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Faculty of Social Sciences

Institute of Economic Studies

Bachelor Thesis

Prague 2009 **Katarína Miklovičová**

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Bachelor Thesis

Impact of excise taxation on government revenue and demand of Czech and Slovak households

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Abstract

The objective of this thesis is to analyze the impact of complying with EU excise tax requirements on government revenues and demand of Czech and Slovak households. To estimate the tax influence the flow adjustment model is used for motor fuels and the partial adjustment model is used for addictive goods. Motor fuel tax has significant, although small, effect on demand in both countries. Household expenditures are barely affected by the cigarette taxation as tobacco companies absorb part of the tax and consumers switch to cheaper brands. The effect of past tobacco consumption on present demand is significant in both countries, but stronger in the Czech Republic. There is a good opportunity for both governments to collect even higher excise tax revenues in the future. These could cover the costs of externalities, if appropriately allocated.

Keywords: excise taxation, household demand, government revenue

Abstrakt

Cieľom predkladanej bakalárskej práce je analýza dopadu adaptácie spotrebných sadzieb Európskej únie na štátne príjmy a na dopyt českých i slovenských domácností. Na odhad vplyvu daní použijeme model tokového prispôsobenia pre motorové palivá a model parciálneho prispôsobenia pre návykové statky. Daň na motorové palivá má signifikantný, hoci malý, vplyv na dopyt v oboch krajinách. Domácnosti sú slabo ovplyvnené zdanením cigariet, keďže tabakové spoločnosti absorbujú časť dane a spotrebitelia prechádzajú k lacnejším značkám. Účinok minulej spotreby tabaku na súčasný dopyt je signifikantný v oboch krajinách, avšak silnejšie sa prejavuje v Česku. Obe vlády majú príležitosť v budúcnosti ešte zvýšiť svoje príjmy zo spotrebných daní. Tie by mohli pri vhodnej alokácii pokryť náklady externalít.

Kľúčové slová: spotrebné dane, dopyt domácností, štátne príjmy

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1 Introduction

Excise taxes are indirect taxes on consumption or use of certain products. The basic purpose of excise taxes is to "correct" negative externalities by including them into the market price. All member states of the European Union apply excise taxes on three product categories. These are: alcoholic beverages, manufactured tobacco products and energy products (motor and heating fuels, natural gas, electricity, coal and coke). The total revenue from excise taxes goes directly to member states. The development of the legislation in the area of excise taxes includes regular increases of the minimum rates. These have to be adopted by all member states during a transitional period. Changes in minimum rates then influence prices of tobacco, alcoholic and energy products and in turn have an impact on the quantity demanded. Besides, an effect on the tax revenue is expected, as well. The focus of this thesis is on the influence that the excise tax increases have on government revenue and on demand for motor fuels, tobacco products and alcoholic beverages in the Czech Republic and Slovakia. Both countries were obliged to adjust their excise tax rates to the minimum levels after the EU accession on 1 May 2004. We will compare the impacts on household expenditures and tax receipts. Further, we will examine whether the excise taxes actually fulfill the corrective purpose as defined by Pigou.

To carry out a thorough analysis, reliable data need to be acquired and closely examined using an appropriate model. The *Household Budget Surveys* conducted by Czech Statistical Office and Statistical Office of the Slovak Republic create a unique opportunity to analyze the effect of excise tax changes on household expenditures. Details on tax receipts and excise tax legislations provided by the Ministry of Finance of the Czech Republic and Ministry of Finance of the Slovak Republic supplement the statistical data. The period covered is 1998-2008. In the centre of this analysis are the models used to capture the impact of specific tax changes on the household expenditures. When focusing on motor fuels, the *flow adjustment model* will be adopted. The *partial adjustment model* will be used in case of addictive products.

