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**Are Tobacco Excise Taxes Discouraging Smoking Behavior?  
Cross-Sectional Evidence from Poland**

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**This is a documented report of poster presentation titled “Are Tobacco Excise Taxes Discouraging Smoking Behavior? Cross-Sectional Evidence from Poland” provided by Christina Czart Ciecierski for the Second Conference on the Health Status of Central and Eastern Populations after Transition Warsaw Poland – June 2000**

## **Introduction**

This study uses cross-sectional survey data collected in Poland in April 1999 to evaluate the early effects of Poland's 1999 January and March cigarette excise tax hikes on the smoking behavior of adult Poles. Specifically, this research examines the correlates of smoking behavior and how adult smokers with varying socio-economic and socio-demographic characteristics have reacted to changes in cigarette price. Possible smoker reactions to increasing cigarette prices include: cessation, trial cessation, cutting back and substitution. Survey questionnaires were distributed among a randomly selected group of individuals and were administered face to face by trained survey administrators. Results indicate that smoking among adult Poles is sensitive to excise tax hikes. Although 52% of smokers surveyed reported that the rising cigarette prices in January and March of 1999 had no effect on their smoking behavior, 33% of the sample reported "actively" reacting to higher cigarette prices. Among those who actively altered their smoking behavior, nearly 7% reported quitting or trying to quit smoking. Another 26% reveal smoking less or switching to less expensive brands. Over 12% of smokers reacted in a passive manner. The discouraging effect of Poland's rising excise taxes reinforces the findings of earlier economic studies, which report an inverse relationship between tobacco prices and cigarette consumption across various national samples. In Poland, this negative relationship between rising taxes and tobacco consumption provides the statistical evidence that's necessary to help convince Polish policymakers of the continued need for strategic tobacco pricing policy in Poland.

## Tobacco Taxation in Poland

During the 1990's the Polish Ministry of Finance has become increasingly involved in Poland's tobacco control policy. Although from 1990 until 1993, cigarette producers in Poland were not subject to any forms of taxation, in 1993, two forms of taxation were imposed on tobacco products: value added taxes (at a rate of 22%) and excise taxes (levied on four categories of cigarettes). Appendix table A presents the VAT tax and excise duties imposed on four separate categories of cigarettes between 1993 and 1999.<sup>1</sup> The categories of cigarettes include: foreign, domestic king size, domestic with filter and domestic without filter. The foreign brand category applies to imported cigarettes as well as those foreign brands manufactured in Poland but produced entirely from imported tobacco. Although initially, foreign brands were taxed heavily, after 1993 they benefited from relatively low increases in excise tax duties. Between 1993 and 1997, excise taxes on international cigarettes increased by a total of 202% in comparison to a 442% increase on domestic King Size brands or a 502% increase on domestic filtered brands and a 554% increase on domestic non-filtered brands. Table 1 below presents the relatively small annual percent increases in tobacco excise taxes experienced by foreign tobacco firms in comparison to domestic producers.

**Table 1: Percent Increases in Poland's Cigarette Excise Taxes, 1993-1998**

| <b>Cigarette Category</b>      | <b>1994</b> | <b>1995</b> | <b>1996</b> | <b>1997</b> | <b>1998</b> |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Foreign King Size</b>       | 0%          | 28%         | 43%         | 10%         | 19%         |
| <b>Domestic King Size</b>      | 42%         | 57%         | 77%         | 12%         | 25%         |
| <b>Filtered Cigarettes</b>     | 41%         | 75%         | 78%         | 8%          | 12%         |
| <b>Non-Filtered Cigarettes</b> | 50%         | 79%         | 87%         | 10%         | 13%         |

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<sup>1</sup> Data is provided by Poland's Ministry of Finance.

In 1999, sizeable and significant tax levies were placed on Poland's tobacco excise taxes. In an attempt to discourage further inequalities in taxation, excise taxes on all tobacco products were increased by an equal proportion, regardless of foreign or domestic origin. The first was a ten percent increase, which took effect in January. The remaining three increases, each at five percent, were levied in March, June and September. The overall effect of these quarterly tax hikes amounted to a 27% real rise in excise taxes for 1999.

## **Economics and the Demand for Tobacco**

Economic fundamentals maintain that a downward sloping demand curve exists for all normal goods and services purchased by consumers. This means that as the price of a good increases, the quantity demanded of the good that is demanded by a consumer decreases. For many years, economists believed that because of the addictive nature of tobacco, this economic principle could not be applied to tobacco products. In other words, many economists believed that the demand for cigarettes was unresponsive to changes in price. During the last three decades, a number of economic researchers have successfully built econometric models, which effectively describe consumer demand for tobacco products. These studies use new econometric methods and varying sources of data to estimate the effects of cigarette prices and taxes on smoking participation and daily cigarette consumption. One general conclusion emerges from this research: increased cigarette prices reduce cigarette smoking.<sup>2</sup> This research provides powerful economic implications for policymakers across the globe. Lawmakers can use a variety of fiscal and legal tools to influence the price of tobacco products in their respective countries. The price of cigarettes may be measured in two general ways. First, the retail price of a pack of cigarettes reflects the monetary price paid by smokers. A second, broader measure of price accounts for the monetary price and a number of perceived costs associated with smoking.

