CENTRAL EUROPEAN UNIVERSITY
CENTER FOR POLICY STUDIES

OPEN SOCIETY INSTITUTE

MAKSYM MASHLYAKIVSKYY

Achieving Tobacco Control Policy Goals in Ukraine via Economic Tools

2003/2004

CPS INTERNATIONAL POLICY FELLOWSHIP PROGRAM

MAKSYM MASHLYAKIVSKYY

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3. Introduction

This research is done in the framework of the International Policy Fellowship Program (IPF-Budapest) financed by the Open Society Institute (OSI). The research field is tobacco control economics while the analysis is primarily focused on Ukraine. The main objectives of the research are as follows:

- To analyze tobacco control in Ukraine and evaluate the effectiveness of existing tobacco control policy;

- To analyze international experience in applying economic tobacco control tools;

- To conduct economic modeling of Ukraine's tobacco market, determine the most effective tools for tobacco control in Ukraine and evaluate their impact;

- To develop tobacco control policy recommendations for the Ukrainian government.

The data used for the analysis mainly come from the official sources (the State Statistics Committee of Ukraine, the National Bank of Ukraine). The data on advertising come from the Ukrainian Media monitor. In addition, a review of the press was performed.

4. Research Framework

4.1. Goal

This research is devoted to analyze different tobacco control tools and their effective utilization in Ukraine. While conducting the analysis, I considered the primary goal of the tobacco control policy, namely reducing consumption of tobacco products and smoking prevalence.

However, in Ukraine, the government defines as another priority of tobacco taxation (one of the most effective tobacco control tools) – raising tax revenues. This issue is also analyzed in this research. The reason for doing so is the fact that the government is likely to be extremely sensitive to the revenue issue. Therefore, proper analysis of the fiscal outcomes of the tobacco control policy may be more convincing for the government.

The majority of the analysis in this paper has been conducted based on Ukraine's data. This was done in order to provide a country-specific research rather than "repeating international experience". Although tobacco control measures and their effectiveness have been widely studied in other countries, in-depth country-specific analyses have the following advantages:

- They are more easily accepted by the public at large and policy makers as they provide "real situation analysis" in a country. Consequently, such analysis is not subject to usual counterarguments that "our country is so specific that no international experience can work here".

- Such analysis allows to forecast more precisely the impact of using tobacco control tools (on consumption, tax revenues, etc.) in a country.

- The strength of the impact of different tobacco control tools may indeed differ across countries and/or regions.

4.2. Tobacco control tools

The following tobacco control tools are analysed in this research:

- Taxation;

- Advertising and sponsorship restrictions/bans.

4.3. Approach

This research is an attempt to analyze tobacco control in Ukraine from the economic perspective. The analysis is built on the fact that all tobacco control tools aim at influencing incentives and/or behavior of final consumers. For instance, tobacco taxation aims at making tobacco products more expensive for consumers who are expected to reduce their consumption given their limited incomes. Advertising bans are expected to eliminate tobacco industry's influence on current and potential consumers' behavior.

Therefore, we are particularly interested in knowing the reaction of current and potential consumers to the implementation of different tobacco control tools. Consequently, the analysis is primarily focused on the demand side of the tobacco market. In some cases, the supply side is analyzed as well.

4.4. Logic of the analysis

Each section of the report is devoted to analysis of a tobacco control tool.

First, a general overview of a policy tool is provided.

Second, I analyze how the tool was used in Ukraine in previous years. This is supplemented with evaluation of the policy's effectiveness in terms of reducing tobacco consumption and, where applicable, with estimates of its impact on government revenues.

Third, I provide analysis of how the tool should be used effectively in order to achieve the primary tobacco control goal. This is done on the basis of available data for Ukraine and/or on the basis of international data.

Fourth, I analyze different policy options. This includes analysis of the impact of different policy decisions on agents involved. Depending on the tool, the list of agents is determined. Where possible, the effect is quantified. Where applicable, the issue of smuggling is taken into consideration.

Finally, policy recommendations will be elaborated.

5. Tools: Taxation[1]

5.1. Overview

Tobacco taxation is considered to be one of the most effective tools allowing to reduce tobacco consumption. Changes in taxation levels have direct impact on the price of cigarettes. The tool is especially powerful for lower-income countries where people are more sensitive to price changes given their low incomes. Therefore, the price elasticity of demand for cigarettes tends to be higher in such countries. Consequently, even small increases in the taxation level allow for notable decreases in tobacco consumption.

5.2. Effectiveness of the Tool Usage in Ukraine

Taxation is one of the few tobacco control tools used in Ukraine. Not surprisingly, the tool allows to reduce cigarette consumption in Ukraine. This is shown in the following figures.

Figure 1.   Cigarette prices vs. excise tax

Source: State Statistics Committee, Ukrainian Law, own calculations.
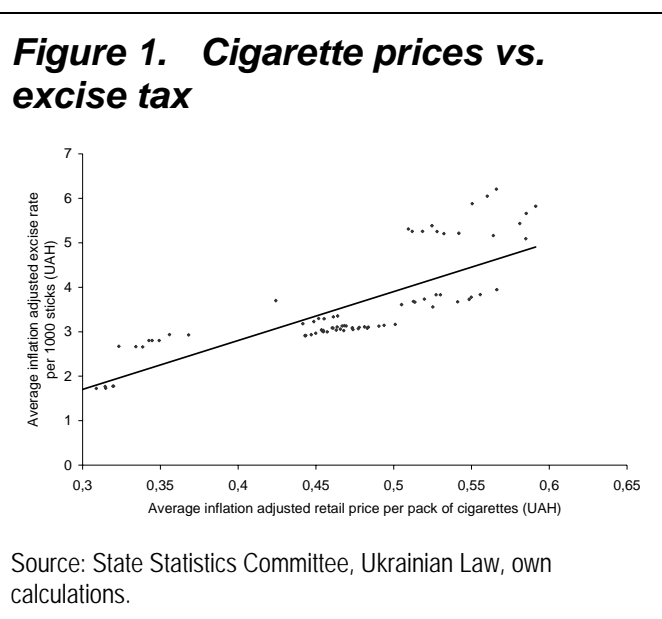
Based on the 1997-2003 monthly data, figure 1 illustrates the interdependence between the cigarette excise tax level and the average cigarette price. As the figure reveals, there is a strong positive relationship between the two variables. This means that the tobacco companies shift at least part of the excise tax on consumers. In fact, as the estimated econometric model reveals, on average, if the excise rate per one pack of

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[1] In order to conduct a detailed analysis of the tobacco market, an econometric model was estimated. A detailed description of the model is provided in Annex 1.

cigarettes grows by 0.1 UAH, the price of one pack increases by almost 0,14 UAH (based on the data for the period under consideration).

5.2.1. Cigarette Demand in Ukraine

Since reliable estimates of total cigarette consumption are missing in Ukraine, I will first analyze dynamics of legal cigarette sales.

Four multinational companies are the major market players. These are Philip Morris, BAT, JTI, and Reemtsma. Each company has its factory in Ukraine. The companies entered Ukraine's market in 1993-1994 mainly through buying-out old soviet tobacco factories. Despite this, in this research, we analyze data for the period from 1997 till 2003, as prior to 1997 the tobacco companies had been modernizing old factories and developing their production capacities.

Figure 2 shows the data for monthly production of cigarettes in Ukraine for the period from January 1997 till December 2003. It is clear from the figure that some seasonality is present in cigarette production, namely production is lower at the beginning and at the end of each year. However, as the trend line reveals, cigarette production in Ukraine is constantly growing despite some monthly fluctuations.

Figure 3 reflects the other type of domestic companies' activities, i.e. external trade. Starting 1999, Ukraine became a net exporter of cigarettes majority of which is sold to the former Soviet Union countries.

Figure 2.   Domestic cigarette production

Source: State Statistics Committee, own calculations.

