49,929	201.6	100,646	52.8
2012-13	61,662	67,377	54,300	224.0	121,643	50.7
2013-14	71,394	64,482	51,967	266.3	138,411	51.6
2014-15	**81,929**	**62,667**	**50,504**	**317.6**	**160,403**	**51.1**
2015-16	90,544	53,522	43,134	400.0	172,552	52.5
2016-17	66,000	34,342	27,677	449.2	124,328	53.1
2017-18	**69,300**	**59,058**	**47,596**	**351.6**	**167,354**	**41.4**

Source: Economics Survey of Pakistan, FBR Year Book
Note: Revenue collection for 2017-18 is retrieved from: https://fp.brecorder.com/2018/09/20180902403968/.

It is important to note that in 2014-15 the production at current prices was Rs 160 billion and cigarette production and excise duty collection was 62.5 billion sticks and Rs 81.9 billion, respectively. However, in 2017-18, the production at current prices was 167 billion (Rs 7 billion higher than 2014-15 value) and the production of cigarette was 59 billion sticks, 3 billion less than in 2014-15, but the excise duty collection was Rs 69 billion – Rs 13 billion less than in 2014-15. Thus, despite an increase in the value of production, tax revenue declined.

An argument generally put forwarded by the industry is that any increase in tax rates leads to fall in production and also in the profitability of firms. However, as shown in Figure 4, there is a positive relationship in general between tax rate and gross profits of the firms in Pakistan.

Figure 4: Relationship between FED rate and growth rate of gross profit of firms

Source: Financial statement of companies listed with the Karachi Stock Exchange.
Note: The profit data includes Phillip Morris (Pakistan), Pakistan Tobacco Company and Khyber Tobacco Company.

REVENUE LOSS

In order to calculate the revenue loss due to the introduction of three-tier excise duty structure, we estimated the potential tax revenue. Table 12 depicts the trend in effective excise duty per 1,000 cigarettes. The data shows that in 2009-10 the excise tax revenue per 1,000 cigarettes was Rs 683, which increased to Rs 1,932 in 2016-17 and later declined to Rs 1,174 in 2017-18. By applying the previous rate on the production of 59.1 billion sticks the government would have collected Rs 114.1 billion in 2017-18, which is 65 percent higher than what was actually collected.

Table 12: Excise duty and domestic production 2009-10 to 2017-18

Years	Excise Duty (A)	Domestic Production (B)	Excise duty per 1000 cigarettes (A/B)*1000
	Rs Billion	Billion (number)	Rupees
2009-10	44.6	65.3	683
2010-11	46.8	65.4	715
2011-12	53.2	62.0	858
2012-13	61.7	67.4	915
2013-14	71.4	64.5	1,107
2014-15	81.9	62.7	1,307
2015-16	90.5	53.5	1,692
2016-17	66.3	34.3	1,932
2017-18	69.3	59.1	1,174

Source: Economics Survey of Pakistan, FBR Year Book
Note: Revenue collection for 2017-18 is retrieved from: https://fp.brecorder.com/2018/09/20180902403968/.

For a more robust analysis, we have estimated the following equation to find the potential level of revenue from a given level of production:

$$lntax_t = \alpha + \beta * lnQ_t + \gamma timetrend + \mu$$

$lntax_t$= log of tax (excise and sales tax) in year t

lnQ_t = log of production of cigarettes in year t

Time trend = 2000=1, 2001 = 2 ,……, 2018 = 18

We have estimated the above equation by using the data from 2000 to 2017, the estimated equation is given below:

$$lntax_t = 5.58 + 0.37 * lnQ_t + 0.12 * timetrend$$

P-Value (0.007) (0.038) (0.000)
R-Square = 0.9771, F-Stat = 267.18

In order to estimate, the potential tax revenue in 2017-18 we have plug in the following values into the above equation and solve it:

Cigarette production in 2017-18 = 59.05 billion stick $lnQ_{2017\text{-}18}$ = 10.99

Time trend value = 18

$$lntax_t = 5.58 + 0.37 * 10.99 + 0.12 * 18$$

$$lntax_t = 11.78$$

Taking the anti-log of above gives us the estimated tax revenue (potential tax revenue) from 2017-18 production.

Based on the above methodology, potential tax revenue from cigarettes for 2017-18 is estimated to be Rs 130.1 billion.

The actual tax revenue from cigarette industry for 2017-18 was Rs 87.5 billion. Therefore, the revenue loss due to this three-tier structure is:

Rs 130.1 billion – Rs 87.5 billion = **Rs 42.6 billion**

Thus, the results do not validate the government's claim regarding additional revenue by reducing illicit trade through reducing prices for the lowest tier.

It is important to note that during 2010-11 and 2015-16, the consumption of tobacco decreased significantly. The main reason for this decline was increase in the prices of cigarettes due to increase in tax rate. However, in 2017-18 the government reduced the tax rate which may have led to an increase in the consumption of cigarettes in Pakistan. Unfortunately, the information regarding the use of tobacco in 2017-18 is not available. However, information on production and tax revenue reveals that the reduction in the duty for low-priced cigarette led to a lower revenue for the government.

IMPLICATIONS OF THREE-TIER TAX STRUCTURE: INSIGHTS FROM THE FIELD

In order to analyze the statutory and actual retail prices and trade margins of cigarette retailers, a small survey of 40 tobacco retailers in 4 major cities of Pakistan was conducted. An important finding that emerged from the survey is that there are very few brands that lie in the second tier while tier1 and tier 3 combined cover more than 95 percent of the retail sale.[13]

A cigarette brand falls under the lowest tier if the retail price is Rs 59 per 20 cigarettes or less while the highest tier brands have a retail price of more than Rs 126 per 20 cigarettes. The survey data reveals that there exists a difference between the printed (statutory) price and the actual sale price of cigarettes at the retail stage. For the lowest tier, a brand with printed price of Rs 58 was being sold at Rs 60. For the highest brands, this difference is even large (see Table 13). Actual price margins of the retailers are estimated to be 4.3 and 5.3 percent for the lowest and highest tiers respectively.

