The Economics of Tobacco in Lebanon: An Estimation of the Social Costs of Tobacco Consumption

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Executive Summary

Tobacco Control is currently being implemented in various countries worldwide, as a result of the direct effect of tobacco smoking on health. Lebanon has several pending laws for tobacco control however none is yet ratified and implemented. This paper aims to understand the Lebanese tobacco market and assess whether this market creates an overall revenue or cost to the Lebanese economy. This should inform the current legislative debate on passing a new law for tobacco control and help policymakers further understand the dynamics of the Lebanese market upon instating new policies.

Based on the size of the transaction flows in the market for tobacco and other related markets, we identify four classes of immediate primary stakeholders (consumers of tobacco products, tobacco farmers, the state run monopoly in charge of regulating the tobacco market –the Régie—and licensed local distributors) and two classes of secondary stakeholders (the advertising industry and retailers). Consumers simply pay the final price for tobacco products, as regulated by the Régie. The regulated price affords retailers a small margin of profit and distributers a larger margin. Distributors engage in advertising their product in the local advertising industry. The Régie conducts Lebanon's international trade in tobacco by exporting the local production of tobacco leaves, which it buys at a subsidized price, and importing packaged cigarettes which it then sells to the local distributors. For each of these sets of agents, we estimate the inflow and outflow of cash from the sale or purchase of tobacco-related products. Our estimates show that the net benefit from transactions among direct stakeholders is close to $271.3 million.

We also identify classes of stakeholders who incur costs and benefits from smoking that are separate from the direct transactional cost and benefits linked to the sale and purchase of tobacco-related goods, and these are the Ministries of Finance and Health, employers, second hand smokers, the environment and the overall Lebanese economy. We estimate the revenues and expenditures linked to tobacco for each of these stakeholders. The sale of tobacco is a source of three classes of revenue for the Ministry of Finance (MoF): excise tax returns, tariff revenue and revenue from the value-added tax. The MoF in turn has to lay out the total amount of the subsidy to local tobacco farmers, via the Régie. Indirect tobacco effects include the costs related to medical treatment from smoking-related illnesses both to smokers and to passive smokers, which are incurred by the Ministry of Health (MoH). The costs also include the lost productivity of smokers and past smokers at work, which are incurred by employers, the cost to the environment in terms of the increased risk of forest fires and the added street waste to be collected, and the cost to the overall economy of foregone production from the premature death of smokers. The indirect benefits include the medical bill savings on old-age related medical care for premature deaths from smoking as well as the saved pension benefits from smokers who die before retirement age. Because of data limitations, we are unable to include the health costs of second hand smoking, the health costs of smoking beyond the three main medical conditions that it causes (cardiovascular disease, lung and bladder cancers and respiratory disease). Our estimates are therefore a conservative lower bound on the costs of smoking given the scarcity of relevant data on a substantial source of smoking related costs, and given our explicitly cautious imputation methods of incidence rates and related medical bills. The net effect we calculate is a loss of 55.4 million.

Overall, we find that even with our conservative estimates for the costs of smoking, on balance the net effect of smoking on the Lebanese economy is a loss of $55.4 million per year.

1. Introduction

Tobacco Control is currently being implemented in various countries worldwide. This is a result of the direct effect of tobacco smoking on health. Broadly speaking, Tobacco Control entails a ban on tobacco advertising both below and above the line,[1] a ban on smoking in public areas, an increase in the tax on cigarette packs, and the placement of health warnings on cigarette packs. The extent of control varies from country to country. However, when any of these measures is adopted a decrease in cigarette consumption is expected, thereby reducing the prevalence of smoking-related illnesses and ultimately smoking-related deaths. Lebanon has several pending laws for tobacco control however none are yet ratified and implemented. An excise tax is currently in place on imported tobacco, in addition to a tariff and the value-added tax. These instruments generate some revenue for the government. However, it should be noted that tobacco also imposes a cost on the government. The cost of tobacco on the Lebanese economy has yet to be assessed. This paper aims to understand the Lebanese tobacco market and assess whether this market creates an overall revenue or cost to the Lebanese economy. This should inform the current legislative debate on passing a new law for tobacco control and help policymakers further understand the dynamics of the Lebanese market upon instating new policies.

The direct stakeholders are consumers of tobacco products, licensed tobacco farmers, the Régie Libanaise des Tabacs et Tombacs (Régie) and local licensed distributors of imported tobacco products. The Lebanese population has high smoking prevalence rates in both adults and youth. Both cigarettes and water pipe are consumed by both age groups and are more prevalent among Lebanese males. Although this means there is a high tax revenue return since demand is high, we should not overlook the fact that tobacco causes a number of costly illnesses. Tobacco farmers in Lebanon receive a subsidy from the Régie for every ton produced. This Price Support Program (PSP) was instituted to incentivize farmers to stay in the Southern part of Lebanon. Tobacco farming is concentrated in the South (57%); the remaining 43% is produced in the Bekaa and the North. Farmers need to have a license in order to grow tobacco. The license entitles them to a preferential sale price offered by the Régie. The Régie then sells the tobacco in the international market (at a net loss) and imports manufactured tobacco. The manufactured tobacco is then sold to licensed distributors and subsequently to retailers.

There are various costs related to tobacco smoking: health costs, inefficiency costs, costs from lost production, environmental costs, and costs to non-smokers. The latter is not assessed in this study since data are scarce. Direct costs include health costs, inefficiency costs, and environmental costs, as they are currently incurred by economic actors. Costs from lost production are an imputed expense based on tobacco-related mortality and thus is an indirect cost of tobacco smoking.