Figure 3.   Cigarette exports and imports

Source: State Statistics Committee, own calculations.
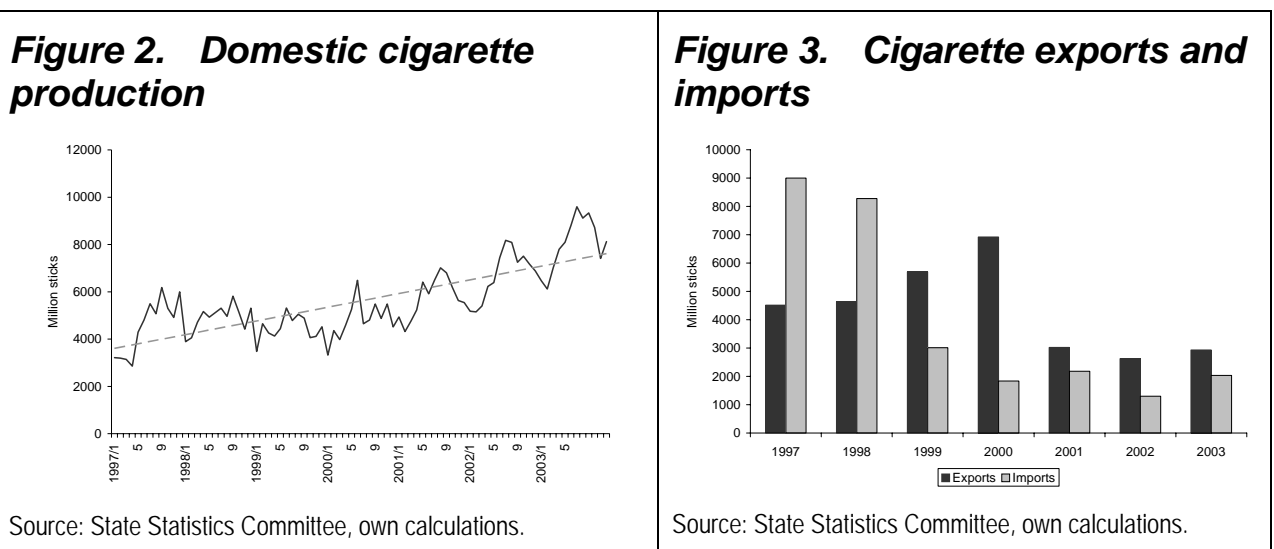
The share of exports in total production is not significant. For instance, according to 2001 data, cigarette exports accounted for only 4.3% of the production volume. Despite the fact that an increase in exports was accompanied by declining imports (1997-2000),

we can conclude that legal domestic cigarette consumption is growing in Ukraine. Figure 4 illustrates this point. A fall in legal domestic sales was observed in 1999 which was mainly caused by increased excise rates (the issue is illustrated below) and growing illegal imports[2].

Figure 4. Legal domestic sales of cigarettes in Ukraine

Source: State Statistics Committee, own calculations
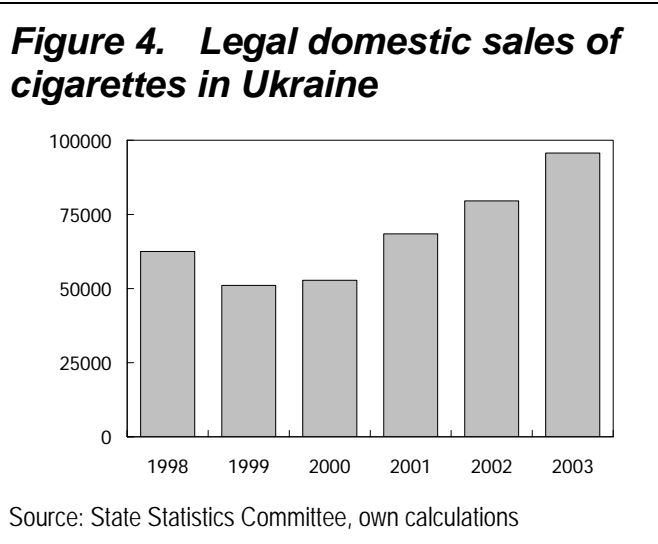
Finally, figure 5 illustrates the other dependence: legal domestic sales of cigarettes versus the excise rate.

Figure 5. Legal domestic sales of cigarettes and excise taxation (1997-2003)

Source: State Statistics Committee, Ukrainian Law, own calculations.
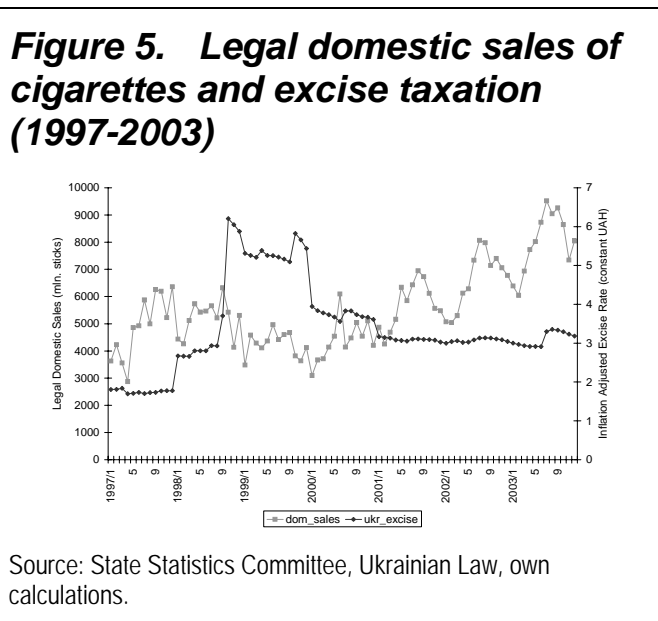
It is clear from the chart that higher excise rates tend to decrease legal cigarette consumption in Ukraine. For example, in September 1998, the tax rate rose from 2 EURO up to 3 EURO for filtered cigarettes and up to 2.3 EURO for no-filtered cigarettes. The rates grew further due to depreciation of Hryvnia with respect to EURO.

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[2] The issue of smuggling is analyzed further in this report.

As of January 1999, the common tax rate of 2.5 EURO was set for both types of cigarettes. This represented a decline in the average weighted excise rate. However, due to further depreciation of the national currency, the tax rates increased (see data for late 1999). As can be seen from the graph, during this period (late 1998-1999), legal domestic sales of cigarettes declined.

However, the question remains: What is the influence of higher taxes on total (legal + illegal) consumption? In order to answer this question, I will try to evaluate the total consumption using the estimated econometric model of the tobacco market. The major simplifying assumptions of such evaluation are as follows:

- Cigarette demand is satisfied from the two sources: legal sales and smuggling;

- Majority of smuggled cigarettes originate in Russia;

- The major cause of smuggling is the excise tax differentials between Ukraine and Russia[3].

In accordance with the assumptions, total cigarette consumption equals legal consumption plus illegal consumption. While we know the volumes of legal sales, the volumes of illegal sales remain unknown. The approach to estimating illegal cigarette consumption is the following.

Step 1

The estimated econometric model contains a variable reflecting an incentive to smuggle cigarettes to Ukraine. This is expressed as a difference between the Ukrainian and Russian excise rates. At the first step, we take the estimated coefficient in front of the variable. The coefficient should be interpreted as follows: by how much legal domestic sales will fall due to increased difference in the excise rates[4]. The value of the coefficient is -0.07. Therefore, given the model specification, we may conclude that a 10% increase in the Ukrainian excise rate or 10% decrease in the Russian excise rate will cause a 0.7% decline in legal sales due to increased smuggling.

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[3] The only thing which the model makes possible, is estimating the volume of smuggling caused by tax differentials between the two countries. Therefore, the estimate should rather be considered as an estimate of bootlegging. However, according to numerous articles in the press and opinion of the industry representatives, the entire volume of smuggling can be explained by tax differentials. Therefore, my model allows testing this hypothesis.

[4] Since the variable is expressed in logs, the coefficient represents percentage change in legal sales due to 1% change in the variable.

Step 2

At step 2, I will try to simulate what would be the volume of legal sales if the tax rates in the two countries are equal (no incentive to smuggle). In order to do so, I will hypothetically "increase" the Russian excise rate up to the level of Ukraine. This allows us to evaluate how many cigarettes are consumed by smokers in Ukraine who currently buy smuggled products but if the Russian tax is increased would switch to legal products. The following is shown using a formula:

$dD = 0.07 * dRUS\_EX$,

where dD is the change in legal domestic sales, $dRUS\_EX$ — change in the Russian excise rate (in this case — increase), 0.07 — coefficient in front of the incentive variable from the model.