### **Retail Price of Cigarettes**

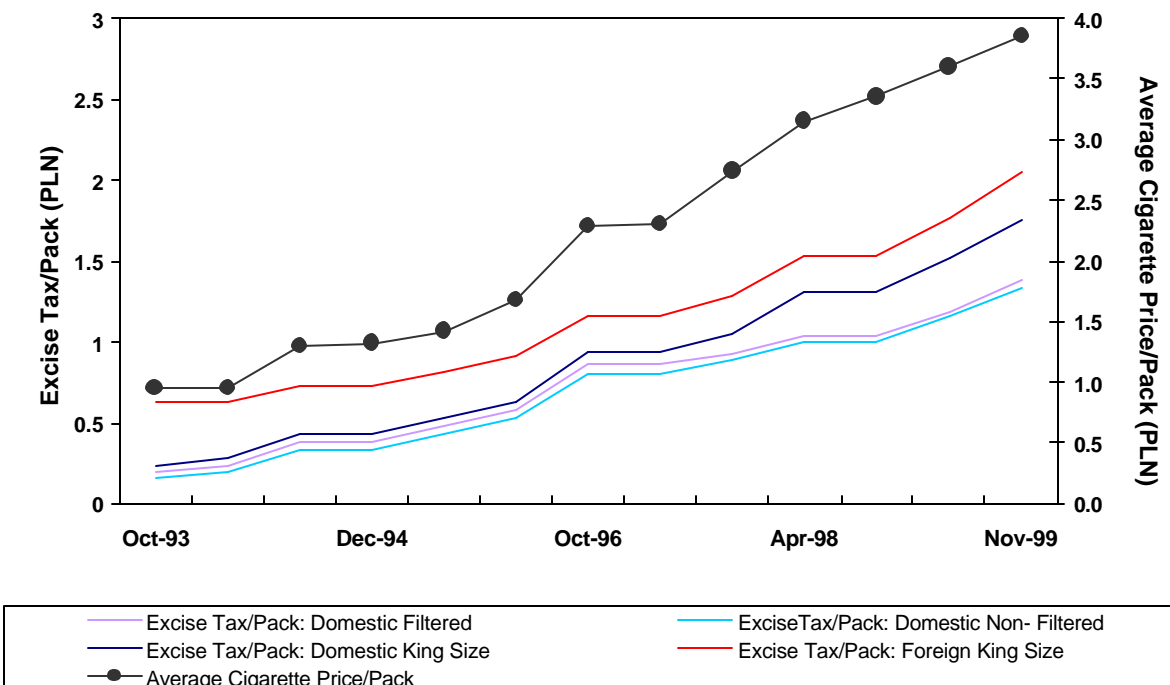
The retail price of cigarettes that prevails in the marketplace in most countries is highly correlated with the level of excise taxes imposed on tobacco. This is also true in the case of Poland. Here, the retail prices of Polish sold cigarettes do rise with increased levels of taxation. As presented in figure 1, the average nominal price of cigarettes sold in Poland has increased together with the tobacco excise taxes. Figure 1 plots cigarette excise tax levels for four categories of cigarettes sold in Poland

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<sup>2</sup> For a comprehensive review of the literature see Chaloupka and Warner, 1999

domestic filtered, domestic unfiltered, domestic king size, foreign king size) between 1993 and 1999.

**Figure 1. Poland 1993-1999**  
Cigarette Excise Tax Rates vs. Average Price per Pack



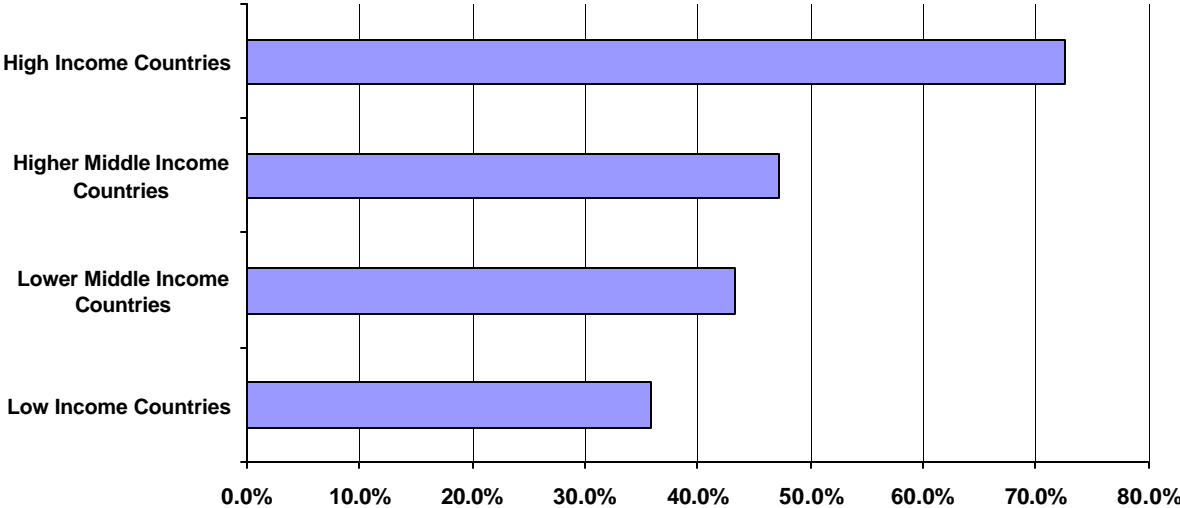
Given both the positive association between tobacco excise taxes and cigarette prices as well as the negative relationship between retail cigarette prices and cigarette consumption, it is not surprising that tobacco excise taxes have become a matter of both political and legislative debate. Excise taxes on cigarettes provide legislators with a strong fiscal tool, which generates revenues for the State and yields positive public health benefits by discouraging smoking. Yet, in order to tobacco excise taxes to be effective, two important criteria need to be established. First, tobacco excise taxes must constitute a considerable portion of cigarette price in order to make a difference. Second, the increase in the retail price of cigarettes, which results from increased excise taxes, must be greater than the inflation rate.

### ***Tax as a Fraction of Price***

In order to be effective, tobacco excise taxes must constitute a significant portion of cigarette price. Figure 2 uses 1995 World Bank statistics and provides a comparative view of tobacco tax levels

and prices across countries. In high-income countries such as the United Kingdom, France and Germany, tobacco tax accounts for approximately two thirds of the retail price of a pack of cigarettes.

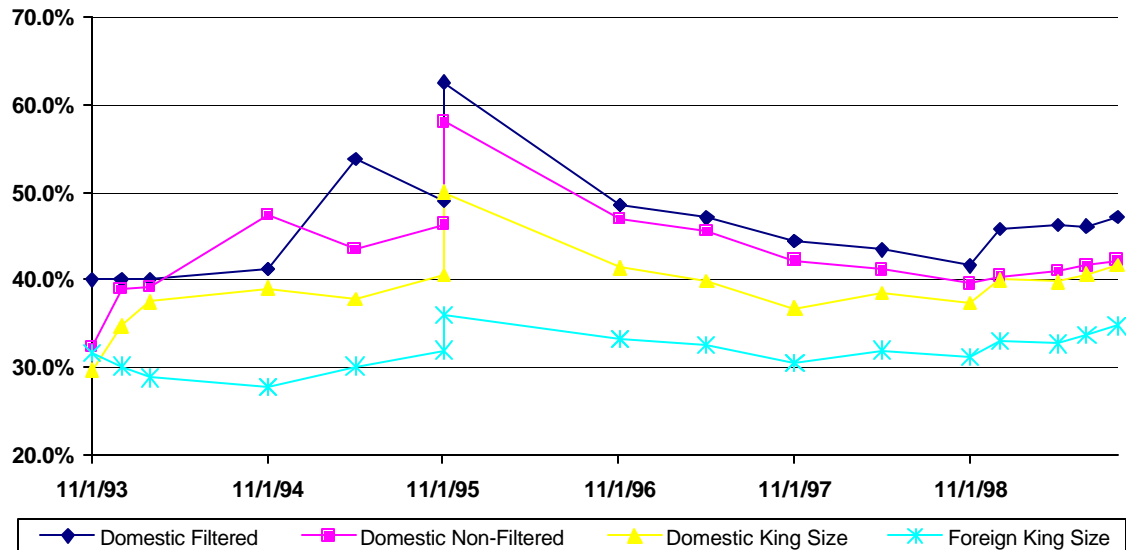
**Figure 2. Tax as a Percentage of Price  
A Comparison of Low, Middle and High Income Countries**



Several transitional economies including Poland, Hungary and the Slovak Republic, are captured by the higher-middle income category. Here taxes generally constitute approximately forty percent of price. In low-income countries such as Cambodia and Bangladesh, tax constitutes between twenty and thirty percent of price.