Health costs are evaluated by calculating the expenses of the 27 smoking-related diseases. However, data on all 27 diseases are not available in Lebanon. Therefore, the most dominant diseases were measured: cardiovascular disease, cancer, and respiratory diseases. However, even the estimates for these diseases will not be

[1] Below the line advertising includes tobacco companies sponsoring events, distributing free packs in events; whereas above the line includes advertisement in print and audio-visual media.

complete, as data on illnesses are not available. Inefficiency costs assess the number of absences that smokers and past smokers have from work as a result of a smoking-related disease. This affects their productivity at work. Environmental costs consist of forest fires that are caused by cigarettes and the resources spent in collecting smoking related street waste.

The indirect cost of tobacco smoking is the estimated present value of lost production from premature death because of smoking. We calculate this loss with the use of differential mortality rates for smokers and non-smokers and the average wage rate. Second Hand Smoke (SHS) is an essential contributor to tobacco costs. However, information about the extent and effects of tobacco exposure is lacking in Lebanon. An alarming 78.9% of children in Lebanon are exposed to smoke at home whereas 74.9% are exposed to it outside the home. The estimated costs of tobacco calculated in this paper will therefore be a lower bound for the actual costs of tobacco. This number will be used in the calculation of the net benefit or cost of tobacco to the Lebanese economy.

2. Smoking Prevalence in Lebanon and the Consumption of Tobacco

More than a third of Lebanese adults are smokers. Lebanon has high smoking rates for both cigarettes and water-pipes especially among the youth aged 13-15**.** According to the most recent figures (Sibai and Hwalla, 2010; Saade, 2005), approximately 42.9% of male adults and 27.5% of women are cigarette smokers[2]. The prevalence rates are 14.8% and 6.7% for male and female youth respectively (Table 1). Water-pipe smoking prevalence in youth was even more staggering than that of cigarettes with 64.5% of males and 54.6% of females smoking on a regular basis (Table 2)[3]. Lebanese women have the highest female smoking rate in the region (Figure 1).

Table 1: Cigarette Smoking Prevalence (most recent surveys)

	%	1998	2005	2008
Adults (18+)	**Male**	46%	...	42.9%
	Female	35%	..	27.5%
	Total	..	..	34.7%
Youth (13-15)	**Male**	..	14.8%	..
	Female	..	6.7%	..
	Total	..	10.5%	..

Sources: (Sibai AM and Hwalla N., 2010); (Saade, 2005)

Table 2: Water-pipe Smoking Prevalence

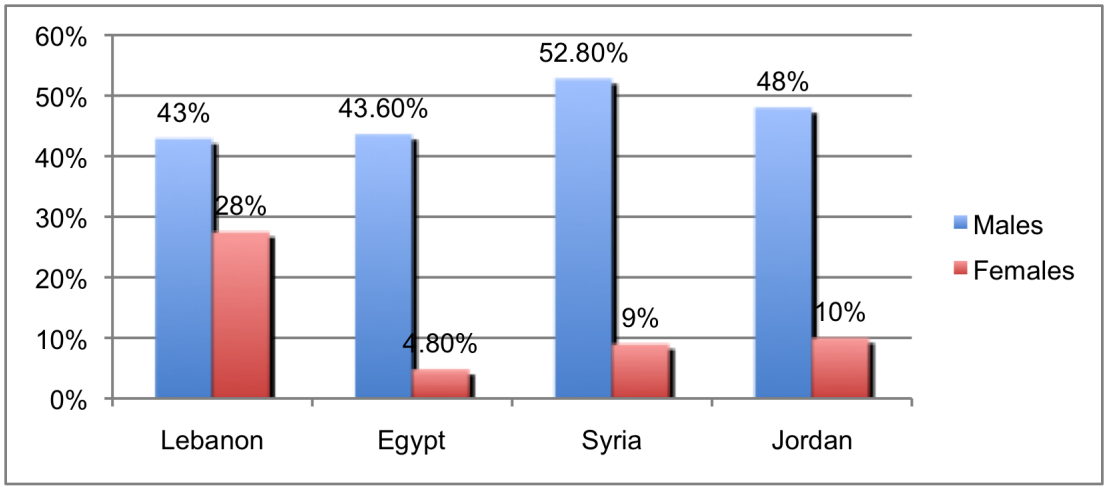
	%	2005	2008
Adults (18+)	**Male**	..	25.8%
	Female	..	23.3%
	Total	..	24.5%
Youth (13-15)	**Male**	64.5%	..
	Female	54.6%	..
	Total	59.5%	..

Sources (Sibai AM and Hwalla N., 2010); (Saade, 2005)

[2] Approximately 46.1% of smokers and 33.5% of past smokers do not have any health insurance and thus rely on the Ministry of Health for insurance. (Sibai AM and Hwalla N., 2010)

[3] Health costs due to water-pipe smoking are not assessed in this paper due to lack of information. However, those who only smoke water-pipe (no cigarettes) constitute about 18% of the population. (Sibai AM and Hwalla N., 2010)

Figure 1: Smoking Prevalence Rates in the Region (Adults 18+)[4]



Source: (WHO, 2005); (Sibai AM and Hwalla N., 2010)

Lebanon has one of the highest rates of smoking in the adult population, with consumption reaching 12.4 packs per person per month. Approximately 7.8 billion cigarettes are consumed per year[5] (Table 3). Male smokers smoke on average about 1 pack and a half per day. Although there are other countries with higher prevalence rates, these cigarette consumption rates rank among the highest in the world. Lebanese monthly cigarette packs consumption is 12 times higher than that of Singapore and 3 times that of Syria (Figure 2).