Table 13: Price margins of retail sale of cigarettes (Rupees)

	Distributor's Price	Printed Price	Sale Price	Actual Price Margins (%)*
Lowest tier brands	57.5	58.0	60.0	4.3
Highest tier brands	144.4	146.3	152.0	5.3

*Price margins are the sale price as a percentage of distributor's price.

With a sale price of Rs 60, most of these brands would lie in the second tier of the FED. Table 14 shows the applicable tax revenue and prices of the lowest-tier brands if the printed retail prices is increased to match the actual sale price. It appears that the unregulated sale price has led to a revenue loss of Rs 21.4 per pack of 20 cigarettes. Retail sale of cigarettes at a higher price also indicates that tobacco consumers are willing to pay higher prices, which justifies the increase in tax rate for cigarettes for all the tiers.

Table 14: Impact of price difference on tax revenue (Rupees)

	Ex-Factory Price	FED	GST (17%)	Trade Margins	Retail Price	Tax Revenue per pack
Printed retail price	32.5	17.1	8.4	0	58.0	25.5
Actual sale price	32.5	17.1	8.4	2	60	25.5
Statutory price	32.5	35.4	11.54	2	81.44	46.9
Revenue Loss	**-**	**18.3**	**3.14**	**-**	**21.44**	**21.4**

Based on the price margins, the volume of retail margins is estimated to be Rs 143 billion (Table 15), which could be tapped by the provincial governments as a tax-base for GST on services. It is important to mention that GST on goods is collected by the federal government while GST on services comes under the domain of provincial governments as per the Constitution of Pakistan.

Table 15: Magnitude of retail margins

Average Weighted Retail Prices of Cigarettes in Pakistan 2017-18	Rs 50.76
Price Margin	4.8 Percent
Price margins per pack of cigarettes based on weighted retail prices	50.76 x 0.048 =Rs 2.4
Declared consumption of Cigarettes	59.1 billion sticks
Value of retail margins	**2.4 x 59.1 = Rs 143.1 billion**

In order to understand the problems that provincial revenue authorities are facing in term of taxing retail services in Pakistan, face-to-face meetings were held with the heads of Punjab Revenue Authority, Khyber Pakhtunkhwa Revenue Authority and Sindh Revenue Board. Currently, wholesale and retail trade are not treated as services and hence come under the ambit of FBR.

[13] It was also validated in the meetings with FBR officials that the federal excise duty collection under the second tier is very small.

However, Punjab government collects services tax on commission from wholesalers and retailers. The main issue as highlighted by provincial tax authorities is that since cigarette is a good, so the trading (wholesale and retail) is also treated as good. However, the provincial tax authorities of Punjab and Khyber Pakhtunkhwa have shown interest in developing tax policy for taxing the wholesale and retail trade services.

In Pakistan, GST is collected as a value-added tax and is applicable at the retail stage as well. However, due to tax administration issues, the retail stage component of tax is also collected at the manufacturing stage. This leads to a situation where any tax evasion at manufacturing level cannot be captured at any subsequent stage. Therefore, the introduction of GST on wholesale and retail trade will not only provide additional tax revenue to the government, but will also allow the government to curb the tax evasion.

IV Measuring the Inter-Sectoral Linkages of Cigarette Industry

Objective of this section is to estimate income, output and employment multipliers for the cigarette industry in order to measure the macroeconomic impact of changes in tobacco use on different sectors of the economy. Output multipliers measure the effect of one-unit change in the final demand of a specific product. Employment multipliers measure the effect on employment (in Full-Time Equivalent terms – FTE) of one-unit change in the final demand while the income multiplier is defined as the change in the total value of income from wages, salaries and supplements due to change in the final demand for output of an industry.

We have used industry input-output table for the Pakistan's economy prepared and updated by the Federal Board of Revenue (FBR). This table refers to the financial year 2010-11 and has been constructed using 86 industry input-output tables. Technical details are provided in Annexure-II.

The effect of cigarette industry on other industries in the economy has been measured in two ways. If production of tobacco industry is decreased, there will be a reduction in demand in the industries which produce the intermediate inputs for cigarette industry. Impacts based on this type of relationship are called backward-linkage models. Similarly, reduction in the production of cigarette industry will also have an impact on the supply of tobacco industry output for other sectors that use its production. Impacts based on this type of relationship are called forward-linkage models. Other key terminologies are listed in Box 1.

Box 1: Key Terminologies

Input-output (IO) table: IO tables show inter-industry relationships within an economy, showing how output from one industrial sector may become an input to another industrial sector.

Final demand: is the use of output for consumption, investment, government expenditure and exports.

Initial effect: impact of changes in final demand of cigarettes on the output, income and employment of cigarette industry.

Direct effect: impact of changes in the final demand on the output, income and employment of input suppliers to cigarette industry.

Indirect effect: impact of changes in final demand of cigarettes on the output, income and employment of the sectors that supply inputs to the sectors that supply inputs to cigarette industry.

Consumption induced effect: impact of changes in final demand of cigarette on the output of cigarette industry due to changes in consumption and wages.

The following part of this section briefly discusses the structure of cigarette industry and provides estimates of output, income and employment multipliers. It is also important to note that this section only reports gross effect results, without adjusting for the re-distributional effect of consumption on other sectors of the economy, which is the focus of Section V that presents net multiplier values.