Figure 3 depicts the proportion of the excise tax to the retail price of cigarettes in Poland in the 1990's. The retail price of domestic cigarettes has been subjected to the highest proportion of excise

**Figure 3. Excise Tax as Percentage of Price per Pack**  
 Four Categories of Cigarettes in Poland  
 1993-1999



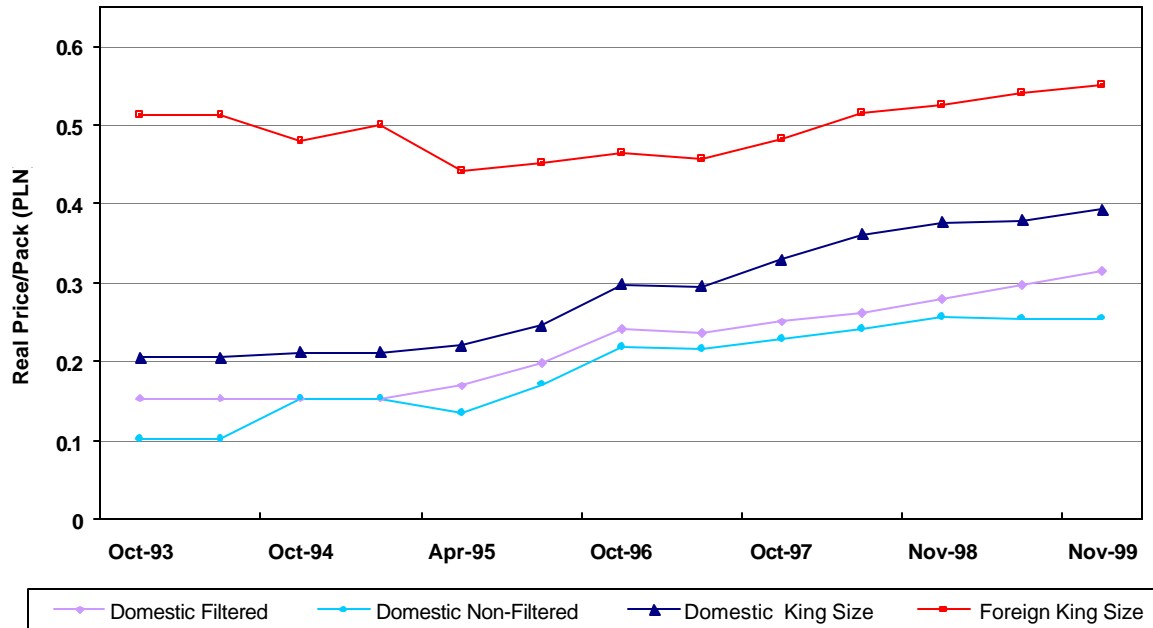
taxes since early 1995. Excise taxes on domestic unfiltered cigarette prices constitute the second highest proportion of the final retail price. Interestingly, excise taxes on foreign brands however, comprise the lowest proportion of price. These plots reinforce the trends, which were depicted earlier in table 2 of this paper. That is, although initially, foreign brands were taxed heavily just as heavily as domestic king size and non-filtered brands (just a little over 30%), over time foreign producers benefited from relatively low levels as well as small increases in excise tax duties. Furthermore, even under the tax reform efforts of 1999, it appears that foreign tobacco firms in Poland continue to be subject to much lower levels of taxation and smaller annual increases in excise taxes when compared to domestic producers.

### *Real versus Nominal increases in Tobacco Excise Taxes*

The effectiveness of raising excise taxes to discourage smoking also relies on the magnitude of the increase relative to a country's rate of inflation. The increases in excise taxes must be real not just

nominal. In other words, the rate of increase in the retail price of cigarettes that occurs because of increased excise taxes must be greater than a country's rate of inflation. Figure 4 depicts how this ratio of excise tax to retail price has been changing in Poland since the enactment of cigarette taxes in 1993.

**Figure 4. Price Trends in Poland**  
Real Cigarette Price/Pack  
1993 to 1993



### Full Price of Cigarettes

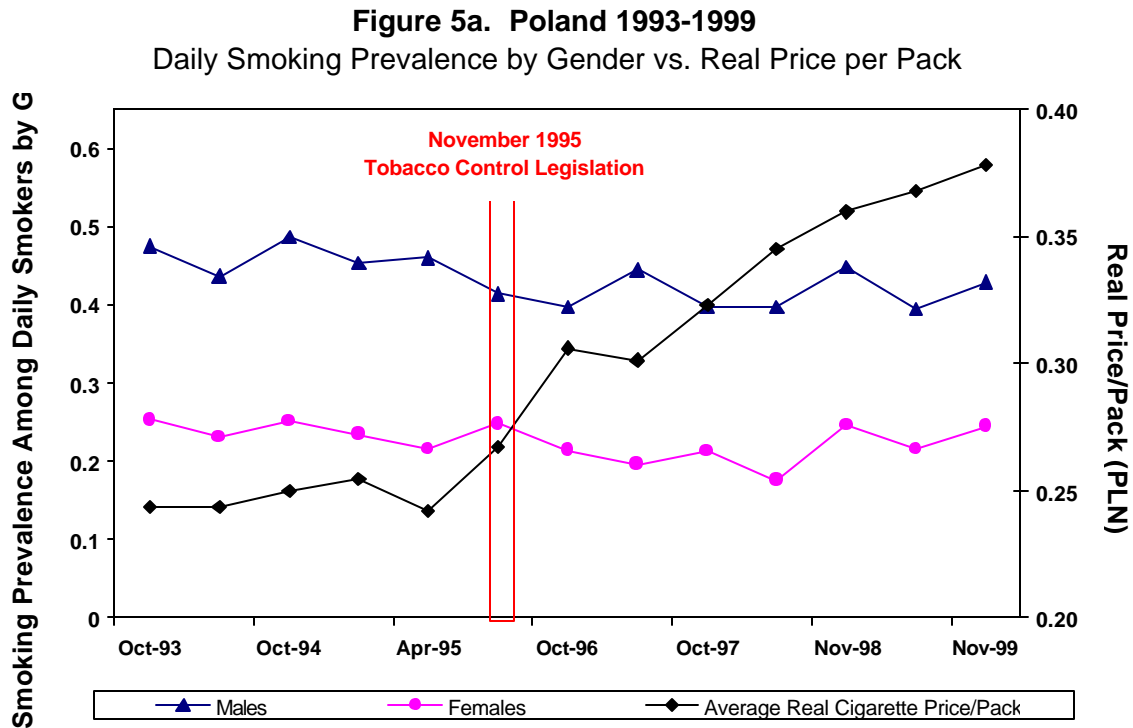
Health economists often apply a more general definition of cigarette price when analyzing the effectiveness of tobacco control policies on cigarette consumption. Here, the full price of a pack of cigarettes not only refers to the monetary cost of a pack of cigarettes but also includes the costs associated with obtaining and consuming cigarettes. Public policies, which restrict smoking in public places, impose additional costs on smokers by increasing the time required for consumption. For example, smokers who are subject to smoking restrictions in their place of employment are forced to smoke outdoors or are subject to fines if caught smoking in restricted areas. Policies, which issue health warning labels raise, the perceived long-term costs associated with smoking by informing