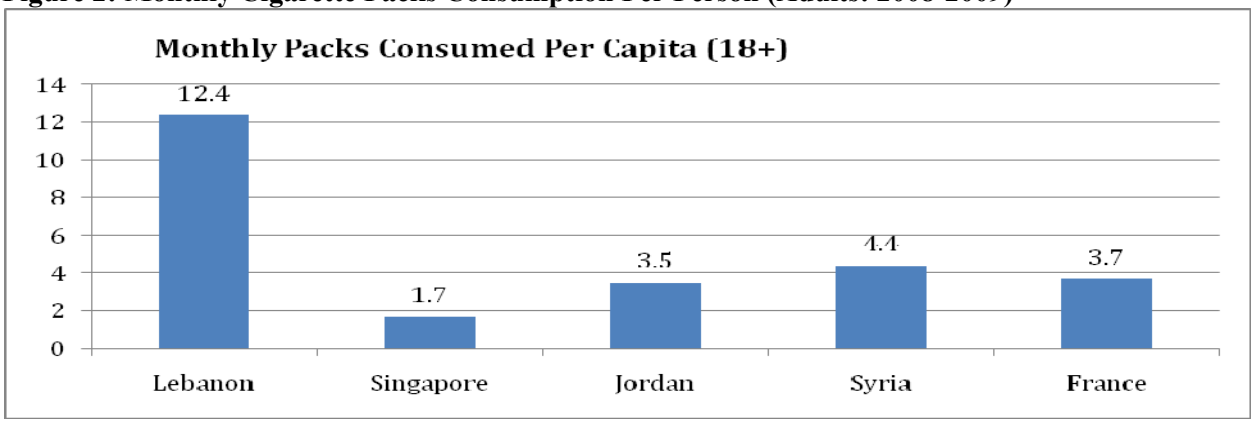
Table 3: Annual Cigarettes Consumption (Adults 2008-2009)

	Males	Females	Total
Cigarettes/ Day	27	18	45
Cigarettes (billions of Sticks)/year	5.3	2.43	7.8
Cigarette Packs (in millions)/ Year	2.7	1.2	3.9
Annual Cigarette Consumption per capita (for over 18 population)	4,228	1,807	2,979

Sources: (Sibai AM and Hwalla N., 2010); (Ministry of Health Statistical Report, 2007)

[4] According to the most recent surveys
[5] This figure was calculated by using average daily consumption and population estimates

Figure 2: Monthly Cigarette Packs Consumption Per Person (Adults: 2008-2009)



Sources: (Tobacco Atlas, 2009); (Lebanon: based on Author's Calculations)

The locally manufactured cigarette brands (Cedars and Byblos)[6] have a market share close to 21% whereas the remaining 79% of the market belongs to imported brands. Market shares were assessed using the ratio of consumption (local to foreign) extracted from the Household Expenditure Survey of 2004-2005[7]. Cedars cigarettes are sold in two forms, a carton packet and a paper packet priced at $0.5 and $0.3 respectively.[8] Foreign brands are more commonly consumed with prices ranging from $0.8 to $2. The price of foreign brands averaged $1.32.

Table 4: Expenditure on Cigarettes (2009)*

	Price	Quantity (in million packs)	Total Expenditure
Local Brand	$0.4	81.5	$32,373,661
Imported Brand	$1.32	306.8	$404,932,876
Total	**-**	**388.3**	**$437,306,537**

*Author's Calculations based on prevalence rates and daily consumption; (Household Expenditure Survey, 2004-2005)

Tobacco expenditure among the poorest Lebanese families is equal to the expenditure for recreation and is close to that of education. Tobacco expenditure takes its toll on the poorer segments of society, accounting for 2-3% of their total expenditures (Table 5). In the bottom wealth quintile of households, the share of expenditures on tobacco is equal to the share on recreation and furniture and is only 1% less than the share spent on education. For the second lowest quintile, the share of tobacco in expenditures is equal to those of education and clothing.

[6] Two other brands were being locally produced however it seems they have been discontinued "OK" and "Supars"

[7] It should be noted that smuggled cigarettes in Lebanon contribute about 25-50% of the market share (Tobacco Atlas, 2009).

[8] The amount produced of each is unknown so an average price of $0.4 per pack was used. The quantity consumed was calculated from the average daily cigarette consumption of adults.

Table 5: Distribution of Household Expenditure (Shares) by Wealth Quintile

	Poorest	2	3	4	Richest	*Overall*
Food	35	31	28	24	19	27
Clothing	3	3	3	2	2	3
Housing and Energy	5	6	7	7	7	6
Transport	30	24	21	18	16	22
Recreation	2	2	2	2	3	2
Hotels and Restaurants	6	6	7	7	8	7
Communication	4	8	10	13	13	10
Furniture	2	4	4	5	5	4
Miscellaneous	3	3	3	3	4	3
Health	3	6	7	10	12	8
Education	3	3	4	4	6	4
Alcohol	1	1	2	2	4	2
Tobacco	**2**	**3**	**2**	**2**	**1**	**2**
	100	100	100	100	100	100

Source: (Household Expenditure Survey, 2004/2005)

3. The Industrial Organization of the Tobacco Market

2.1 The Régie

The Régie is the state-run monopoly in charge of the exporting importing of tobacco products and of subsidizing tobacco farmers. The Ministry of Finance has direct control of Régie's finances. Therefore, the company's net profits, expenses, and losses are directly linked to the public treasury. The tobacco subsidy takes the form of a Price Support Program (PSP) that sets a pre-determined price and a quota for quantity produced for licensed tobacco farmers (World Bank, 2010). The tobacco that is bought from the farmers is then sold on the world market at a loss. Over the past few years, the drop in the world market price of tobacco has meant larger losses for governments with PSPs. Usually, the value of exported tobacco is deducted from that of tobacco imports. Lebanon exports raw leaf tobacco and in return imports manufactured tobacco at a significantly higher price but in the same quantity. The Régie covers the cost of the subsidy from tariff revenue on imported products. The imported manufactured tobacco is then sold to licensed distributors (450), which are either franchise holders or general distributors. The distributors then sell the cigarette packs to numerous retailers (reaching 100,000) around the country. The retailers sell the packs to the consumers at a low profit margin as the price of cigarettes is set by the state.