The simulated situation is the following: Consumers buying illegal cigarettes hypothetically face higher excise rates and, hence prices, and start switching to legal products.

The formula above allows estimating how much cigarettes former consumers of illegal products will buy in the legal market if the price of illegal cigarettes grow. Through such simulations, we may get an idea of how many illegal cigarettes is consumed now.

In such a way, an estimate of the volume of smuggling is received. After that, I add up legal domestic sales and the estimated volume of smuggling (see Figure 6).

Figure 6. Estimate of total cigarette consumption in Ukraine
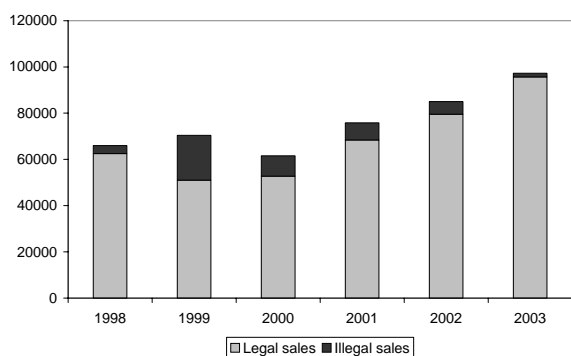
Source: own calculations.

Figure 7. Share of illegal tobacco products in total sales
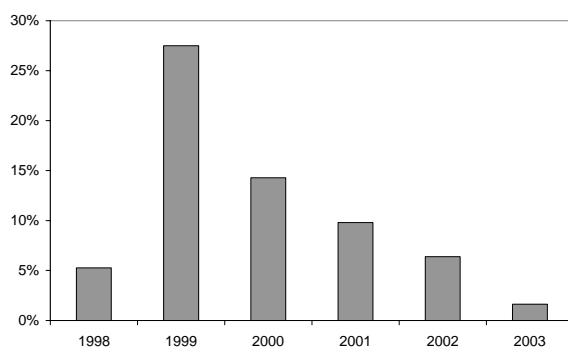
Source: own calculations.

As we see from the figure above, starting 2001, cigarette consumption has been growing in Ukraine at a rather high annual rate. At the same time, my estimates show that in the period of higher taxes (1999-2000, see figure 5), total cigarette consumption

was lower despite the growth in the volume of smuggling. Therefore, we may conclude that in terms of the primary tobacco control goal (reducing cigarette consumption), the taxation tool is effective even when smuggling exists. The current tax policy does not stimulate consumers to reduce cigarette consumption. At the same time, as the analysis reveals, the tool is powerful in reducing smoking in Ukraine.

5.3. Achieving the Goal

As the analysis above and the econometric model show, there is a need to increase tobacco taxes in Ukraine. This will both reduce cigarette consumption and increase government revenues from the excise tax on tobacco products.

However, the government should be aware of several peculiarities of Ukraine's tobacco market:

- Demand elasticity is very low in Ukraine (-0.3 in the short run, and -0.48 in the long run), meaning that Ukrainian consumers are not very sensitive to price changes;

- The elasticity of demand with respect to the excise rate is -0.06 in the short run, meaning that a 10% increase in the excise rate causes consumption to drop by only 0.6% (in the long run the elasticity is higher -0.09);

- Cigarette consumption grows with increased household incomes: if household incomes grow by 10%, cigarette consumption will increase by 2.1% in the short run and by 3.3% in the long run. As household incomes will grow (which is happening now) cigarette consumption will increase "naturally".

Regarding the government revenues, based on the econometric model estimated, we may conclude that the tax rate in Ukraine should be increased at least 2 times (this is depicted in the graph below). The graph below shows the so-called Laffer curve reflecting the relationship between the tax rate and the tax revenues received. According to economic theory, for most good the following hold true:

- If the tax rate for the good is small, initial increases in the tax rate lead to higher tax revenues as in such a case consumer behavior is not very much affected.

- There is a certain tax rate applying of which gives maximum revenue from the tax on the good.

- If the tax rate is increased above the revenue-maximizing point, tax revenues may fall as consumers will adjust their behaviour and the price elasticity of demand will increase significantly.

As can be seen from the graph, currently, Ukraine's tobacco market is on the upward sloping part of the Laffer curve (below the revenue-maximizing point) meaning that increasing the tax rate will give more revenues to the government.

Figure 8. Laffer curve for tobacco excise tax in Ukraine
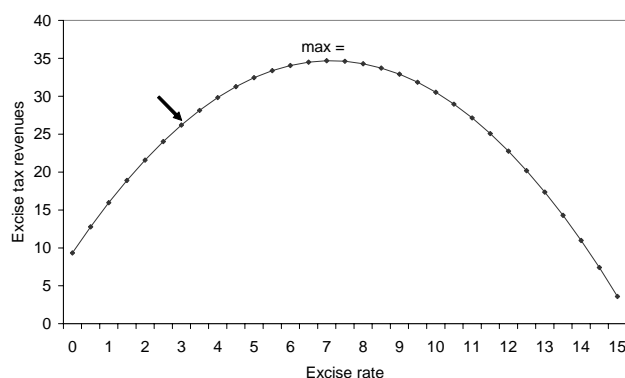
Source: Own calculations based on the estimated econometric model.

Note: An arrow in the graph shows current position of Ukraine.

Since this represents calculations from the model, it should be noticed that such a large increase may cause structural changes in the model equations. Therefore, the numeric result (namely, two-fold increase in the tax rate) should be treated with care. However, the definite outcome of the analysis is that at the current point, higher taxes will increase budget revenues from cigarette taxation. Next section provides overview of some policy options available for the government.

5.4. Policy Options

In the view of the above analysis, this section provides policy options available to the government. Besides providing policy options themselves, I will give a brief analysis and/or estimates of the impact of such policies on the parties involved. Regarding tobacco taxation, consequences for the following agents will be analyzed:

- Smokers who will benefit from their improved health due to lower smoking;

- Government. Besides public health concerns, it is interested in increasing tax revenues and reducing the volume of smuggling;

- The tobacco industry often using a number of arguments against increasing tobacco taxes and being able to effectively persuade the government[5]. In this regard the impact of taxation on tobacco industry employment and revenues will be analyzed as well.

Basically, the overall recommendation that can be drawn from the above analysis is that the government should increase tobacco taxes. In this regard, two questions should be answered: "How to increase taxes?" and "What will be the impact of such policy on the agents involved?"

The issue of the taxation principle (namely, specific taxation versus ad-valorem or mixed taxation) is not analyzed in this paper. Despite the fact that the issue is often debated in Ukraine, it is clear that the tax rate itself is more important since for each specific tax rate an ad-valorem equivalent rate could be calculated.

The choice of the taxation system highly depends on the government's ability to ensure tax revenues and compliance with the tax legislation. As shown in many research papers, both taxation systems (specific and ad-valorem or mixed) have pros and cons. For instance:

- Ad-valorem system may be good for countries with high inflation as the tax amount automatically adjusts with the overall inflation. For countries with moderate inflation the specific taxation system may do the same if, for instance, the law on taxation includes the clause on annual adjustment of the tax rate in accordance with the inflation rate.

- Specific system may be especially good for countries with poor enforcement of the tax legislation as this system is easier to administer given that the tax base is the physical volume of the good produced.