INPUT-OUTPUT STRUCTURE OF CIGARETTE INDUSTRY

The input-output table gives structural information about the tobacco sector (manufacturing of cigarettes) in Pakistan and its linkages with the rest of the economy. The data shows that total output of the cigarette industry was Rs 570 billion (2010-11). In order to produce this output, the cigarette industry used intermediate inputs of Rs 283 billion from agriculture, industry and services sectors (Table 16). At sector level, the cigarette industry used input of Rs 0.37 from services, Rs 0.07 from industry and Rs 0.05 from agriculture sectors to produce output of Rs 1. The Rs 287 billion figure is the value added[14] by the cigarette industry. One important finding is that the supply of this sector is not used as an input in other sectors since cigarettes are final consumption product directly used for consumption by individuals. In other words, the cigarette industry has no forward linkages, it has only backward linkages.

Table 16: Input-output structure of the cigarette industry

	(Rs Million) Cigarette Industry
Agriculture	27,530
Industry	42,101
Services	213,418
A. Intermediate input use across sector	**283,049**
B. Value added	**286,993**
C. Total output	**570,041**

SHARE OF WAGES AND CONSUMPTION

Household sector receives wages for work done in the cigarette industry and spends some or all of this wage income on goods and services. Using the input-output table, Table 17 shows the wages & salaries received by employees working in the cigarette industry and final private consumption expenditure by the household on cigarettes. The share of wages in total output is 1.14 percent which is much lower as compared to other sectors of the economy – the aggregate share of wages in all the sectors is more than 10 percent. This indicates that the size of income multiplier for the cigarette industry would be relatively low. The share of final private consumption in total private consumption is 3 percent – showing a relatively large consumption-induced effect for the cigarette industry multipliers.[15]

Table 17: Wage and consumption share for cigarette industry

Heads	2010-11 Value
Wages & salaries	6,495
Total output	**570,041**
Share in total output	**1.14%**
Household consumption expenditures on cigarettes	467,825
Total household expenditures	**3%**

OUTPUT MULTIPLIERS

We now present the output multiplier effects for changes in demand for the cigarette industry. The output multiplier for cigarette industry is defined as the total value of production by all

[14] Value added = total value of production – total value of input use

[15] The multiplier effect is an economic term referring to how an increase in one economic activity can cause an increase throughout many other related economic activities.

industries of the economy required to produce one extra rupee worth of final demand for that industry's output.

To estimate the output multipliers, the first task is to estimate the technical coefficient for cigarette manufacturing, which indicates the direct effect of changes in the production of cigarette industry on other sectors/industries. As shown earlier, cigarette production used intermediate inputs of Rs 0.496 to produce output of Rs 1.0 implying that if final demand of the sector is decreased by Rs 1.0 billion, cigarette industry will reduce its demand for input by Rs 0.496 billion from other sectors. Table 18 presents industry-wise breakdown of the direct effect of changes in the output of cigarette industry on the other sectors. The major sectors with back-ward linkages to the cigarette industry include trade, paper & printing, tobacco and roads. These four sectors would absorb 97 percent of the total direct effect with the trade sector being the largest.

Table 18: Intermediate inputs used by cigarette industry (industries with highest direct effect)

Industries	Value of Input	Direct effect
Trade	188,358	0.3304
Paper & printing	38,240	0.0671
Tobacco	27,343	0.0480
Road	20,664	0.0362
Other chemicals	1,878	0.0033
Railway	1,861	0.0033
Insurance	1,565	0.0027
Electricity, water works & supply	866	0.0015
Refined petroleum	402	0.0007
Other Sectors	1,872	0.0033
Direct Effect	**283,049**	**0.4965**

The indirect effect shows the impact on the sectors which supply inputs to the input-supplying sector of cigarette industry. The indirect effect is estimated to be 0.41.

Table 19 provides the estimates of Type-I (simple) output multiplier and Type-II (total) output multiplier. The simple multiplier ignores the changes in output due to changes in consumption and wages. Accordingly, the value of simple multiplier (1.91) indicates that a Rs 1.0 billion decrease in final demand for cigarettes will reduce output of the economy by Rs1.9 billion.

Table 19: Output multipliers for cigarette industry of Pakistan

Type of Multipliers	Cigarette Industry
A. Initial effect	1.000
B. Direct effect	0.50
C. Indirect effect	0.41
D. Type I (simple)	**1.91**
E. Consumption induce effect (F-D)	0.99
F. Type II (total) multiplier	**2.90**

Consumption expenditure by households also leads to additional demand (or output) in the economy. This induced production of extra goods and services is referred to as the consumption-induced effects. The total multipliers are calculated considering the initial effects, the production-induced effects and the consumption-induced effects. The total output multiplier for the 'cigarette industry' in Pakistan is estimated to be 2.9. This implies that an additional output of Rs 2.9 is required from all industries to satisfy an increased consumption of Rs 1.0 in the cigarette industry, as well as to satisfy the additional demand generated by the increased wages, salaries and

supplements resulting from all increased output. In other words, output of the economy will decrease by Rs 2.9 billion due to reduction of Rs 1.0 billion in the final demand for cigarettes.

Table 20 lists the most affected sectors due to change in the final demand for cigarette in Pakistan, except for cigarette industry itself.[16] The second most affected sector in this case is the domestic trade (wholesale and retail trade) that supplies inputs to cigarette industry. The third most affected sector is banks and other credit institutions, because large part of the industry is in the formal sector that uses financial instruments for transactions. Road and paper & printing are also among the sectors that are significantly affected. Overall, the results show that the magnitude of changes in the cigarette demand on the other sectors is small.

Table 20: Top 5 Sectors affected by changes in the final demand of cigarette industry: Based on Type II output multiplier

Sectors	% Contribution into multiplier
Trade	14.0
Banks and other credit institutions	13.0
Road	4.2
Paper and printing	3.4
Livestock and slaughter products	2.3

INCOME MULTIPLIERS

The income multiplier is defined as the change in the total value of income from wages, salaries and supplements due to change in the final demand for the output of an industry. As mentioned earlier, the share of wages and salaries in the cigarette industry is 1.14 percent (Table 17), implying that a change in final demand would lead to a small income effect.