Total subsidies to tobacco farmers reached $51.1 million in 2008. Quantity and not quality is the primary concern of tobacco farmers since they are paid per ton produced. The PSP buys the tobacco at a pre-determined price of about $7,500 per Metric Ton (MT) (World Bank, 2010). The selling price of the tobacco is approximately $3,500 per MT in the international market. This constitutes a loss of approximately $17.3 million for the Régie.

2.2 Farming

There are approximately 24,000 registered tobacco farmers, of which 40% rely on other sources of revenue. Tobacco constitutes only a third of household revenue of tobacco farmers (World Bank, 2010). Approximately 40% of farmers work off-farm whereas 23% rotate tobacco with other crops (World Bank, 2010). In the South,[9] tobacco is already being rotated with chickpeas, sesame, lentils, wheat, okra, fava beans, and thyme (World Bank, 2010). Tobacco production is particularly hazardous. Farming tobacco leads to Green Tobacco Sickness in farmers and lung damage from tobacco exposure (Tobacco Atlas, 2009). This constitutes a health cost that is not assessed in this paper because of the absence of any relevant data on the health hazards of tobacco farming in Lebanon.

Table 6: Production Statistics

Indicator	Value	Notes
Number of Farmers	24,000	Registered
Dependants on Cultivation	55,200	0.9 seasonal workers per farmer and 1.2 dependants per farmer
Land Used (hectares)	9000	
% Agriculture Land Used	3.2%	Total Tobacco Hectares/ Total Agricultural Hectares
% Farmers Relying on Other Sources	40%	Off-farm dependency; 23% of tobacco farmers perform crop rotation on their land
Production Level (MT)	9000	
Tobacco Varieties (%)	Burley: ~1.2% Saade 6 (sharki): ~82% Tinbak: ~16.5%	

Sources: (World Bank, 2010); (Ministry of Agriculture & FAO, 2008); (Ministry of Agriculture Statistical Report, 2001)

Lebanon is one of only 5 countries in the world that dedicates more than 1% of its agricultural land to growing tobacco. There are only 5 countries that grow tobacco on more than 1% of their agricultural land: Malawi, North and South Korea, Macedonia, and Lebanon (Tobacco Atlas, 2009). Lebanon uses approximately 3.2% of its agricultural land for tobacco cultivation; most of this land is located in the South.

An estimate of 9000 Metric Tons of tobacco is produced each year over an area of 9000 hectares. Each hectare takes on average 610 labor days as opposed to 25 and 242 labor days for cereal and fruits/vegetables respectively. An average production of 9000 MT was produced between 2005 and 2007 (World Bank, 2010). The majority of tobacco (57%) is produced in the South (Table 7). Tobacco growing is highly labor intensive as compared to other crops (Table 8).

[9] Approximately 55% of registered farmers reside in Southern Lebanon (World Bank, 2010)

Table 7: Production by Region

Region	Metric Tons/Year	% of total Metric Tons /Year
South	5130	57%
North	1800	20%
Bekaa	2070	23%
Total	9000	100%

Source: (World Bank, 2010)

Table 8: Labor Intensity of Tobacco Production

Crop	Labor days/hectare
Tobacco	610
Cereals	25
Fruits and Vegetables	242

Source: (World Bank, 2010)

2.3 Trade Flows and Distribution

Lebanon is a net importer of tobacco, with a trade deficit reaching $129.9 million in 2008. Lebanon exports mainly unprocessed, low quality, tobacco leaves and imports manufactured tobacco products, mainly cigarettes (Table 10). The average export price reached $3,164/ton whereas the average import bill stood at $14,971/ton.

Table 10: Trade (2008)

	Quantity (tons)			Value (000 $)			Trade Balance (000 $)		
	Manufactured Tobacco	**Leaf**	***Total***	**Manufactured Tobacco**	**Leaf**	***Total***	**Manufactured Tobacco**	**Leaf**	***Total***
Import	10,107	831	10,938	158,727	5,021	163,748	**-158,616**	**28,705**	**-129,911**
Export	17	10,676	10,693	111	33,726	33,837			

Source: Lebanese Customs Website [Accessed March 2010]

2.3.1 Fiscal Revenues from Tobacco

Total fiscal revenues for tobacco reached $189.1 million in 2008. These included revenues for excise, customs, and value-added taxes. Excise tax varies for different forms of tobacco. Cigarettes and other manufactured tobacco (cigars, cigarillos, etc.) have higher excise tax rates than unmanufactured tobacco. Cigarette excise taxes dropped 3.5% in 2008. However, imports for that same year were higher than the previous year, resulting in a net increase in the total tax revenue. The manufactured tobacco tax accounts for 96.5% of total tax revenue from tobacco. Cigarettes alone constitute 94% of the total. If excise tax remained unchanged between 2007 and 2008 and imports remained the same for 2008, total tax revenue would have increased to $194.4 million. There would have been a $5.3 million increase, almost equal to the total tax revenue from unmanufactured tobacco.