From the above, we may conclude that the choice of *the taxation system* is more related to the issue of ensuring collection of revenues based on a certain tax rate. At the same time, the issue of the tax revenues is primarily connected with *the tax rate*.
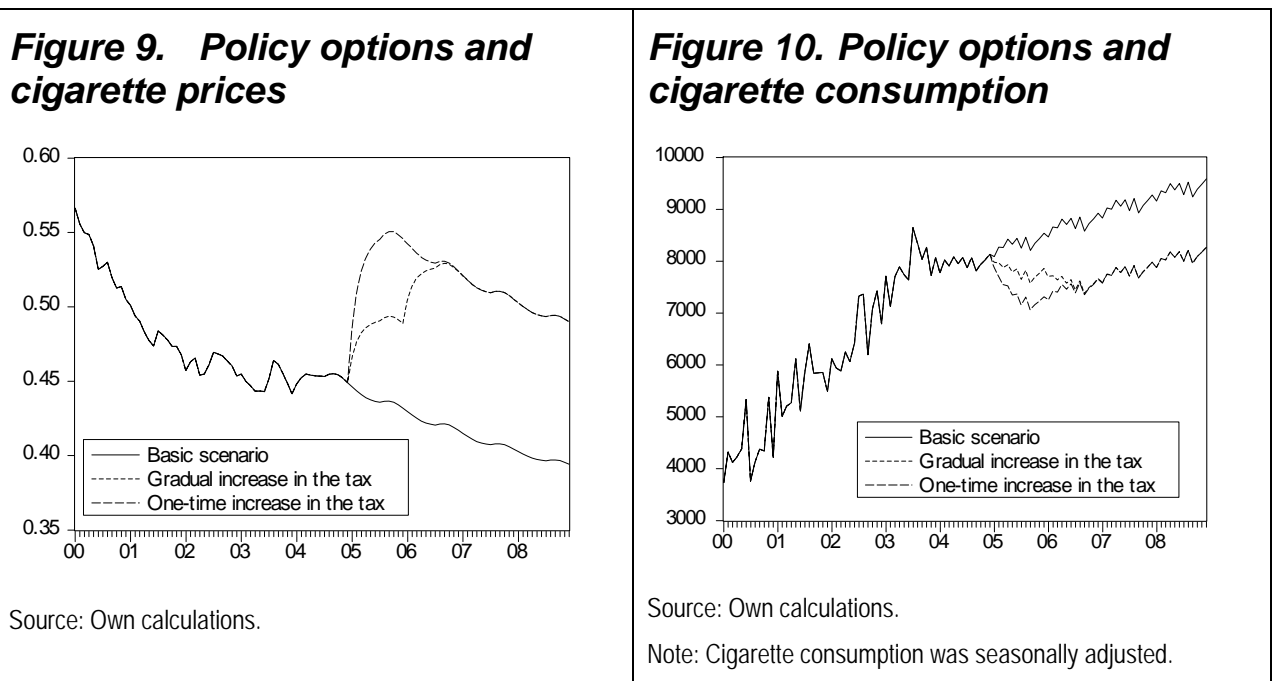
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[5] In my opinion, it is necessary to analyze the industry as well since it is sometimes claimed that the industry is an important foreign investor into Ukraine's economy. Given the limited amount of foreign investment in Ukraine, the government may find this issue very important.

Therefore, the taxation options analyzed in this paper deal with the tax rate and not with the taxation principles. The following major options of tobacco taxation are analyzed in this paper:

- Option 1. The tax rate remains unchanged.

- Option 2. During next 2 years, the tax rate increases by 25% each January.

- Option 3. Starting January 1, 2005, the tax rate is increased by 50%.

Of course, the list of options is not exhaustive. My major goal is to determine what will be the effect of a one-time large increase and a gradual increase in the tax rate. These options are compared with the "doing nothing" policy option.

The following graphs illustrate the impact of the three policy options on cigarette prices, cigarette consumption, and government revenues[6]. The forecast horizon is 2004-2008.

Figure 9. Policy options and cigarette prices

Source: Own calculations.

Figure 10. Policy options and cigarette consumption

Source: Own calculations.

Note: Cigarette consumption was seasonally adjusted.

As can be seen from the graphs, under the "doing nothing" scenario, cigarette prices are lower, as well as government revenues, while cigarette consumption is higher. The two scenarios envisaging tax increases differs only in the indicators for the year 2005 when the "gradual increase" scenario gives lower revenues and prices together with higher cigarette consumption if compared to the "one-time increase" scenario. After 2005, the indicators are roughly the same under the both scenarios envisaging tax

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[6] The simulations are made based on the estimated econometric model of the tobacco market.

increases. Therefore, it may be better for the government to choose the "gradual increase" scenario as it maybe politically easier to implement.

Figure 11. Policy options and government revenues

Source: Own calculations.
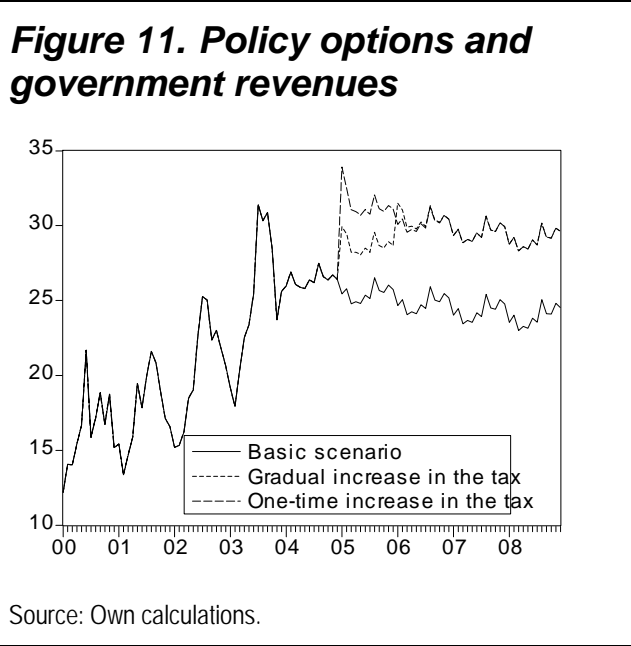
The table below provides comparative analysis of the outcomes of the three policy options.

Table 1.   Tobacco taxation: Comparative analysis of the policy options

	Option 1 ("doing nothing")	Option 2 (gradual increase)	Option 3 (one-time increase)
Consumption	Gradually increasing	Two-step decline, then – gradual growth. At the end of the forecasting period, consumption is lower compared to basic scenario and equal to that under "one-time increase" scenario	One-time decline, then – gradual growth. At the end of the forecasting period, consumption is lower compared to basic scenario and equal to that under "gradual increase" scenario
Government revenues	Lower than under other scenarios	After the two increases in the tax rate, revenues are the same as under the scenario 3, higher	Cumulatively for the whole forecasting period, the revenues are larger than under other

		than under scenario 1.	scenarios.
Cigarette bootlegging into Ukraine[7]	Unchanged.	Slight two-step increase.	Slight one-time increase.
Tobacco industry revenues	Not affected by the government. Gradually growing due to increased consumption.	Decline in two steps. Given the low elasticity of demand, the industry can offset the effect through increasing the price further.	One-time decline. Given the low elasticity of demand, the industry can offset the effect through increasing the price further.
Tobacco industry employment	The effect is not clear. The issue is analyzed further in this report.		

Source: Author.

As it was already mentioned, changes in tobacco taxation are expected to influence two particular areas where the effect of such policy is not clear enough. The areas are employment in the tobacco industry and smuggling. These are analyzed below.

5.4.1. Employment

It is often claimed that the tobacco industry is an important employer for the domestic economy. Moreover, the industry claims that tobacco control measures (and taxation in particular) will reduce the industry output and therefore, it will be forced to lay out their workers.

Figure 12. Employment in tobacco industry[8]

Source: State Statistics Committee, own calculations.