This topic has already been covered for many other European and American countries. Major findings and comparisons were presented by Baltagi and Levin (1986), Baltagi and Griffin (1996) and Baltagi, Griffin and Xiong (2000). These papers showed that in case of motor fuels the price elasticity is -0.26 in the short- and -0.78 in the long-run indicating inelastic

demand, income elasticity lies between 0.12 and 0.87 and vehicle stock elasticity is negative. Our analysis will demonstrate that for Czech and Slovak data, "tax elasticity" lies in the price elasticity range computed in the papers, income elasticity is very close to values for other European countries and vehicle stock elasticity is negative in the Czech Republic and insignificant in Slovakia. In case of tobacco products, the papers establish that the price elasticity lies between -0.8 and -0.1 which indicates inelastic demand again, income is mostly insignificant and past consumption estimates are positive, between 0.49 and 0.97. Our analysis will confirm income insignificance and positive, less than unitary, estimates of past consumption and it will attest to insignificance of taxes. We will further show that both governments have the option to collect enough revenues for covering the costs of externalities.

The structure of the thesis is as follows: firstly, the corrective role of excise taxes and their theoretical influence on demand are described. Secondly, structure of taxes and tax revenues in the European Union, the Czech Republic and Slovakia is examined. Thirdly, a separate analysis of motor fuels, tobacco and alcoholic beverages taxation is conducted. In this analysis we will describe rates and revenues in detail, outline a model used to capture the effect of excise taxes on household expenditures and present the results. The final section offers concluding remarks.

2 Theory of excise taxation

2.1 Corrective role of taxes

As Arthur Cecil Pigou stated in his major work *The Economics of Welfare*, "there are many obstacles that prevent a community's resources from being distributed among different uses or occupations in the most effective way."[1] Negative externalities are such obstacles. Where they exist the market equilibrium is not Pareto efficient[2]. As the Graph 1a shows, if we consider a producer of steel, the marginal social cost including the marginal cost of pollution is above the marginal private cost (supply curve). When a negative externality of production, in this case pollution, is not included in the market price the market equilibrium quantity is higher than the efficient level of output.

Similar logic can be applied to tobacco, alcohol and energy products, as well. The marginal social cost of smoking includes for instance the cost of curing illnesses caused by smoking. The marginal social cost of drinking alcoholic beverages covers the costs of drunk driving or rehabilitation centers. And the marginal social cost of energy products contains air pollution.

As reaching Pareto efficiency is desirable, a suitable solution for correcting externalities is to be found. Finding the solution means searching for alternative allocation. An efficient allocation requires that all agents face the correct prices for their actions[3]. In addition to control regulations, Pigou introduced taxes and subsidies, Coase drew attention to private bargaining and Dales advocated tradable permits[4]. Kaplow inclines to Pigou's ideas and claims that "to tax activities that impose negative externalities and subsidize those that generate positive externalities… is optimal."[5] What Pigou suggested is that "it is possible for the State, if it so chooses, to remove the divergence in any field by "extraordinary encouragements" or "extraordinary restraints""[6] where the most obvious forms are bounties and taxes. If these are set to optimal levels, Pareto efficient allocation may be achieved. This

[1] Pigou, 1932, p. 129

[2] Atkinson, Stiglitz, 1980

[3] Varian, 1992

[4] Kaplow, 2008

[5] Kaplow, 2008, p. 137

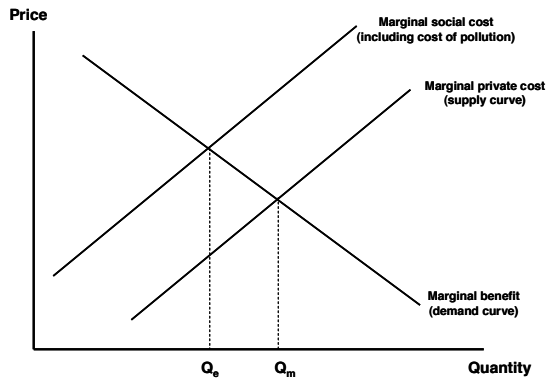
[6] Pigou, 1932, p. 192

concept evolved into the most favorable market-based public sector solution to externalities[7], especially if the property rights are not sufficiently defined[8].