Table 11: Cigarettes Tax Revenues

	2007		2008	
	Rate	**Amount**	**Rate**	**Amount**
Excise Tax	103.5%	$133,077,195	100%	$150,167,000
Customs Tax	5%	$6,428,850	5%	$7,508,350
VAT	10%	$12,857,700	10%	$15,016,700
Total Tax Revenue	-	$152,363,745	-	$172,692,050

Sources: (Ministry of Finance, 2008); Lebanese Customs Website [Accessed March 2010]

Table 12: Other Manufactured Tobacco Tax Revenues

	2007		2008	
	Rate	**Amount**	**Rate**	**Amount**
Excise Tax	100%	$3,476,000	100%	$8,560,000
Customs Tax	5%	$173,800	5%	$428,000
VAT	10%	$347,600	10%	$856,000
Total Tax Revenue	-	$3,997,400	-	$9,844,000

Sources: (Ministry of Finance, 2008); Lebanese Customs Website [Accessed March 2010]

Table 13: Unmanufactured Tobacco Tax Revenues

	2007		2008	
	Rate	**Amount**	**Rate**	**Amount**
Excise Tax	48%	$79,000.00	48%	$5,021,000
Customs Tax	5%	$3,950.00	5%	$523,021
VAT	10%	$7,900.00	10%	$1,046,042
Total Tax Revenue	-	$90,850.00	-	$6,590,062

Sources: (Ministry of Finance, 2008); Lebanese Customs Website [Accessed March 2010]

Table 14: Total Tobacco Tax Revenue and Import

	2007	2008
Total Tobacco Excise Tax Collected	$136,632,195	$163,748,000
Total Tobacco Customs Tax Collected	$6,606,600	$8,459,371
Total Tobacco VAT Collected	$13,213,200	$16,918,742
Total Tobacco Tax Revenue	$156,451,995	$189,126,112

Sources: (Ministry of Finance, 2008); Lebanese Customs Website [Accessed March 2010]

2.3.2 Retail and Marketing

There are approximately 450 licensed tobacco distributors and roughly 100,000 licensed retailers. According to law number 16 (30 January 1935) Chapter 3 Section 3 Articles 41-49, the Régie is responsible for issuing licenses to authorized distributors and retailers to sell tobacco (IDAL, 1996). The license validity varies between 6 months and 1 year (IDAL, 1996) (Figure 3). The licensed distributors are franchises of different cigarette brands or general distributors. They sell tobacco to the retailers with a profit margin of about 5% of the retail price (IDAL, 1996). Licensed wholesalers however profit at 1.7% of the retail price. Retailers then sell to the consumers at a low profit of $0.07 per pack on average (Author's Personal Contact). The aggregate sum of cigarettes purchases reached $437.3 million, however retailers' profit margin is very narrow. It should be mentioned that the government

taxes tobacco, with tax revenue reaching $189.1 million this is part of the total consumer expenditure on tobacco.

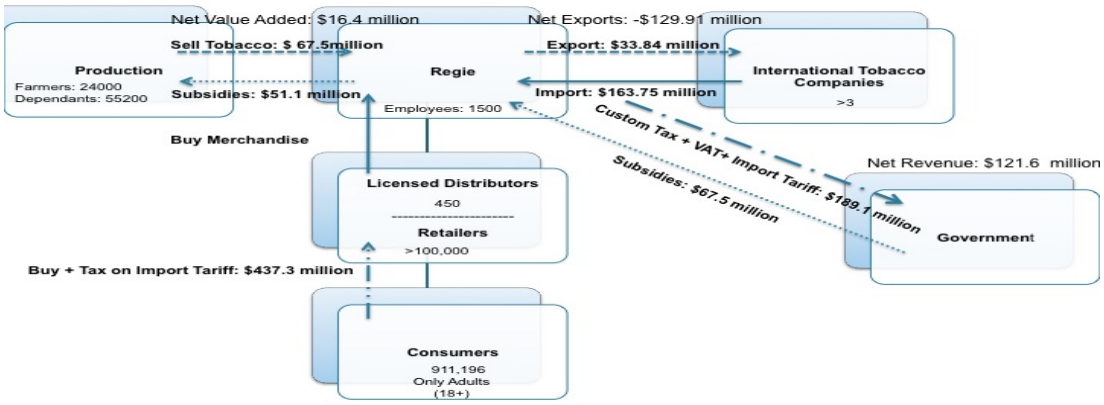
Tobacco brands are not amongst the top ten advertised brands in Lebanon, and tobacco advertising spending constituted only 9.6% of the advertising sector over a 5 year period. In 2009 the tobacco advertising bill totaled $7.2 million for all media categories accounting only for 4.5% of the $156 million total spent on advertising that same year[10] (Byblos Bank, 2010). There has been a recent debate on whether the advertising sector might lose if tobacco advertising was to be banned (Daily Star, 2010). This fear does not seem to be warranted based on the low percentage (9.6%) that tobacco advertising contributes to total advertising spending. Countries that have adopted the policy of banning tobacco advertisements have not been affected since the tobacco advertisements are simply replaced by other brands.

Table 15: Top 10 Advertised Brands (2008)

Rank	Brand Name
1	Toyota
2	Zain
3	Pepsi
4	Coca Cola
5	Head and Shoulders
6	Amana Care
7	Pantene Pro-V
8	BankMed
9	Bank Audi
10	Zein Al-Atat

Source: Arabad Magazine website [Accessed March 2010]

Figure 3: Distribution and Economic Flow (2008)



Source: Author's Estimates; (Regie, 2003)

[10] Personal communication with Dr. Rima Nakkash.

Total national net gain from the tobacco industry totaled $271.1 million dollars in 2008. Figure 3 summarizes the transaction flows in the tobacco trade. International tobacco companies gain $114.9 million whereas the various local distribution channels gain a net of $84.4 million (Table 16). The Régie gains a net of $50.3 million after accounting for exports and net value added. The Régie's cost of packaging tobacco, manufacturing the local brand, and paying employee's salaries is not available. Subsidy payments are deducted from total tobacco tax revenues. Total local net revenue is the sum of Régie's, the government's, and the distribution channels' net gains. Local net revenue also includes foreign tobacco advertising spending pumped in to local advertising agencies.