Figure 13. Indices of employment and production, 1998=100

Source: State Statistics Committee, own calculations.
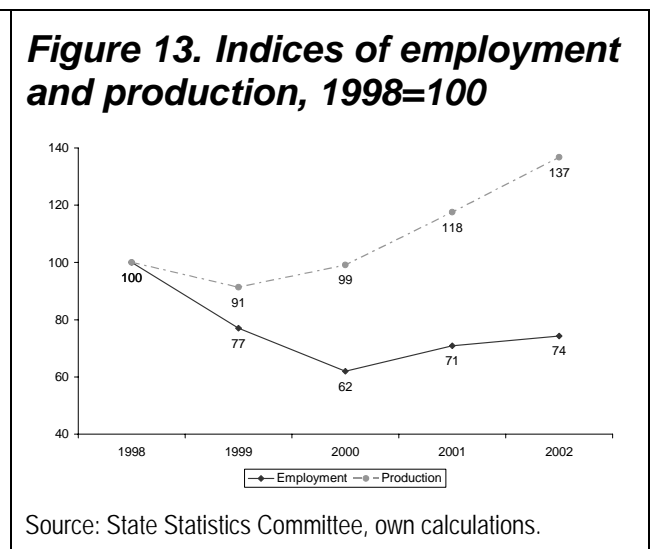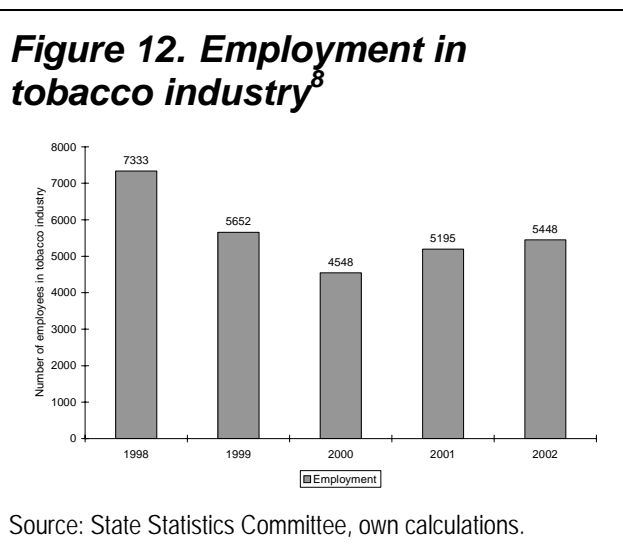
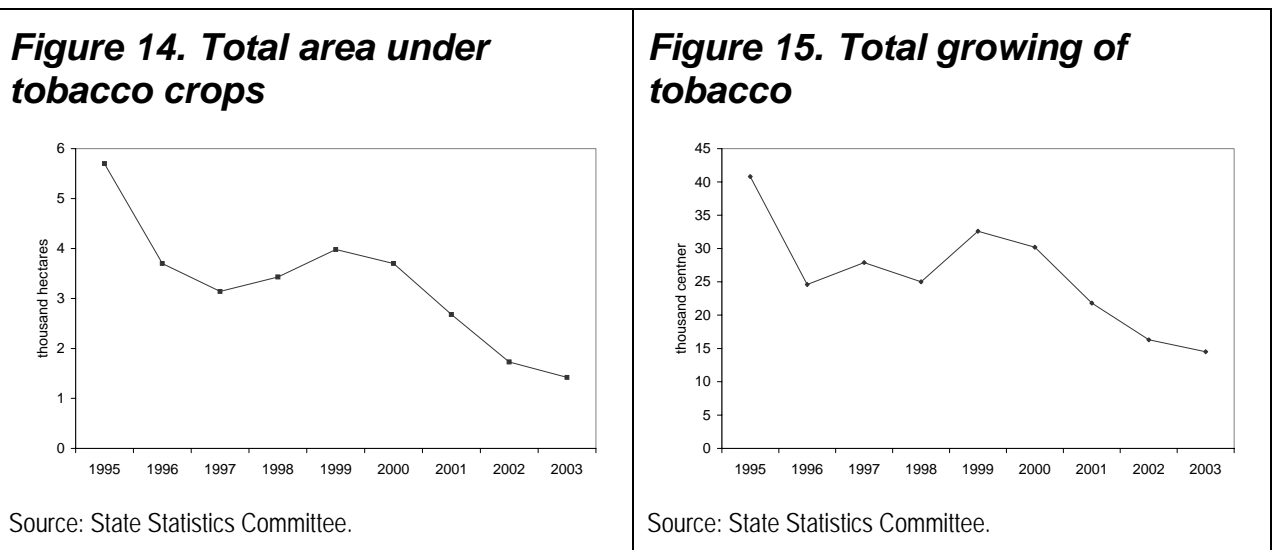
[7] Analyzed further in this section in more detail.

[8] Please, note that the data for 2000 do not include employment at the Kyiv tobacco factory. This is due to some gaps in the statistics by the State Statistics Committee.

Figure 13 plots the two data series, namely, tobacco industry output and total employment in the industry[9]. For the ease of comparison, the data is expressed in the form of indices where both of them were set equal to 100 in 1998.

As we can see, there is no strict relationship between the two indicators. In general, if we compare 1998 and 2002, we can conclude that while cigarette production increased by 37%, employment in the industry declined by more than a quarter.

Therefore, based on the data analyzed, we cannot predict the employment effect of reduced (increased) cigarette production as this seems to be determined by the tobacco companies' employment policy and changes in technologies used in cigarette production.

Reduced cigarette production in Ukraine is unlikely to affect farmers growing tobacco. Despite an overall increase in the cigarette production during the period under consideration, tobacco growing is declining in Ukraine. This is depicted in the following charts.

Figure 14. Total area under tobacco crops

Source: State Statistics Committee.

Figure 15. Total growing of tobacco

Source: State Statistics Committee.

5.4.2. Smuggling

Especially during 1999, the peculiarity of the Ukrainian cigarette market was the availability of cheaper smuggled cigarettes. Sometimes, illegal cigarettes were two times cheaper compared to legally produced cigarettes. Of course, this had a direct impact on tobacco control efforts of the government.

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[9] The numbers for the industry employment include only workers involved in cigarette manufacturing. Therefore, tobacco farmers and workers engaged in primary tobacco processing and distribution of final products are not taken into account.

Figure 16. Excise rates in Ukraine and Russia (1997-2002)

Source: State Statistics Committee, Ukrainian and Russian Law, own calculations.

It is often claimed that majority of smuggled cigarettes was brought from Russia and Moldova. Among the major causes of smuggling, the industry and many experts claim the difference in the taxation levels in Ukraine and its neighboring countries. This is depicted in the figure 16 above. Indeed, sales of smuggled cigarettes increased dramatically in the period of large tax differentials (1999-2000).

At the same time, as was analysed earlier in this report, the estimated econometric model of Ukraine's tobacco market (see Appendix 1) indicates that a 10% increase in the Ukrainian excise rate will lead to at most 0.07% drop in legal domestic sales due to increased smuggling. As the above analysis showed (see Figure 7), the model provides estimates which are close to the estimates provided by experts including those from the industry[10].

The huge volume of smuggling in 1999 was caused by really large differentials in the tax rates between the two countries. In that year, the tax rates differed by over 6 times. However, in the next year, the share of smuggling dropped to around 14% of the market, while the Ukrainian excise rate was still 3.5 times higher than the Russian rate.

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[10] For instance, in 1999, experts claimed that about 30% of the market is covered by illegal sales, while the model provides estimate of about 28%.

As we can see from the graph above, in 2003, the tax rates in the two countries did not differ significantly, while the estimated volume of smuggling was negligible. Therefore, even noticeable increases in the Ukrainian tax rate will not cause extensive smuggling.

6. Tools: Advertising Restrictions/Bans

6.1. Overview

Advertising restrictions/bans are regarded to be effective tools for reducing tobacco consumption. However, implementation of this tool affects a larger number of agents who may oppose to such a policy. Besides the government receiving revenues from taxes on advertising, the advertising industry itself is likely to oppose such a policy. Therefore, a proper analysis of the policy outcomes is needed or otherwise it will not be accepted.

6.2. Effectiveness of the Tool Usage in Ukraine

Until now, Ukraine has enjoyed some restrictions on tobacco advertising. In particular, there is a complete ban on TV and radio advertising of tobacco products. However, advertising in printed mass-media and out-door advertising is not prohibited.

Consequently, according to the Ukrainian Media Monitor, the tobacco companies are at the top of the list of the largest advertisers using both types of advertising. Moreover, if we consider out-door advertising, cigarettes are the most heavily advertised good both in terms of the number of advertisements and in terms of the amounts spent.

Figure 17. Out-door tobacco advertising expenditures, 1999-2001, thousands USD per month
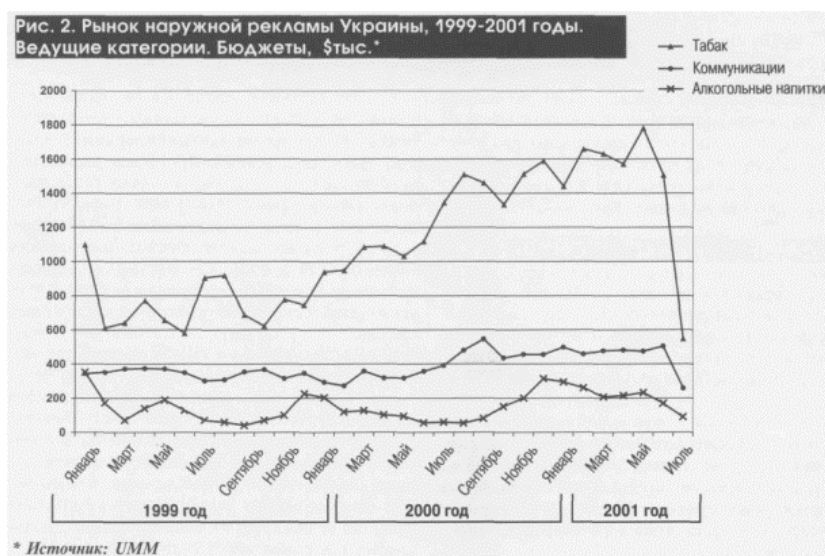

Source: Ukrainian Media Monitor.