Estimates for Type I and Type II income multipliers for cigarette industry in Pakistan are presented in Table 21. The results show that a reduction of Rs 1.0 billion in the final demand for cigarettes will have an initial effect of Rs 0.008 billion on the income of the people employed in cigarette industry. The sectors which directly supply inputs to the cigarette industry will decrease the demand for labor and their wage bill will be reduced by Rs 0.065 billion (direct effect). The wage bill of the sectors that supply inputs to the input-supplying sector of tobacco industry will be reduced by Rs 0.15 billion (indirect effect). The simple income multiplier shows that the income in the economy will decline by Rs 0.167 billion. Subsequently, this decrease in the income level will lead to lower consumption expenditure. The estimates show that due to decrease in final demand, the consumption-induced effect on income will be Rs 0.22 billion.

Table 21: Income multipliers for cigarette industry

Type of Multipliers	Cigarette Industry
A. Initial effect (share of wages % of total output)	0.008
B. Direct effect	0.065
C. Indirect effect	0.146
D. Simple multiplier	**0.167**
E. Consumption induce effect (F-C)	0.217
F. Total multiplier	**0.385**

[16] The biggest impact, of course, would be on cigarette industry itself because its output will decrease equal to the initial effect.

Finally, the value of total income multiplier (0.385) implies that due to decrease of Rs 1.0 billion in final demand of cigarette, the income level in the economy will decline by Rs 0.385 billion. Thus, the impact of income multiplier is very small compared to the other sectors of the economy. Moreover, the estimates reveal that the most affected sector in this regard would be banks because it has highest wage-to-output ratio as compared to all other sectors. The second most affected sector is personal & household services followed by public administration and defence (Table 22). This is important to mention that public administration & defence sector is affected due to consumption-induced effect.

Table 22: Top 5 Sectors affected by changes in the final demand of cigarette industry: Based on Type II Income multipliers

Sectors	% Contribution into multiplier
1. Banks	65.5
2. Personal & household services	7.0
3. Public admin & defence	4.3
4. Road	2.3
5. Paper & printing	2.1

EMPLOYMENT MULTIPLIERS

Employment multipliers measure the effect on employment of one-unit change in the final demand of cigarette. The first step is to estimate the employment coefficient for all the sectors included in input-output table, which are calculated by dividing the number of employed persons in a given industry by the total output of that industry. Table 23 shows that if the output of cigarette industry decreases by Rs 1 billion, employment in this sector will decrease by 54 persons. It is evident that the employment effect in cigarette industry is the lowest among the other sectors of the economy since it is not a labor-intensive sector.

Table 23: Employment coefficient

	Output (Million Rs)	People Employed (000's)	Employment Coefficient
Agriculture, hunting and related service activities	5,657,870	19,301	3411
Manufacture of food products and beverages	2,959,803	699	236
Cigarettes & tobacco	570,041	31	54
Manufacture of textiles	2,268,615	1,008	444
Paper & printing	366,175	165	450

The effect based on employment coefficient can be seen as the initial effect (Table 24). Further, direct effect and indirect effect are estimated to 27 and 21. Thus, the simple employment multiplier shows that the overall employment will be reduced by 101 persons. Finally, after adjusting for the consumption-induced effect, the value

Table 24: Employment multipliers for cigarette industry (to produce output of Rs 1 billion)

Type of Multipliers	Cigarette Industry
A. Initial effect (Employment Coefficient)	**54**
B. Direct effect	27
C. Indirect effect	21
D. Simple Multiplier (Type I Multiplier)	**101**
E. Consumption induce effect (F-D)	20
F. Total Multiplier (Type II Multipliers)	**121**

of total employment multiplier indicates that due to Rs 1 billion decrease in the final demand of cigarette, the total employment loss to the economy would be only 121 persons. The most affected sector is trade as shown in Table 25.

Based on the above findings, we can conclude that the impact of cigarette industry is medium in terms of output, but small in terms of loss of income and loss of employment. Further, because cigarette industry does not have large number of inter-linkages within the economy, the impact of this sector is limited to only few sectors. It is also important to note that all the results presented in this section are gross effect. The next section focuses on the re-distributional effect of the consumption expenditures and presents the net impact of reduction in cigarette consumption on the economy.

Table 25: Top 5 Sectors affected by changes in the final demand of cigarette industry: Based on Type II Employment multipliers

Sectors	% Contribution into multiplier
1. Trade	15.34
2. Agriculture	3.84
3. Banks and other credit institution	3.46
4. Paper & printing	3.55
5. Road	2.78

V Pakistan's Economy without Tobacco

Economic theory suggests that removing a good from the consumption basket through substantial increase in price will generate both income and substitution effects. In the context of this study, the reduction in cigarette consumption would allow individuals to spend their savings on other commodities depending on their consumption preferences. While the analysis of consumption elasticities is beyond the scope of the study, we developed a scenario to simulate the macroeconomic impact of a tobacco free economy. Given that a significant portion of the economy lives below the consumption poverty line, we have the following two scenarios for simulating the macroeconomic impact of tobacco free economy:

Scenario I: The full savings from tobacco will translate into increase in expenditures on food items

Scenario II: Re-allocation of savings from tobacco will be on 50 percent on food and 50 percent on education

The rest of the section presents net impact on the economy by applying net multiplier effect of cigarette tax in Pakistan. This includes the computation of the multiplier for different commodity groups. This simulation exercise will give an idea about the magnitude of redirection and net impact on the economy.

