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## The Economic Impact of Cigarette Smoking on the Poor in Jordan

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### ABSTRACT

**Objectives:** To examine the expenditure on cigarette smoking in Jordan and compare the costs with potential investments in food and other essential items. **Methods:** Review of available statistics and calculations based thereon. **Results:** Cigarette smoking prevalence is the highest among the poorest, with the highest rate (57%) being among adult males with an income of 100 to 250 Jordanian dinars per month as compared with the prevalence rate of 14% among adult males with an income of 500 Jordanian dinars or more per month. Our calculations show that the poorest 40% of adult males are 1.7 times more likely to smoke cigarettes than the richest 17% of adult males. The average poorest adult male cigarette smoker with an income of 100 to 250 Jordanian dinars per month spends approximately 25 times more on cigarettes than on health, approximately 10 times more on cigarettes than on education, approximately 2.5 times more on cigarettes than on housing, and approximately 1.5 times more on cigarettes than on food. The amount spent on cigarettes could potentially add up to 115 calories of a balanced diet per capita daily

or 850 calories of a balanced diet per average cigarette smoker daily. Smoking cost the country 1 billion Jordanian dinars in 2012, including money spent on tobacco and smoking-related diseases, which amounted to approximately 5% of the gross domestic product. These calculations underestimate the real cost of smoking because these do not include the loss in work productivity due to smoking, which can be substantial. **Conclusions:** Our positive analysis shows that by adopting policies that reduce cigarette use, Jordan would be able to achieve both short- and long-run economic gains that will disproportionately benefit the poorest. Normative analysis suggests that an increase in tobacco taxes is likely to be the most efficient policy tool to reduce cigarette smoking in Jordan.

**Keywords:** cigarette expenditure, Jordan, nutrition, poverty.

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### Introduction

Nearly 80% of the world's 1 billion smokers live in low- and middle-income countries [1]. In most countries, tobacco use tends to be higher among the poor, who spend a larger proportion of their income on tobacco. Money spent on tobacco cannot be spent on basic human needs such as food, shelter, education, and health care. In the case of the poorest, in whom a large percentage of their low income is required to buy food, expenditures on tobacco may make the difference between having an adequate diet and a state of malnutrition. Tobacco can also worsen poverty among users and their families because tobacco users are at a much higher risk of falling ill and dying prematurely of cancers, heart attacks, respiratory diseases, or other tobacco-related diseases, depriving families of much-needed income and imposing additional costs for health care [2].

Jordan has a population of around 6.5 million and has been classified by the World Bank as an "upper middle-income country," with a gross national income per capita of US \$5160 [3,4].

Jordan has high unemployment rates—12.3% as in 2013 but some estimate it to be as high as 30%, with an estimated 14.2% of citizens living under the poverty line in 2002 [5]. Despite the high level of poverty in Jordan, smoking rates are relatively high. Jordan tops among the Middle Eastern countries in the prevalence of smoking among males. The rate of smoking among Jordanian men was 47% in 2011, followed by 42% in Turkey and 39% in the West Bank and Gaza [6]. The smoking prevalence trends among Jordanian men ranged from 51% in 2002 [7] to 47.1% in 2004 [8] and 48.2% in 2007 [9], whereas the trends among Jordanian boys aged 13 to 15 years ranged from 22.6% in 1999 to 19.2% in 2004 and 22.7% in 2007 [9].

### Methods

Data on tobacco use and on household expenditures were collected from the Hashemite Kingdom of Jordan Department of Statistics [10–14]. Information on the percentage of adult male

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smokers in each income group was based on cross-sectional data from 804 adult smokers (males = 530; females = 274) [15]. The average daily expenditure on cigarettes by cigarette smokers was based on a sample selected using a multistage, geographically clustered design. The sample comprised 4090 individuals, with 42% female smokers and 58% male smokers [16].