Note: the three lines in the graph correspond to three goods with the largest advertising budgets: tobacco (the upper line), telecommunications (the line in the middle), and alcoholic drinks (the lower line).

Figure 15 illustrates the dynamics of out-door advertising expenditures in Ukraine for the most heavily advertised goods. This is monthly data for the period from January 1999 till July 2001. The advertising budgets are expressed in thousands USD. As we can see from the graph, tobacco is the most heavily advertised good (the upper line in the graph).

Figure 16 shows the dynamics of out-door tobacco advertising for the period from 1997 till 2003 (monthly data). This is expressed in the number of out-door boards of tobacco advertising. The data is given for 24 oblast centres of Ukraine, the city of Simferopol (the capital of the Crimea Republic), and the city of Sevastopol located in the Crimea. While the data do not cover entire Ukraine (since the monitoring is not conducted for all settlements), it allows to analyze the advertising dynamics. The source for the data is the Ukrainian Media Monitor.

Figure 18. Out-door advertising of tobacco products

Number of outdoor boards

Source: Ukrainian Media Monitor.
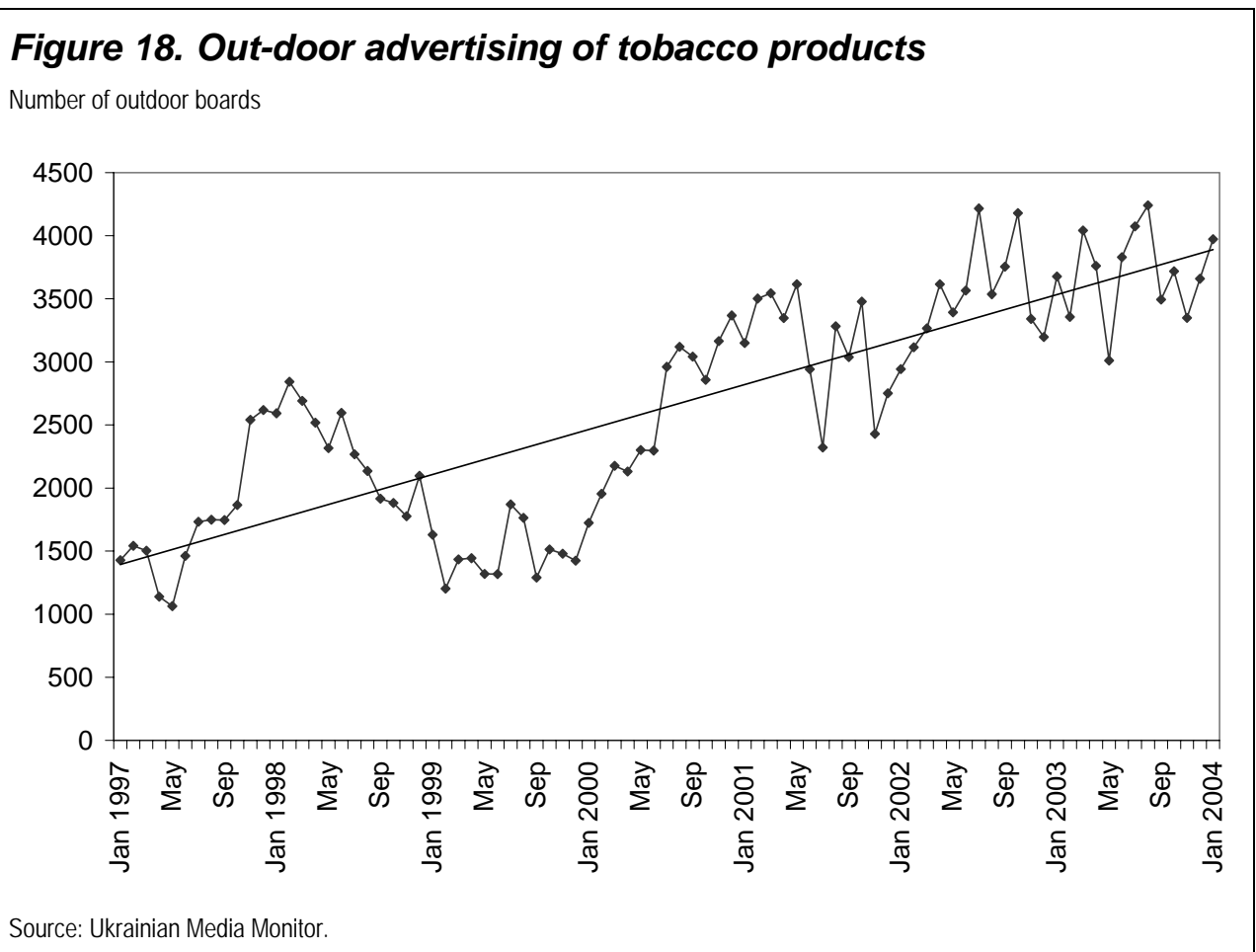
The estimated trend-line in the graph clearly indicates that during the period under consideration the volume of out-door tobacco advertising has been growing. For example, in 2004, the volume of advertising was two times larger compared to 1997. In general, the volume of advertising is larger for cities having bigger populations. In

monetary terms, in 2003, the industry spent over 20 million USD on out-door advertising in the cities under consideration.

Therefore, at least a part of the increase in legal domestic sales may be attributed to increased advertising expenditures. In particular, as the estimated econometric model of the market shows, a 10% increase in the number of out-door boards leads to a 0.73% growth in legal domestic sales of cigarettes. Of course, the opposite holds true: a 10% decrease in the advertising volumes causes a 0.73% decline in domestic sales.

Due to dependence of present cigarette consumption on past consumption, in the long-run, demand is even more sensitive to changes in the volume of advertising. For instance, under the one-time 10% increase in the advertising volumes, cigarette consumption will grow 1.14% in the long run[11].

To sum up: starting from the year 2000, a gradual decline in cigarette prices accompanied by the increased advertising expenditures had its effect: cigarette sales started growing (see above).

6.3. Achieving the goal

As it is clear from the above analysis, advertising is a very powerful tool for promoting cigarette consumption in Ukraine. Moreover, the tool is actively used by the industry which affects current consumption and will have larger long-term effects. Therefore, advertising ban is a good tool for Ukraine's government if the major goal of the policy is to decrease cigarette consumption due to public health considerations.

6.4. Policy options

Basically, there are two main options regarding tobacco advertising: ban it or not. As many research papers showed, partial restrictions on advertising are not effective in reducing smoking. The same holds true for Ukraine: although tobacco advertising is restricted (e.g. ban of advertising on TV, radio, some restrictions on advertising tobacco products in press), cigarette consumption is growing to some extent due to increased volume of advertising by the tobacco industry.

In case there are no changes to the legislation regarding tobacco advertising, one may expect continuation of the growing trend of the tobacco advertising volumes (since this

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[11] Technically, under the long run we understand infinity.

turns to be an effective tool for the tobacco industry to promote cigarette consumption). As was described earlier, this will lead to increased cigarette consumption having even larger effect in the long-run (due to the positive impact of current consumption on future consumption volumes).

In case tobacco advertising is banned, cigarette consumption will definitely decline leading to improved public health. Unfortunately, it is not possible to precisely quantify the reduction in cigarette consumption due to banned tobacco advertising since this represents a structural shift in the estimated model. However, as was shown earlier, the impact of advertising on cigarette consumption is relatively large. For instance, in terms of promoting cigarette consumption, increasing advertising by 4% is equivalent to reducing the average price of cigarettes by 1%.