SCENARIO I: EXPENDITURE SWITCHING FROM TOBACCO TO FOOD ITEMS

The food group has the largest share in household consumption in Pakistan. According to CPI the share of food related expenditure in total consumption expenditure is 35 percent. This simulation is based on the following assumptions:

Assumption I: Government has imposed a tax of 't' amount in the form of excise duty that reduces individual expenditures on cigarette by Rs 1 billion in the economy and now individuals have to spend this additional money on the other commodities.

Assumption II: Individuals spend their entire saved income on food related products. Within food products they will re-distribute their income based on the relative importance of each commodity.

Assumption III: The relative importance of each commodity is estimated based on the share in household consumption expenditures.

Assumption IV: We are only looking at TYPE II output, income and employment multipliers.

The list of commodities included in food basket is given in Table 26 along with their multiplier values. The group covers most of the essential items. The total share of food basket in household consumption is 34.8 percent while the total share of the selected commodity group in household consumption basket is 15.7 percent, which is almost 50 percent of the total food basket.

It is important to note that except for pulses (such as beans, lentils or peas) all multiplier values are higher than cigarette multiplier value and share of pulses in food basket is 7.1 percent. This indicates a relatively higher food multiplier as compared to cigarette industry. Output multiplier for food is 5.364 implying that if food consumption increases by Rs 1 billion, overall output of the economy will increase by Rs 5.4 billion. Considering the output multiplier value for cigarette (2.98), reduction of cigarette production by Rs 1.0 billion will reduce economy's output by Rs 3 billion while the redirection of the expenditure on food will increase economy's output by Rs 5.4 billion. Therefore, the net effect is positive (Rs 2.4 billion).

Table 26: The share of each commodity in household consumption and multiplier value for each commodity

Commodities	Type II multipliers	Share in CPI basket	Distribution of share (%)	Food multiplier
	A	B	C	D = A*C/100
Wheat	4.996	4.5125	28.8	1.439
Vegetable oils and ghee	6.870	3.8252	24.4	1.677
Vegetables & condiments	4.506	1.9761	12.6	0.568
Rice	4.463	1.5821	10.1	0.451
Bakery	6.032	1.155	7.4	0.445
Pulses	2.744	1.1123	7.1	0.195
Sugar	6.741	1.0445	6.7	0.449
Potatoes	4.791	0.4598	2.9	0.141
Sum		**15.6675**	**100**	**5.364**

Income Multiplier

As discussed in the previous section that if consumption of cigarettes decreases by Rs 1 billion, the income will fall by Rs 0.39 billion (Table 21). However, the redistribution of these expenditures on food sector will increase income for the economy. The value of net income multiplier for food group is estimated to be 0.925 which implies that if individuals spend that income on food items this will increase income of the economy by Rs 0.925 billion – the net effect on income would be an increase of Rs 0.54 billion (Table 27).

Table 27: Net income multipliers for cigarette industry

Commodities	Type II multipliers	Share in CPI basket	Distribution of share (%)	Weighted multiplier
	A	B	C	D = A*C/100
Wheat	0.842	4.5125	28.8	0.243
Vegetable oils and ghee	1.191	3.8252	24.4	0.291
Vegetables & condiments	0.717	1.9761	12.6	0.090
Rice	0.816	1.5821	10.1	0.082
Bakery	1.033	1.155	7.4	0.076
Pulses	0.385	1.1123	7.1	0.027
Sugar	1.375	1.0445	6.7	0.092
Potatoes	0.817	0.4598	2.9	0.024
Sum		**15.6675**	**100**	**0.925**

Employment Multiplier

The values of net employment multiplier for different commodity groups are presented in Table 28. The multiplier value for cigarette industry (121) indicates that a reduction in expenditure will reduce employment by 121 persons. However, the multipliers for agriculture and manufacturer of food items have the value of 6651 and 649 respectively. This shows a large positive multiplier effect of redirection of expenditure from cigarettes to agriculture and food related commodities.

Table 28: Net employment multipliers for cigarette industry

	Employment coefficient	Inverted matrix	Multiplier
Agriculture, hunting and related service activities	3411	1.95	6,651
Manufacture of food products and beverages	236	2.75	649
Cigarettes	**54**	**2.24**	121

SCENARIO II: EXPENDITURE SWITCHING FROM TOBACCO TO FOOD ITEMS AND EDUCATION

Assumption I: Government has imposed a tax of 't' amount in the form of excise duty that reduces individual expenditures on cigarette by Rs 1 billion in the economy and now individuals have to spend this additional money on the other commodities.

Assumption II: Individuals spend 50 percent of this income on food related products and 50 percent on education of their children.

The result shows that Rs 1 billion reduction in consumption expenditure on cigarette will lead to an increase of Rs 1.81 billion in output of the economy (Table 29). At first stage, this will reduce output of the economy by Rs 2.9 billion due to reduction in cigarette industry production, but subsequently, reallocation of expenditure by households will lead to an increase in output by Rs 4.7 billion. Therefore, the net effect would by Rs 1.8 billion increase in output. Similarly, the income gains would be Rs 0.55 billion and employment will increase by 5,803 persons.

Table 29: Output, Income and Employment Multiplier for Food and Education sector

	Food	Education	Food & Education	Cigarette	Net Multiplier
Share	**50**	**50**			
Output Multiplier	5.364	4.061	4.713	2.90	**1.813**
Income Multiplier	0.925	0.953	0.939	0.385	**0.554**
Employment Multiplier	2240	9,608	5,924	121	**5803**

Overall, the findings suggest that redistribution of expenditures from cigarette to food and education will produce more output, income and employment in the economy. The second important finding is that the reduction in consumption of cigarettes has an overall positive impact on the economy since the values of net multipliers for output, income and employment are positive.

VI Conclusions and Policy Recommendations

The report analyzes the macroeconomic implications of tobacco use in Pakistan along with reviewing recent changes in the tobacco tax policy.