Table 16: Summary of Economic Flows (2008)

	Payments (million $)	Revenues (million $)	Net (million$)
Régie	$214.8	$265.1	$50.3
International Tobacco Companies*	$48.8	$163.7	$114.9
Distribution Channels	$352.9	$437.3	$84.4
Government	$67.5	$189.1	$121.6
Total Local Net Revenue			**$271.3***

*Includes advertising for 2008

4. Cost of Smoking Related Diseases

Smoking related diseases sum up to 27 different diseases. However, this paper only tackles 3 of them. Cancer, Cardiovascular Disease (CVD), and Respiratory Diseases were assessed in this study. That is because data on these diseases were available. The information obtained does not include all the various costs of managing these diseases. Cancer costs were assessed based on treatment (chemotherapy), hospital admissions, and annual check-ups (only information pertaining to smoking-related lung and bladder cancer was included). No data was collected on the prevalence and cost of other smoking-related cancers.[11] As for CVD, we were able to attain the number of smokers with heart disease that is smoking-related. The only CVD related costs that information was available on were heart surgery and annual check-ups. As for respiratory diseases, treatment cost was unavailable. The only cost included was that pertaining to annual check-ups. For the remaining 24 diseases and illnesses related to smoking, there were no available data. The costs of treatment, admission, and check ups are considered direct costs of smoking.

The highest cancer incidence rates in Lebanese male adults are those pertaining to smoking-related cancers. Lung and bladder cancer ranked first and second respectively in most common cancers in men (Table 17). Prostate cancer was the third most common type of cancer among males.[12] As for women, breast cancer was the

[11] Other cancers directly linked to smoking include: of the trachea, bronchus, esophagus, mouth, larynx, pharynx; indirectly related cancers include cancers of the stomach and the liver.
[12] Incidence rate of prostate cancer: 21.5/100,000

highest.[13] Lung cancer incidence among women is the third most common following colorectal cancer. Incidence rates only include those who were diagnosed within a one-year duration. Therefore those who are undergoing cancer treatment and were diagnosed in a previous year were not accounted for in our study. This is because cancer prevalence rates are not available in Lebanon.

Table 17: Incidence of Cancer Related to Smoking (2004)

	Male		Female		Total	
	Rate (100,00)	**Number**	**Rate (100,000)**	**Number**	**Rate (100,000)**	**Number**
Lung Cancer	28.5	360	10.75	144	-	504
Bladder Cancer	28	354	-	-	-	354

Source: (Shamseddine, 2010)

Smokers and Past-Smokers constitute 58% of those with heart disease. About 11.3% of the adult Lebanese population suffers from smoking-related heart disease. Smokers with heart disease make up 6.6% of the total population (Table 18). However, it should also be noted that second hand smoke increases the risk of heart disease by 25%. This has not been accounted for in our estimates for lack of data. An alarming 46.4% of past smokers have heart disease; many of them are thought to have quit smoking after they experience smoking-related heart problems.

Table 18: Prevalence of Cardiovascular Disease and Respiratory Diseases

		% of group	**% of total population**
Cardiovascular Disease	Non-smokers	7.9%	4.7%
	Smokers/Past Smokers	11% / 46.4%	6.6%
	Total	-	11.3%
Respiratory Diseases	Non-Smokers	6.8%	4.0%
	Smokers/ Past Smokers	4.9% / 8.5%	2.2%
	Total	-	6.2%

Source: (Sibai AM and Hwalla N., 2010)

Only partial costs of smoking-related cardiovascular disease and some cancers were averaged. The average cost of a heart surgery in Lebanon is $4,364 (Table 19) (Ammar, 2009). As for lung and bladder cancer, an average cost of treatment (chemotherapy) was obtained as well as the average number of sessions needed (Jalloul, 2010). Government expenditures for curative care totaled $162.3 million in 2005 (Table 20) (Ammar, 2009). This breakdown was used to assess the average cost of heart surgeries in Lebanon.

[13] Incidence rate of breast cancer: 69/100,000.

Table 19: Average Cost of Treatment

		Average Cost	Notes
Cardiovascular Disease	Average Cost of Heart Surgery	$ 4,364	Calculated from "Health Beyond Politics"
Cancer	Average Cost Lung Cancer Session	$7,500	Acquired through an interview with the President of the Lebanese Society of Medical Oncology
	Average Cost Bladder Cancer Session	$3750	
	Average No. of sessions	6	
	Average Cost of Lung Cancer Treatment	$45,000	
	Average Cost Bladder Cancer	$22,500	

Sources: (Ammar, 2009); (Jalloul, 2010)

Table 20: Ministry of Public Health Expenses Breakdown on Curative Care (2005)

	No. of Cases	Incurred Cost
Medical (ad.)	93,463	$55,603,330
Surgical (excluding heart surgery) ad.	87,148	$61,764,837
Heart Surgery ad.	2,754	$12,019,266
Burns (pt.)	34	$457,670
Dialysis (pt)	1,246	$12,674,891
MRI (pt)	794	$1,367,105
LDH Aphresis (pt)	37	$700,498
Long Stay (days)	1,385,968	$17,775,048
Total	-	$162,362,644

Source: (Ammar, 2009)

A conservative lower bound on the total medical costs of smoking-related diseases in 2008 reached $146.7 million. Cardiovascular disease (CVD) attributed for 71% of the total cost of the smoking-related diseases assessed. The cost of CVD is high, however it should be noted that smoking also increases the chances of a non-smoker suffering from ischemic heart disease by 25% (Tobacco Atlas, 2009). This additional expense is not accounted for in our total. Chemotherapy held the largest weight for the cancer bill reaching $22.7 million for lung cancer and $8 million for bladder cancer (Table 21). Respiratory disease costs were calculated only based on annual visits to doctors, and would substantially increase if more data were available about drugs and other treatment costs.