Hashemite Kingdom of Jordan Department of Statistics surveys [10–14] were used to calculate the following statistics:

1. The average daily per capita expenditure on cigarettes in 2010 was calculated by first finding the total yearly expenditure on cigarettes in 2010 and then dividing it by the size and the number of days in a year.
2. The total yearly expenditure on cigarettes in 2010 was calculated by multiplying the average yearly household expenditure on cigarettes by the number of households in the kingdom in 2010.
3. The percentage of smokers' monthly income spent on cigarettes was calculated by first estimating the average daily expenditure on cigarettes by cigarette smokers and then multiplying it by 30 days to find the average monthly income spent on cigarettes. The average monthly income spent on cigarettes was then divided by the monthly income to find the percentage of smokers' monthly income spent on cigarettes.
4. Smokers' average yearly expenditure on cigarettes was divided by the average yearly expenditure on health, education, food, and housing for different income categories. These calculations were conducted to enable us to compare expenditures on smoking relative to the other expenditures for different income categories.
5. Smokers' average yearly expenditure on cigarettes was allocated across food stuff, housing and related expenditure, transportation and communication, education, clothing and footwear, personal care, medical care, and culture, recreation, and sport in accordance with average expenditures in the richest and poorest governorates in the kingdom. These calculations were conducted to enable us to quantify the increase in expenditures across categories for the average smoker in case they quit smoking.

An example of a balanced diet was constructed on the basis of the recommendations of the jointly published dietary guidelines of the US Department of Health and Human Services and the US Department of Agriculture [17]. According to the example, a balanced diet includes 21% chicken breast, 15% cheese, 13% apples, 12% eggs, 11% oranges, 4% tomatoes, 5% potatoes, 3% lettuce, 7% milk, 2% white bread, and 7% rice. The number of calories of a balanced diet that could be purchased by an amount equivalent to the amount spent on cigarettes is calculated by first estimating the ratio of the average expenditure on cigarettes calculated as mentioned earlier and the recommended minimum amount of expenditure required to purchase the calories of a balanced diet given in the aforementioned example. The

minimum amount of expenditure required to purchase the calories of a balanced diet is calculated using estimated market prices [18]. This ratio is then multiplied by the number of calories of a balanced diet to find the number of calories of a balanced diet purchased by the equivalent amount spent on cigarettes.

## Results and Discussion

The prevalence of smoking is higher among the poor; cigarettes are in fact disproportionately consumed by the poor [19,20]. Within individual countries, tobacco consumption burden is also the greatest among the poor [21]. By analyzing the data collected and by conducting some simple calculations, we arrived at similar conclusions concerning cigarette use in the Hashemite Kingdom of Jordan. Table 1 shows that the burden of smoking falls mostly on the poorest, with 57% of Jordanian adult male smokers originating from the poorest 40% of the Jordanian adult male population. By dividing the ratio of the Jordanian adult male smokers in the poorest income category by the ratio of the Jordanian adult male smokers in the other three income categories, we find that the poorest 40% of Jordanian adult males are 1.97 times more likely to smoke cigarettes than the second poorest 33% of Jordanian adult males, 2.85 times more likely to smoke cigarettes than the third poorest 10% of Jordanian adult males, and 1.7 times more likely to smoke cigarettes than the fourth poorest (i.e., the richest) 17% of Jordanian adult males. We also observe that the relationship between income and smoking prevalence represents a reverse J-shape. One explanation could be that smoking prevalence is the highest for the lowest income group and this may be attributed to the substantially low level of education combined with a high level of stress [15]. As income level increases, the level of stress decreases and the education level improves, which leads to lower levels of smoking prevalence. We will call this effect the substitution effect, which implies that as the opportunity cost of smoking increases people will smoke less and consume more of other goods and services. But as income keeps increasing to higher levels, the household member share of total household expenditure increases, which leads to the individual household member to consume more goods and services, including cigarettes. We will call this the income effect. At a certain point, the income effect will outweigh the substitution effect and the household individual member will end up buying more cigarettes as his income increases. There is also the evidence that Jordanians view smoking as a social habit; having coffee and cigarettes with friends and family members is deeply rooted in the culture [22]. Therefore, as the household member share of total household expenditure increases, there will be more social activities, which could also lead to an increase in smoking prevalence [23].

Keeping in mind that the rate of smoking among Jordanian adult males was 47% in 2011 and by dividing the percent of "Jordanian adult male smokers in income group/Jordanian adult males in

**Table 1 – Jordanian adult male cigarette smoking rates and relative risks of smoking by income group, 2009 [6,11,15].**

Monthly income in Jordanian dinars (per adult male)	Percentage of adult male smokers in income group/adult male smokers	Percentage of adult males in income group/adult males	Percentage of adult male smokers in income group/adult males in income group	Jordanian adult male relative risks of smoking
100–250	57	40	67	1.43
251–400	24	33	34	0.72
401–500	5	10	23.5	0.5
500+	14	17	39	0.83

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