Given that Pakistan is one of the largest producers of raw tobacco, it is generally perceived that tobacco products have a larger impact on the economy. In contrast, the study finds a relatively small share of tobacco in the agriculture sector of Pakistan. Tobacco crop accounts for less than half percent of the total value added of the agricultural sector. The total cropped area under tobacco is only 0.2 percent of the total cropped area. While 8,200 people are engaged in growing of tobacco, they constitute only 0.03 percent of the total agriculture employment in the country.

Like agriculture, the share of the cigarette industry in terms of output and employment is also very low. The estimates show that the share of the cigarette industry in total industrial output is only 0.08 percent. Similarly, the share of the cigarette industry in overall employment is only 0.3 percent. These findings show a small contribution of the sector into the national economy of Pakistan.

The analysis also indicates inconsistency in tobacco tax policy. Presently, federal excise duty and sales tax are the two major taxes on cigarette industry –it is the excise duty that drives the taxation policy on cigarettes. Yearly changes in excise duty rates not only cause fluctuations in cigarettes production and consumption but also cause significant revenue losses to the government.

While production of cigarettes demonstrates a declining trend over time, in 2017-18 it has shown a phenomenal growth of 72 percent. The main reason for this increase is the change in the structure of federal excise duty that moved from two-tier to three-tier. The introduction of the three-tier structure caused a decline in the tax rate. As a result, in 2017-18, on average the effective excise tax rate decreased by 11.7 points and reached to slightly more than 40 percent. The decline in effective tax rates of the low-price cigarettes is even sharper. The effective excise tax rate for low-priced cigarettes declined from Rs 1,536 per thousand sticks in 2016-17 to Rs 800 per thousand sticks in 2017-18, showing a massive decline of almost 48 percent. The estimates show that the introduction of three-tier structure and decline in effective tax rate of cigarettes caused a tax revenue loss of around Rs 42.6 billion (1 percent of total tax revenue) to the national exchequer.

There has been a 'pass through' of excise tax rates in cigarette prices as well. On an average, the prices of cigarettes have declined by 21.7 percent while the decline in prices of low-priced cigarettes was even higher. The higher growth in production and decline in prices largely translated into consumption boom of cigarettes that has shown a massive growth of 68.8 percent in 2017-18. Given that excise tax rate declined on relatively low-price brands, it disproportionately attracted the poor segment of the society. Alarmingly, the poor 40 percent of the households are the largest consumer of cigarettes in Pakistan.

The macroeconomic impacts of reducing cigarette consumption were looked into by tracing out backward and forward linkages. The estimates of gross output, income and employment multipliers based on the input-output table for cigarette industry have relatively small magnitudes. This implies that changes in consumption of cigarettes will generate relatively small impacts on the other sectors of the economy in general and on the overall economy in particular.

A simulation exercise was also conducted to analyze the impact of decline in the consumption of cigarettes and simultaneous increase on food consumption. The simulation results show that consumption switching will increase the output, income and employment in the economy, due to the redirection of expenditures towards food.

POLICY IMPLICATIONS/RECOMMENDATIONS

The following major policy implications can be drawn from the analysis presented in the report:

- Direct and indirect macroeconomic impacts indicate that reduction in cigarettes production is likely to be beneficial for the economy in the medium to long run due to expenditure switching. *This makes a strong case for higher tobacco taxation in Pakistan.*

- The analysis also indicates that inconsistent tobacco taxation policies with substantial yearly changes are not only causing fluctuations in cigarettes production and consumption but are also contributing to significant revenue losses. Therefore, *this study recommends consistent and coherent tobacco taxation policies with a dual objective to reduce prevalence of cigarettes consumption and raise revenues to offset the negative health implications of tobacco use.*

- To have a consistent tobacco taxation policy, *it is recommended to incorporate an automatic inflation adjustment mechanism for non-ad valorem taxes on cigarettes.*

- The complex tier-wise structure of excise duty on cigarettes provides an incentive for low-priced products and results in revenue loss to the national exchequer. *It is therefore, recommended that the price-tier-based structure of the federal excise duty be abolished and a single, high, uniform tax be applied to all types of cigarettes.* This would not only help curb the tobacco use in the country, particularly among poor segments of the population, but would also contribute in generating more revenues that can be used for promoting public health.

- The study highlights that tobacco taxations are less than the prescribed rate by the WHO. Moreover, cigarettes production and consumption are sensitive to taxation and have inverse relationship. *It is recommended that the federal excise duty on cigarettes should substantially be enhanced to reduce the prevalence of cigarette use in the country.*

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ANNEXURES

ANNEXURES

Annexure-I: Share of Cigarette Industry in the Total Industrial Production

Years	Production of cigarettes	Cigarette production index, 2005-06 =1	Value of production of cigarettes at 2005-06 prices	Large scale manufacturing at 2005-06 prices	LSM index 2005-06=1	Value of LSM production at 2005-06 prices	Share of cigarette industry in LSM production
	A	B	C	D	E	F	G =C/F
2005-06	64,137	1.00	52,402	903,323	1.00	2,929,320	1.79
2006-07	65,980	1.03	53,974	989,896	1.10	3,222,252	1.68
2007-08	67,446	1.05	55,022	1,050,276	1.16	3,398,011	1.62
2008-09	75,609	1.18	61,834	986,887	1.09	3,192,959	1.94
2009-10	65,292	1.02	53,450	1,197,163	1.33	3,895,996	1.37
2010-11	65,403	1.02	53,450	1,007,331	1.12	3,280,838	1.63
2011-12	61,954	0.97	50,830	1,018,706	1.13	3,310,132	1.54
2012-13	67,377	1.05	55,022	1,064,185	1.18	3,456,598	1.59
2013-14	64,482	1.01	52,926	1,122,266	1.24	3,632,357	1.46
2014-15	62,667	0.98	51,354	1,159,052	1.28	3,749,530	1.37
2015-16	53,522	0.83	43,494	1,193,569	1.32	3,866,702	1.12
2016-17	34,342	0.54	28,297	1,260,676	1.40	4,101,048	0.69
2017-18	59,058	0.92	48,210	1,338,010	1.48	4,335,394	1.11

Source: Economic Survey of Pakistan, CMI 2005-06.