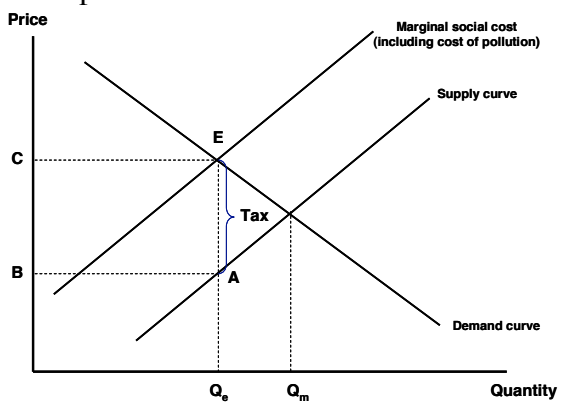
The corrective taxes (also called Pigouvian taxes) on negative externalities are designed to make the marginal social cost and the marginal private cost equal. In the Graph 1b, the new equilibrium is in E, where the market equilibrium quantity is equal to the efficient level of output. EA is the pollution tax per unit and the area BAEC is the sum of collected pollution taxes. The new equilibrium quantity is reached at a higher price – agents now face the correct price for their actions. An attentive reader might notice that imposing the tax causes a decrease in consumer surplus and in producer surplus (the producer receives price after tax). This is partially offset by the tax revenue. The triangle between the new equilibrium, point A and the former equilibrium is a deadweight loss (DWL), which is usually undesirable. However, one might argue that lower equilibrium quantity induces less externality and so the excise tax could be justified even with the DWL.

Although many economists agree that it is optimal to tax negative externalities and subsidize positive externalities[9], there is a considerable skepticism, as well. The solution to negative externalities using corrective taxes requires the taxing authorities to know the marginal social cost of a taxed good and to set the tax at the optimal level. The problem is, the taxing authorities cannot be expected to have this knowledge[10].

Graph 1a



Graph 1b



Source: Stiglitz, 2000

[7] Stiglitz, 2000

[8] Sojka, 2000

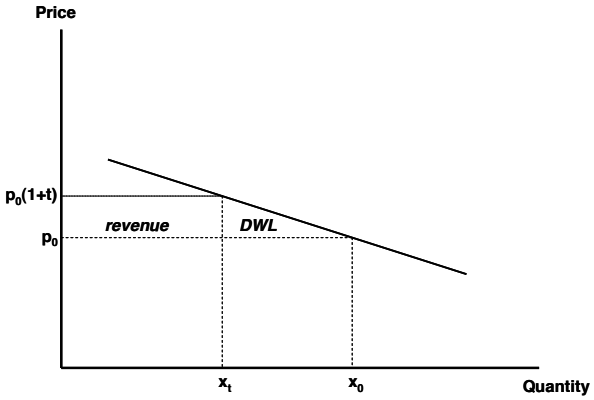
[9] Kaplow, 2008

[10] Varian, 1992

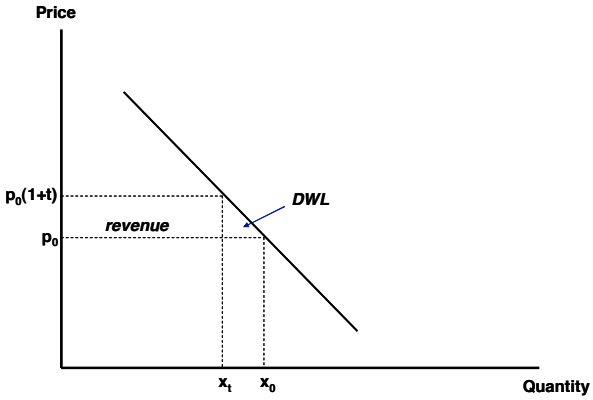
2.2 Excise taxes and demand

Taxes affect prices and so they influence the quantity demanded. The degree of impact depends mostly on the elasticity of demand. Pigou stated, that "the best way of rising a given revenue is by a system of taxes under which the rates become progressively higher as we pass from uses of very elastic demand or supply to uses where demand or supply are progressively less elastic."[11] This opinion received serious criticism but the basic idea is valid. As Graphs 2a and 2b show, the less elastic the demand curve is, the less is the quantity demanded influenced by a tax change. Therefore, the less elastic demand curve allows the tax authority to collect higher revenue while causing less deadweight loss. With a perfectly inelastic demand curve, the price rises by the full amount of the tax and the burden falls solely on consumers[12].

Graph 2a



Graph 2b



Source: Atkinson, 1980

An increase in a minimum excise tax rate raises prices in all member states that do not already have the rates voluntarily higher than is required. Unless the demand curves for tobacco, alcohol and motor fuels are perfectly inelastic, new equilibrium quantity will be lower. The extent of the equilibrium quantity decrease will depend on the demand curve elasticity. Whether the elasticity is the same in selected EU member states and how the demand drop affects tax revenue is the subject of next chapters.