Another point that should be analyzed is the impact of the tobacco advertising ban on the advertising industry. In this regard, we may conclude the following[12]:

First, tobacco advertising constitutes a significant share of the total volume of outdoor advertising (over 30% of all outdoor advertising expenditures as of 2001), while the share in printed mass-media is moderate (around 3% of all press advertising expenditures as of 2001). At the same time, the shares of outdoor and printed media advertising in the advertising market comprise around 10% each. Therefore, tobacco advertising ban will mainly affect outdoor advertising sector, while the advertising market as a whole will not be greatly affected by the ban.

Second, according to 2003 advertising market overview[13], the share of outdoor tobacco advertising in the total volume of outdoor advertising started to decline. Compared to 2002, in 2003, the share of the category "Tobacco" dropped by approximately 6%, while the total market grew by over 30%. Such a growth in the market was mainly caused by increased volumes (and market shares) of advertising of other categories (for instance, telecommunications and cars), representing dynamically developing markets.

Finally, while making decision regarding the ban of tobacco advertising, the government should be interested in knowing attitude of the general public towards such a policy. As surveys in different countries reveal, usually, the public supports such actions by the

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[12] The data on advertising come from the Ukrainian Media Monitor.

[13] "Outdoor advertising market. Ukraine. 2003", Media Expert magazine.

government. According to a nation-wide survey conducted in Ukraine in November 2000, 49% of respondents supported a total ban of tobacco advertising[14].

I did not find results of any nation-wide representative surveys devoted to the issue and conducted after 2000. However, an on-line survey was conducted by the Ukrtutun association of tobacco producers. Below, you can see the results of the survey. Over 68% of the Ukrtutun internet site visitors who participated in the survey voted in favor of the ban of alcohol and tobacco advertising while almost 22% voted against the ban.

Table 2.   Survey: What is your attitude towards banning advertising of alcohol and tobacco?
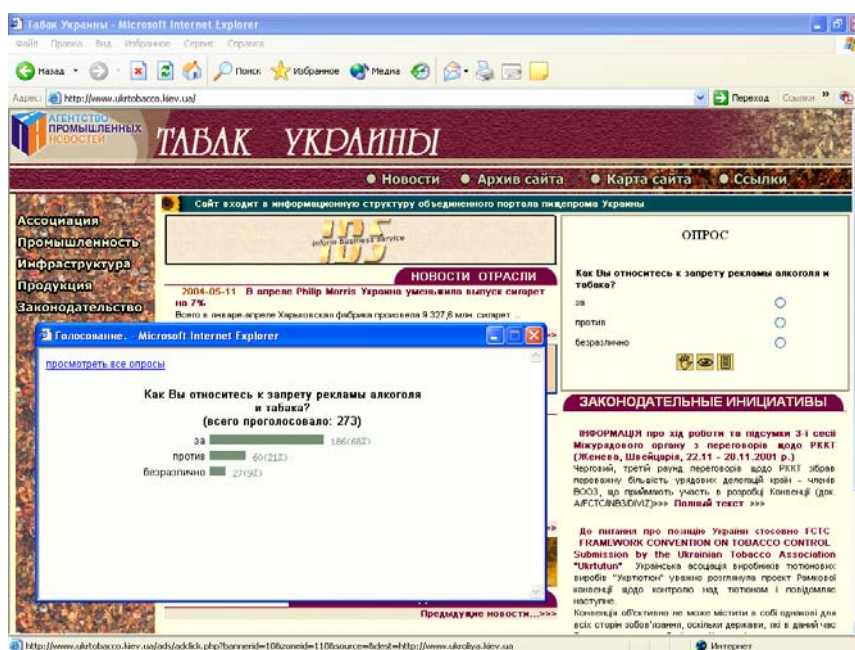
Support	68.13%
Do not support	21.97%
Do not care	9.89%

Source: On-line survey of the Ukrtutun Association of tobacco producers (www.ukrtobacco.kiev.ua, last accessed on May, 20, 2004), N=273.

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[14] See ADIC-Ukraine, "Economics of tobacco control in Ukraine from the public health perspective", 2001.

7. Conclusions and policy recommendations

The following major conclusions and policy recommendations can be drawn from the above analysis:

- Cigarette consumption in Ukraine is growing quickly. The major factors determining the trend are decreasing prices, increasing volumes of advertising, and growing household incomes.

- Ukrainian consumers have low sensitivity to changes in the price of cigarettes. Consequently, if the government intends to reduce smoking, large increases in the excise rate are needed.

- The excise tax is a powerful tool for reducing cigarette consumption and increasing state budget revenues. The tax rates in Ukraine can be increased at least two times. This will reduce cigarette consumption, increase budget revenues, and will have only moderate effect on the volume of smuggling to Ukraine, while more tough government control over smuggling may reduce the volume of smuggling.

- Advertising is a powerful tool for promoting cigarette consumption in Ukraine. The ban of tobacco advertising will definitely reduce cigarette consumption while the effect on the advertising industry as a whole will not be dramatic. According to some surveys, there is a public support in favour of the tobacco advertising ban.

- Tobacco control measures and subsequent declines in cigarette production will not represent a big problem for farmers growing tobacco: currently, despite cigarette production is growing, tobacco farming is declining. Regarding the employees involved in cigarette production, the effect of reduced production is not clear. In recent years, employment in cigarette manufacturing declined despite an extremely fast growth of cigarette production. Therefore, no positive correlation was found between the production volumes and employment.

8. Appendix 1. Estimated Econometric Model of Tobacco Market in Ukraine

The model consists of three equations estimated simultaneously: demand curve, price equation, and the Laffer curve reflecting the relationship between the tax revenues and different factors affecting the revenues. The three equations describe Ukraine's tobacco market. While estimating the model, I used monthly data from January 1997 till December 2003. All estimated coefficients are significant at least at the 10% significance level. In general, the model has good technical characteristics indicating no problems with the model specification. Majority of the coefficients are significant even at the 1% significance level. The estimation output is provided below.

System: SYS01
Estimation Method: Iterative Seemingly Unrelated Regression
Sample: 1997:02 2003:12
Included observations: 83
Total system (unbalanced) observations 243
Convergence achieved after: 6 weight matricies, 7 total coef iterations

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	3.051610	0.475339	6.419864	0.0000
C(2)	-0.306515	0.172302	-1.778946	0.0766
C(3)	0.213723	0.051543	4.146537	0.0000
C(4)	-0.069672	0.031967	-2.179531	0.0304
C(5)	0.359197	0.064713	5.550595	0.0000
C(6)	0.072949	0.039596	1.842324	0.0668
C(7)	0.107662	0.062204	1.730801	0.0849
C(20)	-0.158323	0.028624	-5.531119	0.0000
C(21)	1.387011	0.175794	7.889990	0.0000
C(22)	0.000425	5.74E-05	7.414535	0.0000
C(23)	0.663252	0.038034	17.43855	0.0000
C(24)	-0.022353	0.011158	-2.003243	0.0464
C(25)	-0.130373	0.022009	-5.923703	0.0000
C(26)	-0.043297	0.012118	-3.572948	0.0004
C(27)	0.091766	0.008091	11.34137	0.0000
C(28)	-0.030013	0.006163	-4.869729	0.0000
C(29)	-0.086319	0.010763	-8.020281	0.0000
C(40)	-13.01157	2.618097	-4.969856	0.0000
C(41)	-2.367462	0.376913	-6.281183	0.0000
C(42)	-0.500220	0.161933	-3.089055	0.0023
C(43)	9.487484	1.474044	6.436363	0.0000
C(44)	0.000897	0.000312	2.872258	0.0045
C(45)	0.000581	0.000294	1.978683	0.0491
C(46)	0.199781	0.074559	2.679505	0.0079

Determinant residual covariance	8.24E-07

Equation: LOG(DOM_SALSA)=C(1)+C(2)*LOG(P)+C(3)*LOG(HISA)
    +C(4)*(LOG(UKR_EX(-1))-LOG(RUS_EX(-4)))+C(5)
    *LOG(DOM_SALSA(-2))+C(6)*LOG((AD_OUT_SA+AD_OUT_SA(
    -1)+AD_OUT_SA(-2))/3)+C(7)*BEFORE_CRISIS*LOG(P)
Observations: 80

R-squared	0.870425	Mean dependent var	8.607452
Adjusted R-squared	0.859775	S.D. dependent var	0.228906
S.E. of regression	0.085718	Sum squared resid	0.536368

Durbin-Watson stat	2.050141		

Equation: (P)=C(20)*TAX_SYS+C(21)*(UKR_EX/50)+C(22)*USD+C(23)
*P(-1)+C(24)*V1997+C(25)*V1999+C(26)*V1998+C(27)*CRISIS
+C(28)*V1999_2+C(29)*V1998_2

Observations: 83

R-squared	0.993330	Mean dependent var	0.456445
Adjusted R-squared	0.992508	S.D. dependent var	0.084597
S.E. of regression	0.007322	Sum squared resid	0.003914
Durbin-Watson stat	1.691491		

Equation: (REV)=C(40)+C(41)*(UKR_EX(-1)-RUS_EX(-4))+C(42)
*UKR_EX^2+C(43)*UKR_EX+C(44)*HISA+C(45)*(DOM_SALES(
-2))+C(46)*REV(-1)

Observations: 80

R-squared	0.852284	Mean dependent var	19.13373
Adjusted R-squared	0.840143	S.D. dependent var	5.709234
S.E. of regression	2.282671	Sum squared resid	380.3729
Durbin-Watson stat	1.817461		

8.1. Explanation of variables and model specification

Below, I provide explanation of the variables used in the model, as well as peculiarities of the model specification.