Annexure-II: Methodology for Computing Multipliers

Multipliers are used to capture the primary and secondary effects of changes in final demand in an economy. There are three types of multipliers: Output multiplier, income multiplier and employment multiplier. Output multipliers measure the effect of one-unit change in the final demand of a specific product on total output of the economy. Employment multipliers measure the effect on employment of one-unit change in the final demand. The income multiplier is defined as the change in the total value of income from wages, salaries and supplements due to change in the final demand for output of an industry.

Input-output tables provide a detailed dissection of the intermediate transactions in an economy, and are thereby a means of describing the supply and use of the products of an entire economic system. To simplify the initial presentation, suppose that we have a closed economy with no imports or exports, its input-output table would look like Figure A-1. The table is constructed as a matrix, itself consisting of four sub-matrices. The four sub-matrices, as shown in Figure A-1 are: intermediate usage; final demand; primary inputs to production; and primary inputs to final demand.

The intermediate usage sub-matrix, or quadrant 1, measures the flows between industries. The columns in quadrant 1 depict all the intermediate inputs into an industry's output in the form of goods and services. The rows show those parts of an industry's output that are absorbed as an intermediate input into the other industries. The disposition of output into categories of final demand is given in the final demand sub-matrix, or quadrant 2. Together, quadrants 1 and 2 show the total usage of goods and services supplied by each industry. The primary inputs to production sub-matrix, or quadrant 3, shows all the primary inputs in to production. Such inputs include wages, salaries and supplements, gross operating surplus, and the various forms of indirect taxes. These inputs differ from the intermediate inputs since they are not part of the current output process. Quadrants 1 and 3 together show the total inputs used in the production process in each industry. Finally, the primary inputs to final demand sub-matrix, or quadrant 4, shows all the primary inputs into the final demand.

Assume an economy is divided into n sectors. If we denote by X_i the total output of sector i, Y_i the total final demand for sector i's product, and Z_{ij} the inter-industry sales from sector i to sector j, we may write:

$$
\begin{aligned}
X_1 &= Z_{11} + Z_{12} + \ldots + Z_{1j} + \ldots + Z_{1n} + Y_1 \\
X_2 &= Z_{21} + Z_{22} + \ldots + Z_{2j} + \ldots + Z_{2n} + Y_2 \\
X_i &= Z_{i1} + Z_{i2} + \ldots + Z_{ij} + \ldots + Z_{in} + Y_i \qquad \text{(A.1)} \\
X_n &= Z_{n1} + Z_{n2} + \ldots + Z_{nj} + \ldots + Z_{nn} + Y_n
\end{aligned}
$$

Consider the information in the first row and first column on the right-hand side. The row represents the sales by sector 1, to all the sectors and to final demand; and the column is the sales to sector 1. Thus, the column represents the sources and magnitudes of sector 1's *input* and the row represents the distribution of sector 1's *output*. The Z terms on the right-hand side therefore represent the inter-industry flows of input and output, which can be recorded in a table called an *input-output* table. These figures (the Z terms) are the core of input-output analysis.

Figure A- 1: General Structure of Input-Output Tables

			To	Intermediate Demand						Final Demand							
	From		Row prefix	Agriculture, etc.	Mining	Manufacturing, etc.	Construction	Services	Intermediate usage (sub-total)	Final consumption expenditure private	Final consumption expenditure government	Gross fixed capital expenditure private	Gross fixed capital expenditure public enterprises	Gross fixed capital expenditure general government	Increase in stocks	Final Demand (sub-total)	Total supply (grand total)
	Column prefix									Q1	Q2	Q3	Q4	Q5	Q6		
Intermediate inputs	Agriculture Mining Manufacturing, etc. Construction Services			QUADRANT1 INTERMEDIATE USAGE						QUADRANT2 FINAL DEMAND							
	Intermediate inputs (sub-total)																
Primary inputs	Wages, salaries and supplements	P1		QUADRANT3 PRIMARY INPUTS TO PRODUCTION						QUADRANT4 PRIMARY INPUTS TO FINAL DEMAND							
	Gross operating surplus	P2															
	Commodity taxes (net)	P3															
	Indirect taxes n.e.c. (net)	P4															
	Sales by final buyers	P5															
Total Production																	

TYPE I MULTIPLIERS

Type 1 multipliers are used to estimate the impact of changes in final demand on the economy without considering changes in consumption and wages and salaries into model. In type I multipliers the productive sectors of the economy are assumed to be *endogenous* (determined by factors inside the model), all final demands (private final consumption expenditure, government final consumption expenditure, public gross fixed capital expenditure, increase in stocks, exports) are assumed to be determined by factors outside the model.