smokers of the negative health consequences associated with tobacco use. (Chaloupka and Warner, 1999)

During the 1990's, the Polish anti-tobacco movement successfully lobbied for a number of tobacco control laws in the Polish parliament. The enactment and enforcement of these laws have gradually raised the full price of smoking in Poland by subjecting smokers to a variety of costs associated with the consumption of cigarettes. Poland's tobacco control policies include one of the world's largest and most distinct health warning labels on both cigarette packs and tobacco advertisements (Poland's health warning labels constitute thirty percent of the surface area on either side of the cigarette packs and constitute twenty percent of the area on advertisements). Other pieces of tobacco control intervention which have raised the perceived costs of smoking in Poland include: smoking restrictions in public places including schools, hospitals, sporting events; regulations such as age restrictions, on the legal sale of tobacco products; advertising regulations which ban cigarette ads on television, radio, in youth publications, movie theaters as well as health, cultural and educational institutions; strong anti-advertising efforts including nationwide health promotion and smoking cessation campaigns.

Figure 5a depicts gender specific trends in smoking prevalence in Poland between 1993 and 1999 versus the rising real average price of cigarettes while figure 5b plots the overall trend in daily cigarette consumption against the rising real average price of cigarettes for the same time period. From figure 5a, it is clear that smoking prevalence among Polish males (averaging 43.3% between 1993 and 1999) is much greater than among Polish females (an average of 22.6% for the same years). Yet, since the enactment of Poland's first set of tobacco control laws in November 1995 and just two years after the first installment of an excise and VAT taxing structure on cigarettes, the percent of daily smokers in Poland has steadily decreased each year. The decrease has been most dramatic among the male population. In 1998, just under 40% of males and little less than 20% of females reported smoking.

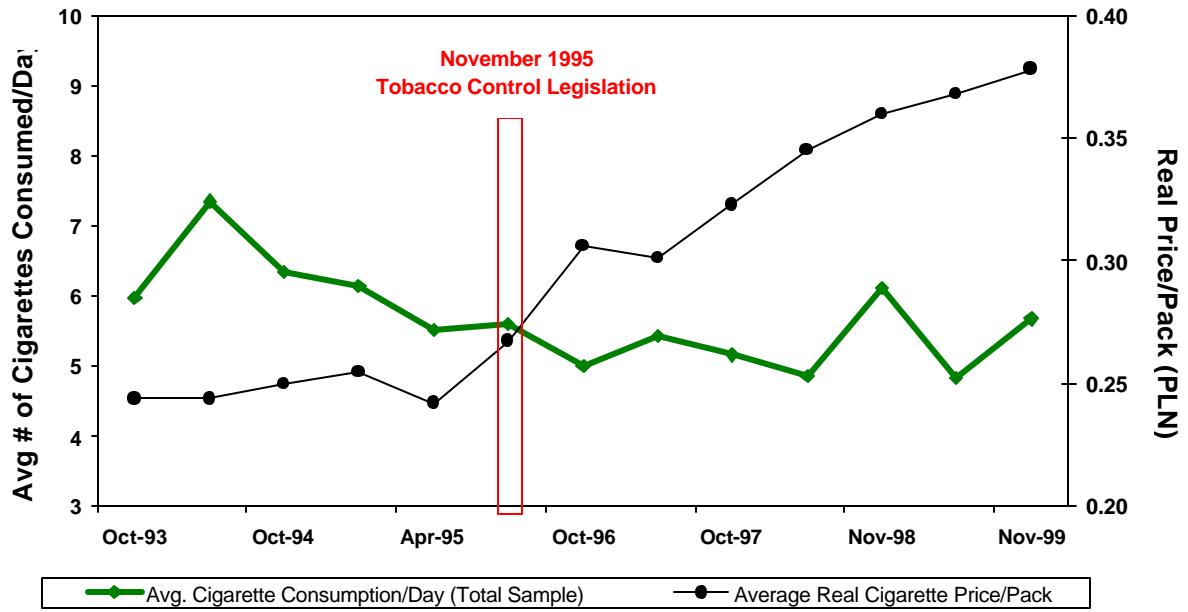
Thus, in Poland, there's been an approximate 10% decrease in the number of male daily smokers and a 5% decrease in the number of female daily smokers since 1994.



As depicted in figure 5b., the average daily consumption of cigarettes among daily smokers has also been decreasing over time while the real average price of cigarettes in Poland has been rising. Figure 5b presents a number of important implications. First, the rise in cigarette price, particularly since April of 1995 has been real. That is, the annual increases in cigarette prices between April 1995 and November of 1999 surpassed the average rates of inflation during those years.<sup>3</sup> Second, an inverse relationship between cigarette price and cigarette consumption is clear. Pricing policy is evidently a efficient and effective means by which to discourage cigarette consumption.

<sup>3</sup> The price term here is a straight average across all four cigarette price measures (foreign domestic king size, domestic filtered, domestic unfiltered). The price term has also been deflated by the Polish consumer price index. In other words, this is the average nominal price of cigarettes adjusted for annual inflation in Poland between 1993 and 1999.