Table 21: Total Cost of Smoking Related Diseases (Lower Bound)

		Cost ($ million)	Notes	Assumptions
Cardiovascular Disease	All Smoke-Related Disease	$78.7	Heart Surgery	Assuming that 10% of smokers with heart disease will undergo surgery % used based on ratio from MOH statistical Yearbook
		$25.8	Visit to Dr.	Assuming 3 visits/ year 50$ per visit
Cancer	Lung Cancer	$22.7	Treatment only (Chemotherapy)	
		$0.3	Hospital Admissions	Assuming 6 admissions/ year 100$ per admission
		$0.2	Surgery	Assuming 15% of patients undergo surgery
		$0.08	Visit to Dr.	Assuming 3 visits/year other than hospital admissions $50/visit
	Bladder Cancer	$8.0	Treatment (Chemotherapy)	
		$0.2	Hospital Admissions	Assuming 6 admissions/ year 100$ per admission
		$0.05	Visit to Dr.	Assuming 3 visits/year other than hospital admissions $50/visit
	Radiotherapy	$2.1	Calculated from "Health Beyond Politics"	Assuming All Radiotherapy is for Cancer Patients
Respiratory Disease	Respiratory Disease	$8.6	Visit to Dr.	Assuming 3 visits/year 50$ per visit
Total	-	**$146.7**	-	-

Sources: (Ministry of Health Statistical Yearbook, 2007); (Jalloul, 2010); (Ammar, 2009)

5. Productivity Cost Related to Smoking

Smokers' and past smokers' sick days constitute a cost due to lost production of $102.2 million per year. Smokers and past smokers complain on average of poor physical health for 122 days/year and 140 days/year respectively (Table 22).[14] Past-smokers make up 6% of the Lebanese adult population and they miss more days than smokers as the majority already suffers from smoking-related diseases (Sibai, A. Hwalla N., 2010). This is a direct cost of smoking on Lebanon and therefore leads to inefficiency in the Lebanese workforce. Smokers and past smokers miss working days as a result of smoking thus affecting the productivity of the enterprise in which they work. This subsequently causes an economic loss to that sector. The total inefficiency due to sick days off of work was calculated by assuming that 10% of annual sick days will lead to absence from work. The possibility of these days falling on a weekend and whether or not a smoker or past smoker was employed was taken into consideration. Age was also accounted for since individuals over 64 are considered retired. As for youth, only smokers between 15-18 years of age were accounted for and whether or not they were employed was also factored in. An average wage was used to assess this cost and this included a possible increase in salary but also acknowledged the inflation rate.[15]

Table 22: Lost Productivity due to Sick Days

	Monthly	Yearly	Total Inefficiency (million $)
Average Sick days- Smoker	10.2	122	$84.4
Average Sick days- Past Smoker	11.67	140	$17.8
Total inefficiency due to smoking	-	-	$102.2

Source: (Sibai AM and N. Hwalla, 2010)

6. Cost of Environmental Degradation due to Smoking

Environmental cost of smoking totaled $13.6 million. Smoking tobacco does not only lead to direct economic losses for economic agents, it also imposes environmental costs that are borne collectively by the overall economy. Disposal of lit cigarettes causes 1% of forest fires (AFDC, 2010). The average number of hectares lost per fire is 15.64 for 2007 (Table 23). The cost of fires in this paper only includes the loss of hundreds of mature trees[16] without taking into consideration the cost on the Army and Civil Defense for extinguishing these fires. Moreover, cigarettes constitute 46% of all items disposed of on the street (Table 24) (Chaaban, 2008). Picking up street waste consumes most of the working time when compared to other means of

[14] It should be noted that taking cigarette breaks can also affect productivity, however this estimate cannot be done since data are lacking.
[15] The average wage used is $654 (World Bank, 2005)
[16] On average, it takes up to 25 years for trees to fully mature.

trash collecting; it also requires the largest workforce. An estimated earnings rate of $2/hour was used to assess the cost of picking up street waste. An average of 10-hour shifts was used to assess the amount of time spent removing cigarette waste off the streets.

Table 23: Cost due to Forest Fires

	2007
Number of Fires	275
Area Damaged By Fire (hectares)	4301
Average No. Of Hectares Burnt per fire	15.64
Cost of Each Hectare Burnt	$150,000
% of fires caused by Cigarettes	1%
No. of fires caused by lit cigarettes	2.75
Cost of fires due to Cigarettes	$6,451,500

Sources: (LFPC, 2010);(AFDC, 2010); (CAS Yearbook, 2007)

Table 24: Cost of Street Cleaning

Indicator	**Value**	**Notes**
Employees	2500	
No. of Street Cleaners	2000	Assumption based on workforce
Wage/Year	7500	Assuming $2/hour 10 hours/day shift
Total Cost of Removing Cigarettes from Streets	$6,716,000	46% of street trash items are composed of cigarettes and cigarette packs

Sources: (Sukleen, 2010); (Chaaban, 2008)

7. Indirect Costs due to Tobacco-Related Mortality

In 2007 approximately 2,701 deaths were due to smoking-related diseases leading to an indirect cost of $64.6 million. According to the Tobacco Atlas, 25% of deaths of those aged 30 years and older in Lebanon are attributed to smoking-related diseases. Premature death constitutes lost production due to smoking.[17] The foregone production due to smoking-related death is evaluated at the present value of total production until the age or retirement.[18] The highest number of smoking-related deaths was among the 60-64 age group. However, employment rates for the same group were the lowest and thus they yielded the lowest estimate of lost productivity. To calculate present value, average wage rate, inflation rate, and the possibility of increased income over time were taken into account. This was assessed for 30-year olds and older and also weighted for employment status upon calculation.

[17] Premature death due to smoking can be considered as a "saving" since smokers contribute to the NSSF fund and to their pension funds but don't end up using them in old age. However this is a minimal "gain" since only 30% of employees are completely dependant on the NSSF.