The ratio of input to output, denoted by a_{ij} (which equals Z_{ij}, the flow of input from i to j, divided by X_j, the total output of j), is termed as a technical coefficient. In input-output analysis, a fundamental assumption is that the technical coefficients are assumed to be fixed. That is, inputs are employed in fixed proportions. Hence, (A.1) can be rewritten as:

$$X_1 = a_{11}X_1 + a_{12}X_2 + \ldots + a_{1j}X_j + \ldots + a_{1n}X_n + Y_1$$

$$X_2 = a_{21}X_1 + a_{22}X_2 + \ldots + a_{2j}X_j + \ldots + a_{2n}X_n + Y_2$$

$$X_i = a_{i1}X_1 + a_{i2}X_2 + \ldots + a_{ij}X_j + \ldots + a_{in}X_n + Y \qquad \text{(A.2)}$$

$$X_n = a_{n1}X_1 + a_{n2}X_2 + \ldots + a_{nj}X_j + \ldots + a_{nn}X_n + Y_n$$

The coefficients in above equations show the amount of extra output required from each industry to produce an extra Rs. Worth of output from a particular industry. The column wise sum of technical coefficients will give us the direct effect of changes in the final demand.

$$Direct\ effect_j = \sum_{i=1}^{n} a_{i1}$$

The direct effect for sector j is the sum of all the technical coefficients for j[th] sector. In above equation, a_{i1} is the technical coefficient of sector 1 for each ith sector.

In matrix notation, (A.2) is expressed as

X = AX + Y

(A.3) From (A.3) we obtain

$$A = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix}, \quad X = \begin{bmatrix} X_1 \\ \vdots \\ X_n \end{bmatrix}, \quad Y = \begin{bmatrix} Y_1 \\ \vdots \\ Y_n \end{bmatrix}, \quad I = \begin{bmatrix} 1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & 1 \end{bmatrix}$$

$$X = (I - A)^{-1} \qquad \text{(A.4)}$$

If the inverse $(I - A)^{-1}$ exists then (A.4) has a unique solution. The matrix A is known as the *direct requirements coefficients matrix* and $\sum_{i=1}^{n}(I - A)^{-1}$gives the type 1 output multipliers for jth sector.

Type I multiplier = initial effect + direct effect + indirect effect

indirect effect = Type I multiplier – (initial effect + direct effect)

The initial requirement for an extra Re. worth of output of a given industry is called the initial output effect. By definition it is equal to one in the total for all industries, since an additional Re.'s worth of output from any industry will require the initial one Re.'s worth of output from that industry plus any induced extra output.

Suppose that there is an increase in the demand for a product A in Pakistan, this implies that the industry will produce additional output of product A to meet the domestic demand. This is the initial effect. To produce the additional output, activity C must of course demand more output from the other industry. This is known as the direct effect and those industries will increase their output by acquiring the additional inputs from the other activities. This is known as the indirect effect. A Type I multiplier measures the **direct and indirect** effects of a change in the output by a particular activity on the total output of the economy[17].

[17] Note that multiplier effects work in both directions. i.e., if output in activity C were to decrease by a certain amount, with any multiplier, then the direct and indirect output effect would be a negative.

TYPE II MULTIPLIERS

The type II multipliers allow us to analyze the impact of changes in the final demand on the economy after including the household consumption and wages and salaries of the employed labor into the model. We extend the existing input output matrix by adding a new row for the wages and salaries and a new column for the household consumption. To differentiate we call it B matrix rather than A matrix.

Type II multipliers for a sector i is the column sum of $(I-B)^{-1}$. The $(I-B)^{-1}$ has one more column and row than the $(I-A)^{-1}$.The remaining rows and columns of the $(I-B)^{-1}$ (denoted by B^{*}). They contain elements which are larger than those of the $(I-A)^{-1}$, because they include extra output required to meet the consumption induced output effects, as a result of closing the model with respect to the households. The matrices B^{*}, A and$(I\text{-}A)^{-1}$are used to derive the input-output multipliers.

Type II multiplier = initial effect + direct effect + indirect sales + induced effect

Consumption induced effects = Type II multiplier – Type I multiplier

Output Multipliers

The equation 1, 2 and 3 below will have three row vectors T1, T2 and T3:

$$T1 = \sum_{i=1}^{n} a_{i1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

$$T2 = \sum_{i=1}^{n} (I-A)^{-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

$$T3 = \sum_{i=1}^{n} (I-B)^{-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

Sum of each column vector of the A matrix will form a new row vector denoted by T1. Similarly, by adding up each column vector of and B*, we obtain T1, T2 and T3 respectively. Let T1`, T2 ' and T3 ' be the transposes of T1, T2 and T3. The derivation of the output multipliers and their various multiplier effects is then as follows:

- The initial effect is equal to changes in the final demand in this case that is one.
- The vector T1 gives the direct effect for each industry/sector.
- The vector T2 gives the Type I multiplier for each industry/sector.
- The vector T2 – T1 – the initial effect matrix will give us the indirect effect
- The vector T3 gives the type II multipliers for each industry/sector.
- The vector T3-T2 gives the consumption induced effect for each industry/sector.

INCOME MULTIPLIERS

First, we construct vector h, the vector of household income coefficients, which is obtained by dividing the income generated by households in the form of wages and salaries from each sector by the corresponding sector's total output. The following equations are used to estimate the income multipliers:

- The vector h will give the initial income effect for each industry/sector.
- The vector h*T1 will give us the direct income effect for each industry/sector.
- The vector h*T2 will give us the type 1 income multipliers for each industry/sector.
- The vector h*T2 - h* T1 will give us the indirect income effect for each industry/sector.
- The vector h*T3 gives the type II income multipliers for each industry/sector.
- The vector h*T3-h*T2 gives the consumption induce effect for each industry/sector.

EMPLOYMENT MULTIPLIERS

First, we construct vector E, the vector of employment coefficients which is obtained by dividing the sector employment by the corresponding sectors output. Then the employment multipliers are derived in a similar way to the income multipliers:

- The vector E will give the initial employment effect for each industry/sector.
- The vector E*T1 will give us the direct employment effect for each industry/sector.
- The vector E*T2 will give us the type 1 employment multipliers for each industry/sector.
- The vector E*T2 - E*T1 will give us the indirect employment effect for each industry/sector.
- The vector E*T3 gives the type II employment multipliers for each industry/sector.
- The vector E*T3 - E*T2 gives the consumption induce effect for each industry/sector.