**Figure 5b. Poland 1993-1999**  
Average Daily Cigarette Consumption vs. Real Price per Pack



## Methods

### **Sampling Procedures**

A nationally representative random sample of the Polish population ages 18 and over was chosen using a three-stage selection process. In the first stage, a sample of cities and local administrations called *gminy* or counties were randomly drawn from across Poland. In the second stage, a set of circuits or districts were again, randomly selected from the sample of cities and counties selected in the first stage. A total sample of 1095 individuals was randomly selected from the sample of districts and cities drawn in stages one and two. These individuals were selected using probability proportionate to the geographical size and socio-demographic distribution (gender, age and education) of the Polish population. The participating respondents represent a cross-section of the Polish adult population from across Poland's 16 voivodships.

### **The Questionnaire**

The Department of Epidemiology and Cancer Prevention at the Maria Sklodowska Curie Cancer Center in Warsaw, Poland designed the tobacco section of this survey instrument. The complete questionnaire is a large omnibus survey that's run and managed by The Center for Public Opinion (CBOS) in Warsaw. Trained survey administrators from CBOS administered the survey to each individual in the form of a face-to-face interview. The omnibus study contains questions on many types of health related behaviors including smoking, drinking, and healthy eating habits. In general, the questions pertaining to smoking attempt to gather information on the characteristics and determinants of smoking behavior. Each of the respondents was asked about his or her past and current smoking participation. Questions on smoking behavior include the following: "Do you presently smoke tobacco", "Have you smoked tobacco daily during the past 6 months", "Have you ever smoked tobacco daily for a period of at least 6 months" and "Have you ever smoked at least 100 cigarettes,

pipes or cigars during you lifetime”. Based on the responses to these questions, four categories of smoking participation variables were defined including regular smokers, ex-smokers, occasional smokers and never smokers. The criteria used to classify individuals into one of the four categories are presented later in this paper.

In addition to health behaviors, the survey also obtained detailed socioeconomic and demographic information. This makes it possible to construct important correlates of adult smoking already identified in the smoking literature. Variables constructed include: age of the respondent (in years), an indicator for gender (male and female), marital status (never married, married, divorced or widowed), religious participation (attend services weekly, attend services monthly, attend services yearly, do not attend), level of education (basic, trade school, high school, college), measures of active and non-active socio-occupational status (active include white collar, unskilled worker, farmer and non-active include student, retiree, disabled, unemployed), income (monthly household income per capita), a self reported standard of living (poor, fair, good) and area of residence (agricultural village, town of up to 100,000 inhabitants, small city of 100,000 to 500,000 inhabitants, major city of over 500,000 inhabitants). The discussion in this paper predominantly focuses on those characteristics, which reflect the socio-economic status of the respondents. Measures for socio-economic status include: income, self-reported standard of living, education and socio-occupational status.

### **Main Outcome Measures**

The focus of this analysis is the effect of the first and second quarter cigarette excise tax hikes on the smoking behavior of the Polish population. This information is obtained from one particular question in the April, 1999 survey. The question in the survey instrument asks: “ In January and March of this year the price of cigarettes had increased. Did these increases affect your smoking behavior?”. Possible responses included: Yes, for this reason, I stopped smoking and remain smoke free; Yes, for

this reason I've decided to try to quit smoking but have returned to the habit; Yes, for this reason I smoke less cigarettes; Yes, for this reason I smoke cheaper cigarettes; No, but I am thinking about quitting smoking; It is difficult to say; and Does not apply since I have never smoked or I stopped smoking before January, 1999. A closer look at the responses to this question will help policy makers interpret the effectiveness of cigarette pricing policy in discouraging tobacco use - particularly among various socio-economic and socio-demographic groups of the population.

## Results

### **Categories of Smoking Behavior**

Table 2 below presents the number of individuals surveyed in April 1999 who were classified as self-reported ex-smokers, regular smokers, occasional smokers and never smokers. Various smoking participation measures (smoke now, smoked in past etc.) for both males and females are presented in the table. Individuals were classified into one of four possible categories dependent upon their smoking behavior.

**Table 2**  
**Categories of Smoking Behavior By Gender**

| <i>Variable</i>                            | <u><i>Regular Smokers</i></u> |       | <u><i>Occasional Smokers</i></u> |      | <u><i>Ex-Smokers</i></u> |       | <u><i>Never-Smokers</i></u> |       |
|--------------------------------------------|-------------------------------|-------|----------------------------------|------|--------------------------|-------|-----------------------------|-------|
| <b>Total (N=1095)</b>                      | 350                           | 32.0% | 32                               | 2.9% | 163                      | 14.9% | 550                         | 50.2% |
| Males (N=519)                              | 222                           | 42.8% | 21                               | 4.0% | 103                      | 19.8% | 173                         | 33.3% |
| Females (N=576)                            | 128                           | 22.2% | 11                               | 1.9% | 60                       | 10.4% | 377                         | 65.5% |
| <i>Chisq = 112.72 (k=3), p &lt; 0.0000</i> |                               |       |                                  |      |                          |       |                             |       |

- *Regular Smokers* consist of those individuals who reveal: smoking presently, smoking at least 100 cigarettes, cigars, cigarillos or pipes during their lifetime and smoking at least one cigarette daily during the six months directly preceding the survey.

- *Occasional Smokers* are those individuals who reveal smoking at least 100 cigarettes, cigars, cigarillos or pipes during their lifetime but who did not smoke at least one cigarette daily during the six months directly preceding the survey. Occasional smokers also include individuals who report: smoking presently, smoking at least 100 cigarettes, cigars, cigarillos or pipes during their lifetime but who have never smoked daily for a period of six months or more.
- *Ex-Smokers* include those individuals who do not smoke at present and did not smoke for six months prior to taking the survey but reveal smoking for at least a period of six months some time in the past and have smoked at least 100 cigarettes, cigars, cigarillos or pipes during their lifetime.
- *Never Smokers* are those individuals who report not smoking at least 100 cigarettes, cigars, cigarillos or pipes in their lifetime. Likewise, never smokers also include individuals who smoked 100 cigarettes, cigars, cigarillos or pipes during the course of their lifetime but who do not smoke at present and have never smoked daily for a period of six months or more.

### **Extent of Smoking Participation**

A variety of factors have an impact on the demand for cigarettes. These include income, advertising, marketing activities and consumer tastes. Consumer tastes are important to cigarette demand analysis and may be explained by a number of commonly collected individual characteristics. Factors such as gender, race, religion and marital status are important non-economic determinants of smoking which help describe smokers. Such characteristics help explain why groups of people of certain social and demographic attributes may choose to consume tobacco more frequently than individuals from other groups.