[11] Pigou, 1947, p. 105

[12] Stiglitz, 2000

2.3 Literature overview

Prior to conducting the analysis let us briefly discuss the already achieved results in this area. Baltagi and Griffin (1996) explored the motor fuel demand in 18 OECD countries in period 1960-1990 and recommended using the *flow adjustment model*. Their major results include the estimates of price (-0.78,-0.26), income (0.12,0.87) and vehicle stock (<0) elasticity. Furthermore, their study compared various estimation methods and the traditional OLS, GLS and Within estimators scored well in overall forecast performance. Another significant research paper in the area of environmental taxes focused on the European Union, especially United Kingdom, showed that excise taxes could make a significant contribution to tax revenue. Fullerton (2008) concludes that "available tax base is broad, high tax rates may be justified by environmental externalities and demand is inelastic… so revenues are not greatly eroded by behavioral responses."[13]

Research in demand for tobacco products brought similar results. Baltagi and Levin (1986) conducted a study on 46 of the United States. It demonstrated insignificant income elasticity and significant price (in)elasticity. The study also proved that "as an anti-smoking tool, cigarette taxation may not be as effective in reducing cigarette consumption as previously thought"[14]. Baltagi, Griffin and Xiong (2001) recommended using the *partial adjustment model* to examine the demand for tobacco products. A few years later Baltagi and Griffin (2004) confirmed that "the revenue-generating potential of cigarette taxes remains strong" and that there is a "limited scope for tax increase as a policy aimed at reduced smoking"[15]. Another noteworthy study by Wasserman (1991) showed that "higher prices will simply lead to increased expenditures on cigarettes while achieving only moderate decreases in consumption"[16].

A study by Selvanathan (2006) focused on alcohol consumption showed that unlike cigarette demand the alcohol demand is consistent with rational addiction model. The value of income elasticity is approximately 0.8 and price elasticity is -0.6 for data from 8 industrialized countries.

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[13] Fullerton, 2008, p. 52

[14] Baltagi and Levin, 1986, p. 154

[15] Baltagi and Griffin, 2004, p. 428

[16] Wasserman, 1991, p. 62

3 Structure of tax rates and revenues

3.1 EU data

3.1.1 Structure of taxes in the EU

The European Union is a high tax area. The revenue from taxes (including social security contributions) reached 39.9% of the EU-27 GDP in 2006 which was approximately 12 percentage points above the tax-to-GDP ratios for USA and Japan[17]. These ratios varied widely within the EU, from 28.6% in Romania to 49.1% in Denmark. In the most recent Communication about taxes – "Tax Policy in the European Union – Priorities for the Years Ahead" – the Commission claimed there was no need for an across the board harmonization of member states' tax systems. However, the Commission concluded that increased tax policy coordination would help to support wider EU policy goals and made a proposal for a move to qualified majority voting in certain tax areas. The proposal was not supported by member states and voting system stayed unchanged – the Council needs to be unanimous.

The direct taxation remains the sole responsibility of the member states as long as they respect Treaty principles and do not restrict the four freedoms (free movement of workers, services and capital and the freedom of establishment). The share of direct taxes in total tax revenues is lower in the new 12 countries. It is 20.1%, 20.4% and 21.4% in Bulgaria, Slovakia and Romania, respectively. The share is much higher in the EU-15[18], reaching the maximum of 61.5% in Denmark. Top *personal income tax* rates vary between 16% in Bulgaria and 59% in Denmark. *Company tax* is left to member states, as well. However, some consolidation has been done. The company income tax rates have been cut forcefully since 1995 and the arithmetic average decreased from 35.3% to 23.6% in 2006. Additionally, the Commission formulated a long term proposal of common tax base which includes the common consolidated tax base and a possible pilot scheme for home state taxation for small and medium enterprises.