8.1.1. Demand equation

The equation was estimated in logarithmic form. In such a case, the coefficients in front of the variables represent elasticity of demand with respect to the variables. In other words, the coefficients show by how many percent the demand will change due to 1% change in independent variables.

DOM_SALES

– legal domestic sales of cigarettes (domestic production + imports – exports), thousands sticks.

DOM_SALSA

– seasonally adjusted legal domestic sales. The adjustment was done since cigarette sales reveal seasonality. This is introduced in the model both as a dependent variable (in the demand equation) and independent variable, the latter reflecting the assumption of consumers' myopic addiction behavior. As an independent variable, this was introduced with the lag equal to 2 periods.

P

– average weighted cigarette price, inflation-adjusted UAH per pack. To calculate the average weighted price, I took prices for filtered and non-filtered cigarettes. After that,

the prices were weighted by the shares of filtered and non-filtered cigarettes in a certain month.

HISA

– seasonally adjusted real household incomes, million UAH. Nominal incomes were first adjusted by the CPI and then adjusted seasonally. This indicator reflects overall changes in the well-being of Ukrainians.

UKR_EX

– inflation-adjusted average weighted cigarette excise rate in Ukraine, UAH per 1000 sticks. As in the case of prices, I used shares of filtered and non-filtered cigarettes as weights to calculate average weighted excise rate inUkraine.

RUS_EX

– inflation-adjusted average cigarette excise rate in Russia, expressed in UAH per 1000 sticks.

Difference between excise rates in Ukraine and Russia

Another variable – the difference between the Ukrainian and Russian excise rates – is introduced in the model to reflect the economic incentive to smuggle from Russia to Ukraine. Having introduced this variable, we can obtain an unbiased estimate of the price elasticity and evaluate how much additional smuggling is caused by changes in the tax differential. If the variable is not introduced in the model, the estimate of the price elasticity of demand is likely to be biased, as the coefficient in front of the price would reflect changes in demand both due to reduced consumption and people switching to consumption of illegal cigarettes. Since the variable is introduced, the two effects are estimated separately: the coefficient in front of the price shows by how much legal sales will change due to people increasing/decreasing consumption, while the coefficient in front of the tax difference variable reflects by how much legal sales will fall due to consumers switching to illegal cigarettes.

The variable representing the tax differentials is expressed in lagged values of Ukrainian and Russian tax rates. The specification in lags was used to account for some peculiarities of smuggling to Ukraine. Below, I provide explanations.

First, it takes time for smugglers to identify the difference or change in taxes (and hence, prices) and to establish channels for distribution of illegal products. Consequently, a change in the excise rate in Russia will not influence Ukrainian market

immediately. Instead, some time will pass before the effect will be felt in the Ukrainian market. One example when there was a dramatic drop in the Russian excise tax is the financial crisis of 1998. After the depreciation of the ruble, the excise tax in Russia fell in real terms and in hryvnia equivalent. As tobacco producers claimed, after the crisis, the massive inflow of illegal cigarettes started after 4-5 months.

Second, consumers may be "brand-addicted". This means that a consumer is used to smoking a particular cigarette brand. Hence, if his "favourite" brand becomes relatively more expensive the consumer my not switch to other cheaper (smuggled) brands immediately. Instead, the consumer will look for a smuggled brand that is more close to his taste. This process will take some time, and the consumer will switch to smuggled cigarettes after a certain period of time.

Third, there is a necessity to transport smuggled cigarettes to more distant regions. In the case of smuggling from Russia, initially, smuggled cigarettes entered the markets of Eastern oblasts of Ukraine that are located directly at the border with Russia. However, in order to extend their markets, smugglers need to move to other oblasts, which are more distant. This requires establishing new distribution chains in other oblasts, which in turn requires certain expenditures and time.

AD_OUT_SA

– seasonally adjusted volumes of outdoor advertising, number of billboards in oblast centres of Ukraine, the cities of Simferopol and Sevastopol. In the model, I used average advertising volumes for the current month and two previous months. Such specification was chosen in order to account for the effect of advertising distributed over time.

BEFORE_CRISIS

– a dummy variable equal to 1 for the period before the financial crisis in Russia (before September 1998) and 0 – after that time. The reason for introducing the variable was to account for the fact that prior to the financial crisis, producers had been introducing new cigarette brands to the market and increasing their production. This led to consumers switching from traditionally smuggled cigarettes to locally produced cigarettes. The dummy was multiplied by the price to account for the fact that consumers were less sensitive to changes in the price of legal cigarettes.

8.1.2. Price equation

UKR_EX/50

– this is the same variable used before (Ukrainian excise rate). However, in the price equation, this was divided by 50 to calculate the excise rate per one pack of cigarettes. Such modification has no impact on the estimation results, however, makes it easier to interpret the results as the dependent variable is the price per one pack of cigarettes.

USD

– exchange rate of Hryvnia with respect to the US dollar. This variable was introduced mainly as a proxy for the missing data on the price of raw tobacco used in cigarette production. Since the majority of raw tobacco is imported to Ukraine, the exchange rate can be a good proxy for the raw tobacco price if we assume that the world price of tobacco did not change significantly over the period under consideration.

P(-1)

– this is the price lagged one period. The variable was introduced to account for some dynamics in the cigarette price.

V1997, V1998, V1999

– the dummy variables equal to 1 in the corresponding years. The reason for introducing the variables is the necessity to model producer behaviour more accurately. The point is that for these three years, the excise tax increases were planned in advance and included in the legislation. Therefore, producers were aware of the future tax increases and acted correspondingly: instead of increasing prices in January of each year (when the tax rates were raised), they did this gradually during previous and current years. Consequently, an increase in the tax rate on January 1 of each of the years did not lead to dramatic changes in the price.

TAX_SYS

– a dummy equal to 1 in the period starting January 2000 till present. This represents a change in the principle of calculating excise taxes in Ukraine. Starting January 2000, excise rates have been expressed in the national currency instead of EURO. In fact, in January 2000, excise rates were significantly reduced. However, producers did not decrease prices so significantly. Instead, they, probably, increased their profits. The dummy was included to simulate this peculiarity of producer behaviour.

CRISIS

– the dummy was introduced to account for changes in producer behaviour caused by the Russian financial crisis and subsequent rapid changes in exchange rates of major currencies with respect to Hryvnia. The dummy was set equal to 1 for September and October 1998.

V1998_2

– the dummy to simulate changes in producer behaviour caused by the expected (and envisaged in the legislation) increase in the tax rate. The meaning of the dummy is the same as for V1997, V1998, and V1999. The dummy was set equal to 1 for the period of increased taxes (September-December 1998).

V1999_2

– a dummy equal to 1 for the last three months of 1999. This variable was included in the model to simulate changes in producer behaviour caused by an unexpected depreciation of the national currency with respect to EURO (and corresponding increase in the excise tax).

8.1.3. The Laffer curve

REV

– government revenues from excise taxation of tobacco products, million inflation-adjusted Hryvnia.

Besides the excise rate, as explanation variables, major factors affecting demand were included. This was done since government revenues are determined not only by the tax rate, but also by the behaviour of consumers (the demand side).