Tables 3 and 4 present summary statistics for all four categories of smoking behavior for the entire pool of respondents as well as for gender subsets of the sample. The columns of the table divide

the respondents into one of four smoking categories while the rows report how each category of individuals (the number and percent) is distributed across various socio-economic or socio-demographic characteristics.

For years, it was believed that the relationship between income and cigarette consumption was positive. That is, economists maintained that cigarettes and other tobacco products were a normal good.<sup>4</sup> This suggested that as an individual's incomes rose, so did that individual's demand for tobacco. However, the past two decades of economic tobacco research and the development of more sophisticated statistical tools have revealed that tobacco is in fact an inferior good. As an individual's income rises, the probability of the individual's smoking participation decreases. Assumptions can be made about the characteristics of the smoking behavior of higher income individuals relative to those of lower incomes. Simply stated, higher income individuals have access to better health information and ultimately, better health care. In addition, higher income groups are associated with higher levels of education. Because of their higher levels of schooling, high-income earners are better informed on matters of their health and on decisions surrounding tobacco smoking. They recognize the adverse effects of smoking and more readily deal with its health consequences.

Tables 3.1-3.3 present various measures of socio-economic status including monthly per capita household income and self-reported standard of living. Socio-occupational status and education are also included as proxies for income. A negative relationship between socio-economic status measures and smoking prevalence (as indicated by the number of regular and occasional smokers) is clear, particularly under monthly per capita income, self reported standard of living and education

In general, as the level of education increases the number of smokers tends to decline. In this sample, this is evident for both the male and female subsets and for the population as a whole. In all

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<sup>4</sup> For a comprehensive review of the literature see Chaloupka and Warner, 1999

three samples, individuals with low, trade school levels of education constitute the largest number of regular, while individuals with some college or more constitute the smallest number of regular smokers. In the male sample, men with primary or trade school levels of education account for a larger percentage of regular smokers relative to individuals with high school and college levels of education. This relationship is less evident among females. Unlike their male counterparts, only 16.6% of primary level and 20.7% of high school educated females smoke regularly. Yet, over 26% of Polish women who either began or completed college smoke regularly. They rank second only to the 30% of females with trade school levels of schooling who smoke cigarettes daily.

The implications are similar for the self-reported standard of living indicators. Individuals who report a poor standard of living constitute the largest fraction of regular smokers. In the general sample, almost 34% of those living under poor economic standards report smoking regularly. In the male subset, 45% of men with poor economic status report smoking daily. This relationship is less clear in the female sample. Here, 46% of women with a poor outlook on their economic status smoke regularly while a larger percentage (62%) of women with a fair standard of living are regular smokers. This finding may reflect the Polish female population inability to accurately classify their standard of living. A number of characteristics may be responsible for this skewness. For example, the inability to rate own standard of living may be associated with Poland's traditional division of labor. Here, women are less involved in the financial matters of the household and are simply unable to correctly rank their economic status.

The monthly household income per capita measure was obtained by dividing the range of monthly income values into quartiles. As a result, four income ranges were constructed and include: less than 300 zlotys per capita per month, between 301 and 400 zlotys per capita per month, between 401 and 600 zlotys per capita per month and over 600 zlotys per capita per month. In all three samples

(total, males, females) the number of regular smokers is largest within the lowest income ranges and fewest among the highest income brackets. Although the distribution of regular smokers across four income groups and three samples does not uniformly show that as an individual's income increases, the probability of the individual being a smoker decreases, it is clear that those within the lowest income brackets tend to smoke more and more often than those with high incomes. In the case of males and the entire sample, the relationship between occasional smoking and income level is actually positive. This suggests that perhaps Polish males associate a certain degree of stamina or prestige to occasional smoking.

Finally, measures of socio-occupational status were also included. The first three categories of occupational status capture those individuals who are actively participating in the Polish labor market. These include skilled white-collar employees, unskilled workers and farmers. A clear pattern of smoking participation emerges across all three samples for each of these three occupational categories. Individuals working in unskilled labor positions are more likely to smoke regularly than their skilled, white-collar counterparts. Because socio-occupational status is really a proxy for income, this finding reflects an income effect: people with high incomes smoke less while people with low incomes smoke more. The patterns of occasional smoking participation are different. Here, skilled, white-collar workers are more than twice as likely to smoke occasionally than their unskilled counterparts. The case of the Polish farmer is an interesting and somewhat unique - 'all or nothing' - scenario. Across all three samples, it is clear that farmers are least likely to smoke regularly. Furthermore, farmers in all three samples report zero episodes of occasional smoking. A clear pattern in the relationship between smoking participation and income (as measured by socio-occupational status) is less evident among individuals non-active in the labor market. Nevertheless, there are interesting findings among categories. First, the largest fraction of regular smokers falls among the unemployed. The percentage

of unemployed who smoke is twice as great as the number of student or retired smokers. In the total sample, over 47% of unemployed persons smoke regularly. In the gender samples 65% of unemployed men and 33% of unemployed women smoke regularly. The second most striking finding is the number of housewives who smoke. Over 34% of female homemakers smoke regularly. Another 8.6% smoke occasionally. These women smoke more than female students and female retirees and surprisingly, surpass the already large percentage of female unemployed (33%) that smoke.

Tables 4.1-4.3 categorize various types of smokers by their individual characteristics such as age, marital status, religious participation and the demographic size of their area of inhabitation. Given the focus of this paper, the implications of the socio-demographic determinants of smoking participation will not be discussed but are reported for the benefit of the reader.

### **Smoker Reaction to Cigarette Excise Tax Hikes**

According to economic consumer theory, as the price of a commodity increases, the quantity demanded of that product will decrease. Historically, it was believed that due to the addictive nature of tobacco, the demand for tobacco products was unresponsive to changes in price. In other words, an addicted cigarette smoker would pay almost any price to consume a constant quantity of cigarettes. Evidence from the past two decades of economic research as well as the advancement of statistical tools reveal that tobacco consumption, and particularly cigarette use, is in fact sensitive to changes in price. As the price of cigarettes rise, the quantity demanded of cigarettes falls. The degree to which a consumer's quantity demanded for a good changes in response to price changes is defined as the price elasticity of demand.

In tables 6 and 7, we look at how fractions of Polish smokers responded to the early tobacco tax hikes of 1999. Given the lack of cigarette ample price points, no econometric analyses were conducted

during the analyses for this study. The figures presented in the table are simple ratios and not measures of the degree of price responsiveness.