[18] Retirement age calculated at 64 years.

Table 25: Mortality Costs (2007)

Age Groups	No. of Deaths Due to Smoking	Present Value ($)
30-34	193	11,406,825
35-39	216	11,143,560
40-44	228	10,137,223
45-49	273	10,884,814
50-54	416	11,122,996
55-59	533	7,700,199
60-64	843	2,237,161
Total	2701	64,632,817

Source: Author's Calculations (Ministry of Public Health Statistical Yearbook; 2007); (Tobacco Atlas, 2009)

8. Damage Inflicted on Non-Smokers

Second Hand Smoke (SHS) affects 78.9% of youth in their homes and is not included in our cost estimates. Roughly 74.9% of children are exposed to SHS outside the home (Table 26). Moreover, 23% of pregnant women continue smoking throughout their pregnancy (Chaaya, 2004). This leads to low birth weight in their babies and Sudden Infant Death Syndrome (SIDS) among other illnesses. These are also diseases that are due to smoking and are not accounted for in our total cost.

Table 26: Exposure to Second Hand Smoke

	%
Children in households with smokers	78.9%
Children exposed to smoke outside the home	74.9%
Pregnant women who smoke	23%

Sources: (Saade, 2005); (Chaaya, 2004)

9. Total Cost Breakdown

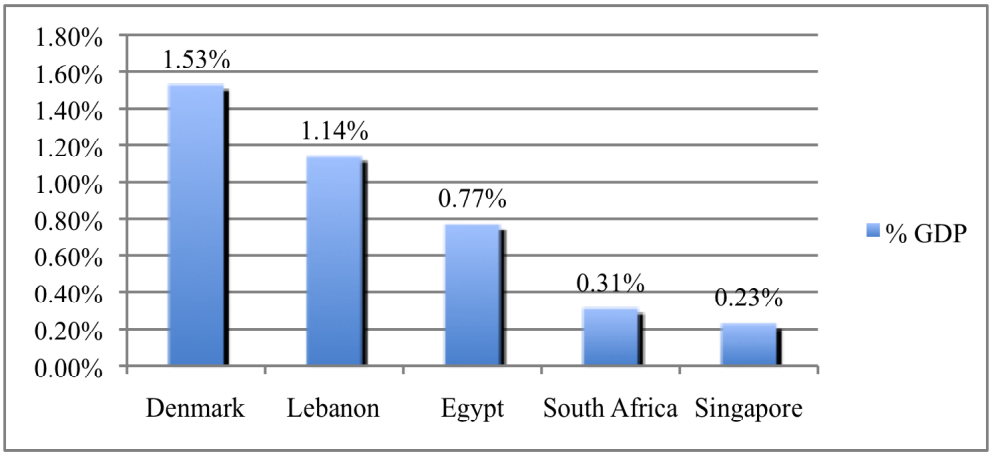
Total cost of smoking is equal to approximately 1.1% of GDP for 2008. Lebanon's GDP in 2008 reached $28.7 billion (World Bank, 2008). The smoking bill costs the Lebanese population at least $326.7 million annually (Table 27). The use of tobacco products in Lebanon costs the country more than the revenue it returns with a minimum loss of $55.4 million. In comparison to other countries, Lebanon's conservative cost due to smoking is quite high (Table 28). Denmark has a higher percentage spent on tobacco whereas other developing countries have a lower expenditure than Lebanon.

Table 27: Breakdown of Tobacco Cost*

	Million $
Total Cost	**326.7**
Direct Cost	262.1
Cost of Disease	146.7
Of Which:	
Cardiovascular Disease	104.5
Smoking-Related Cancer	33.6
Respiratory Diseases	8.6
Productivity Cost	102.2
Environmental Degradation	13.2
Of which:	
Forest Fires	6.5
Street Waste	6.7
Indirect Cost	64.6

*Author's Calculations

Table 28: Cost of Smoking as Percent GDP



Source: Author's Calculations; (Tobacco Atlas, 2009); (World Bank, 2008)

10. Conclusions

Tobacco trade leads to a deficit to the Lebanese economy. We take our estimates of the health costs of smoking to be a conservative lower bound on the true health bill from smoking, given the scarcity of relevant data on a substantial source of smoking related costs, and given our explicitly cautious imputation methods of incidence rates and related medical bills. Furthermore, tobacco trade leads to a drain on the overall public budget of $55.4 million at a time when budgetary considerations are of paramount importance to the Lebanese government.

Policy reforms should be implemented regarding tobacco control in the light of the net loss caused by this sector. If new policies were to be instated, Lebanon will not only experience an immediate decrease in cost but will also prevent higher costs in the long run as tobacco smoking is expected to become the leading cause of death in the near future (Tobacco Atlas, 2009). Therefore immediate action will not only prevent many deaths but will also deflate the government bill in this regard. Furthermore, we hope that by identifying the various stakeholders in the tobacco trade, we can better inform the debate on the equity effects of any future tobacco reform, and help devise remedial policies that take into account the net gainers and losers from any tobacco reform package.

The government has a rich menu of policy tools at its disposal to better control tobacco consumption. From a purely economic standpoint, the tobacco trade shows a striking negative scorecard. We know from the experience of other countries that have implemented stricter tobacco control that the policy instruments available to the government are not only effective at reducing overall consumption of tobacco, thereby addressing the issue at the level of the primary market that is causing the net drain on the Lebanese economy, these instruments can also achieve this consumption cut in ways that are especially beneficial to the treasury. Thus if tax policy is formulated soundly, tax revenues from tobacco would not necessarily have to suffer the entire brunt of the cut in tobacco consumption. We hope to examine more carefully the micro- and macroeconomic effects of a change in the tax rate on tobacco in future research.

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