Tables 5, 6 and 7 present the reaction of Poland's smokers to the cigarette price increases, which resulted after the January and March 1999 excise tax hikes. Columns 1-5 of tables 5, 6 and 7 report how smokers from the survey sample population reacted to the January 1999 and March 1999 cigarette price increases. Table 5 looks at how all smokers in the sample as well as smokers by gender reacted to the rising cigarette prices of early 1999. Tables 6 and 7 present these responses for both the socio economic and socio demographic characteristics of the sample. Columns 1-2 present four possible "active" reactions which smokers may have had to rising cigarette prices. These include: successfully quitting smoking, trying to quit smoking, smoking less cigarettes and substituting towards less expensive cigarette brands. Column 3 captures those who responded passively to the price changes. Specifically, these are smokers who have not changed their smoking behavior but have become more aware of the hazards of smoking and have begun to contemplate quitting. Column 4 reports those who report being completely unaffected by the price increases. Finally, column 5 accounts for those smokers who are uncertain of the effects of the tax.

In table 5 below, we find that overall, 33% of smokers report "actively" reacting to the 1999 price changes. In the general population, almost 7% of smokers report successfully quitting smoking or having had tried to quit smoking though unsuccessfully, as a result of the cigarette tax rises. Another 26.67% report smoking less cigarettes or switching to less expensive cigarette brands as a result of the price rises. Although passive in their reaction to the tax, 12.10% of the general sample reveal that the price increases brought them closer to thinking about eliminating their habit. The results by gender indicate that nearly 31% of males and 37% of females "actively" reacted to the price rises. Another 15% of men and 7.5% of women smokers report that the cigarette price increases did not change their

smoking behavior but did bring them closer to thinking about cessation. The remaining 50% of smokers, both in the overall population as well as in the gender samples report that the price increases which resulted from tobacco tax hikes did not have any effect on their smoking behavior.

**Table 5: Overall Smoker Reaction to Excise Tax Increases**

|                          | 1                                  | 2                                         | 3                           | 4                | 5                       |
|--------------------------|------------------------------------|-------------------------------------------|-----------------------------|------------------|-------------------------|
| <b>Sample of Smokers</b> | <b>Quit or Try to Quit Smoking</b> | <b>Smoke Less or Smoke Cheaper Brands</b> | <b>Considering Quitting</b> | <b>No Effect</b> | <b>Difficult to Say</b> |
| <b>All</b><br>405        | 6.91%<br>28                        | 26.67%<br>108                             | 12.10%<br>49                | 52.35%<br>212    | 2.22%<br>9              |
| <b>Males</b><br>249      | 5.48%<br>14                        | 25.38%<br>63                              | 15.10%<br>38                | 52.48%<br>131    | 1.58%<br>4              |
| <b>Females</b><br>156    | 8.96%<br>14                        | 28.97%<br>45                              | 7.51%<br>12                 | 51.91%<br>81     | 3.09%<br>5              |

Table 6 presents smoker responses to cigarette price increases, according to 4 categories of socio-economic status indicators. These include: education, income, self-reported standard of living and socio-occupational status (for both active and non-active labor market participants). When the price of any good rises, people with lower incomes are most likely to consume less of that good. Thus, we would expect to find that smokers with lower levels of socio-economic status (including low levels of education, income and economic living standards) are more likely to react to increasing cigarette prices than smokers of high socio-economic status. The following discusses this inverse relationship in the context of results presented in table 6.

### *Standard of Living*

In examining the tax reaction results among individuals of various standards of living, the findings from all three samples show that individuals with a poor to fair standard of living constitute the largest percentage of quits or attempted quits. Similarly, those individuals, who have most pronouncedly chosen to limit their daily cigarette consumption or substitute towards less expensive

brands as a result of the tax, reveal a poor standard of living. The smoking behavior of individuals with a high standard of living is least affected by rising cigarette prices. In all three samples, over 60% of smokers who defined a good standard of living state that the price increases had no effect on their smoking behavior. Yet, female smokers who report a high standard of living are most likely to think about quitting as a result of the tax. The same is true for males who reveal a fair standard of life.

### ***Education***

In using education measures as a proxy for income, we infer that the lower the level of education, the lower the estimated income of an individual and the greater the probability of response to increases in cigarette prices. The data from the April 1999 survey provide general evidence to support this relationship. In all three samples, smokers with basic or trade school levels of education are most likely to quit or try to quit smoking. Particularly, less educated females report the greatest response in terms of cessation or trying to quit. By the same token, individuals who reveal the highest levels of education (some college or more) are least likely to quit or try to quit and also, are least likely to cut back their cigarette use or to substitute to less expensive cigarette brands. Finally, similar to the standard of living measures, the smoking behavior of the most educated is least affected by rising cigarette prices. In all three samples, over 70% of individuals who completed some college or more report that the price increases had no effect on their smoking behavior. This variation in reactions is derived from the availability of information among the different education groups. Highly educated smokers presumably already have sufficient access to health information but choose to smoke despite their knowledge of health consequences. Thus, the informational aspects of rising excise tobacco taxes have no effect on the decision to smoke. Likewise, because highly educated individuals tend to earn higher wages, the price effect of the tax is also small relative to less educated groups.

### ***Monthly Income per Capita***

The distribution of smoker responses across the income measures reveals that smokers of low monthly incomes are most likely to actively respond to cigarette price increases. Particularly, in all three samples, individuals who declare low levels of income are most likely to cut back or to switch to cheaper cigarette brands. The results on the other reactions (including quitting or trying to quit and no effect) are less clear and do not reveal a pattern in their distribution across income levels.

### ***Socio Occupational Status***

A number of interesting results emerge from the tax reactions of various socio-occupational groups. Among individuals not actively participating in the labor force, housewives and male students reacted most to rising cigarette prices. Over 48% of male students report actively changing their smoking behavior as a result of the tax hikes (7.7% report quitting or trying to quit while 40.82% report smoking less or smoking cheaper brands). 50.25% of housewives actively changed their behavior towards cigarette consumption (11.95% quit or tried to quit while 38.3% smoke less or substitute for cheaper brands). Retired or disabled individuals reveal being the most amiable to the thought of quitting smoking (11.63% in the total sample, 13.98% in the male sample and 5.75% in the female sample). Finally, the action to smoke less or substitute towards cheaper brands was most pronounced among the unemployed (38.98% in the total sample, 43.27% among males, 31.64% among females).

Among those active in the labor market, farmers reveal the largest active responses to rising cigarette tax rates. 49.48% of farmers in the total sample report actively changing their smoking behavior (8.48% report quits or attempts to quit while 41% report smoking less or substituting towards cheaper brands). Similar results exist among the gender samples. 59.44% of males report active tax reactions (14.46% quit or tried to quit while 44.98% smoke less or smoke cheaper cigarettes) and 59.63% of females reveal changing their behavior towards smoking consumption (31.74% quit or tried

to quit while 27.89% smoke less or smoke cheaper cigarettes). White collar workers are most passively responsive to increases in cigarette price. In other words, over 22% of skilled, white collar workers (33.28% of males and 14.62% females) declare thinking about quitting smoking. Smoker reaction to cigarette price changes is also reported according to various demographic descriptors including age, marital status, religiosity and demographic size. These are presented in tables 7.1-7.3. Again, given the scope of this report, the sensitivity of smokers to price changes according to their socio-demographic characteristics will not be addressed. These tables are provided for the benefit of the reader.

## Discussion

The revised tobacco tax system of 1999 attempts to increase the revenues of the Polish State while improving the nation's health. First, rising excise taxes will help redistribute earnings and profits from thriving tobacco producers to the Polish government. In return, beginning in the year 2000, a fraction of these government revenues will be returned to Polish citizens, as funds will be used to improve public health through new anti-tobacco campaigns and nationwide health promotion.

Secondly, increasing tobacco taxes and therefore, higher cigarette prices, like any tobacco control tool, help to convey a public health message to the public. Smoking is not only costly because it brings illness and death to millions of smokers but because it carries negative health externalities to non-smokers as well. Third, increases in excise taxes will continue to raise the price of cigarettes, requiring smokers to pay more for their unhealthy habit. This will allow the Polish government to collect a type of user fee from smokers in the form of increased revenues. Fourth, higher cigarette prices can effectively discourage new smokers, particularly youth, who face constrained levels of income.

Finally, it is important to understand that it will take time for addicted consumers to re-evaluate their economic choices and tastes and finally, decide to minimize or eliminate smoking from their lives. In general, the addictive nature of tobacco carries important implications for the effectiveness of rising cigarette prices in discouraging tobacco use. Economic models of addiction maintain that an individual's current tobacco consumption is dependent upon the current price of tobacco goods as well as on the levels of his or her past consumption. In analyzing the effects of Poland's recent excise tax hikes, it is important to remember that addicted smokers (in this case, regular smokers) will respond more slowly to price rises than less addicted smokers (occasional smokers or young smokers).

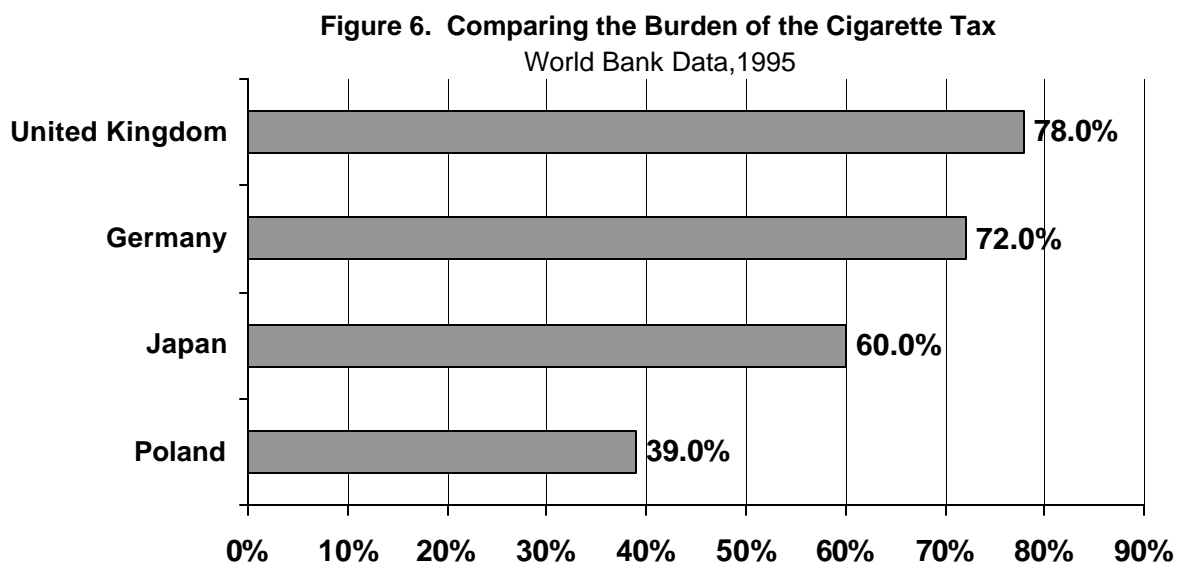
However, over time, if the price increases on tobacco products are real (that is, if the prices of tobacco

products increase at a rate greater than the general rate of inflation) then the response of addicted smokers to price changes will increase over time.

The results reported in the previous section indicate that smoking among Poles is sensitive to price changes. In particular, cigarette use among Poles did react negatively to the first and second quarter excise tax hikes of 1999. Although 52% of the total sample of smokers reported that rising cigarette prices had no effect on their smoking behavior, over 33% of the sample reported actively taking some action towards smoking as a result of rising tobacco excise taxes.

### The Need for Continued Fiscal Tobacco Control Policy in Poland

Figure 6 below present's Poland's cigarette tax burden relative to other cigarette producing countries.



Clearly, Poland continues to fall below EU levels of taxation on tobacco products. Given Poland's aspirations to join the European Union, where cigarette prices are significantly higher and the tax burden on cigarettes is a significantly higher percentage of retail price, the future of Poland's tobacco

taxation structure calls for an improved comprehensive taxation and pricing policy, which will help harmonize Poland's cigarette tax system with those of other European Union countries.

Poland's anti-tobacco campaign does not indicate a slowdown in the future. The upcoming budget calls for a 28% increase in cigarette excise taxes for the year 2000, which constitutes an overall price rise of about 8.5% on all cigarettes. Likewise, the budget calls for a 34% rise in 2001 and a 33% rise in 2002. These increases in excise taxes, if approved by the government, will bring Polish cigarette prices closer to western European levels and will harmonize Poland's tobacco tax system with European Union standards. Also, in early 2000, cigarette sales will be prohibited in all schools, health centers and sporting facilities. Also, at the start of the year, 5% of all tobacco tax revenues will be allocated towards the Polish anti-smoking campaign fund. In fall of 2000, a complete ban on outdoor cigarette advertisements will be enacted. By the end of 2001, tobacco advertisements will be banned from newspapers as well as magazines and tobacco companies will be prohibited from sponsoring any cultural, political or sporting events. These tobacco control policies will place Poland at the forefront of both Eastern and Western Europe's anti-tobacco campaign.

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