[17] Eurostat, 2008a

[18] EU-15 are countries that were EU member states between 1 January 1995 and 30 April 2004

The indirect taxation influences free movement of goods and the freedom to provide services. Therefore, the EU taxation policy ensures that the competition on the Internal Market is not distorted by different indirect taxation systems and rates. The share of indirect taxes in total tax revenues has slightly increased in the past 10 years to 35% in 2006. The main legislative change of *value added tax* was made through the VAT Directive in 2007. The minimum VAT rate of 15% and a reduced 5% rate were fixed until 2010. The VAT rates of member states currently fluctuate between 15% and 25%. The "destination based" principle is used for calculation. The revenues from *excise taxes* make up almost one tenth of the revenues from consumption taxes. Minimum rates are set for all three product categories – alcoholic beverages, manufactured tobacco products and energy products. The rates for energy products will be further raised from 1 January 2010. *Environmental taxes* comprise 6% of the total taxation in the EU. The revenue was increasing considerably in 1990-1994 and it is on decline since 1999, especially in the euro area[19]. The environmental tax revenues of the new 12 member states have been rising steadily since they entered the Union. This, however, has not been sufficient to offset the decline in the EU-15.

3.1.2 Minimum rates and transitional periods

The main part of the EU legislation for excise duties was adopted in preparation for the 1993 Internal Market establishment. It has been further developed ever since – the latest Directive entered into force on 15 January 2009. The legislation in the area of excise duties has 3 major parts. Firstly, the product categories, the way of tax calculation and the scope of exemptions are defined. Secondly, the minimum rates of duty for each product type are set. The form of tax is mostly specific, i.e. monetary amount per quantity of product. Member states are allowed to fix the excise tax rates freely above the minimum rates. Thirdly, the general provisions such as rules for the production, storage and movement between member states are imposed.

[19] Eurostat, 2008a

3.1.2.1 Energy products

Table 1: The minimum levels of taxation applicable to motor fuels

	From 1.1.1993	From 1.1.2004	From 1.1.2010
Petrol (/1000l)	337	421	421
Unleaded petrol (/1000l)	287	359	359
Diesel	245	302	330
Kerosene	245	302	330
LPG (/1000l)	100	125	125
Natural gas	100 (/1000kg)	2.6 (/gigajoule)	2.6 (/gigajoule)

The volumes are measured at temperature 15°C.

Source: European Commission, Taxation and Customs Union

Transitional periods as defined in the Council Directive 2003/96/EC, Article 18:

- for some member states (e.g. Greece, Spain, France) the Directive defines transitional periods during which they are required to gradually reduce the gap between their rates and the new minimum rates. If the difference is less than 3% of the minimum rate, member state may wait until the end of the transitional period to adjust the national rate
- apart from transitional period member states are authorized to continue applying their various derogations until 31 December 2006, subject to prior review by the Council on the basis of a Commission proposal
- member states with difficulties in implementing the new minimum levels of taxation are allowed a transition period until 1 January 2007 to avoid jeopardizing price stability
- amending directives 2004/74/EC and 2004/75/EC specify possibilities to apply temporary exemptions, reductions and transitional periods for countries entering the EU on 1 May 2004 (for a complete list of transitional periods, see Appendix A)

3.1.2.2 Manufactured tobacco products

The minimum levels of taxation applicable to manufactured tobacco products:

Cigarettes[20]:

- Tax has to consist of specific duty per unit of product, proportional excise duty based on the maximum retail selling price and VAT proportional to the retail selling price
- Specific duty has to be in range 5%-55% of the total tax on MPPC[21]
- Overall minimum excise duty (excluding VAT) is set at 57% of TIRSP[22] for MPPC

[20] Requirements came into force on 1 January 1993 unless otherwise stated

[21] MPPC – Most Popular Price Category

- The minimum total excise duty must be EUR 60 (1 July 2002) / EUR 64 (1 July 2006) per 1000 cigarettes in the MPPC
- Member states need not comply with the 57% minimum incidence requirement if the minimum total excise duty exceeds EUR 95 (1 July 2002)/ EUR 101 (1 July 2006) per 1000 cigarettes in MPPC

Cigars and cigarillos:

Overall minimum excise duty of 5% of TIRSP

OR ECU 7 (1 January 1993) / EUR 9 (1 January 2000) / EUR 10 (1 January 2001) / EUR 11 (1 July 2003) per 1000 items or kilogram

Other smoking tobacco:

Overall minimum excise duty of 20% of TIRSP

OR ECU 15 (1 January 1993) / EUR 18 (1 January 2000) / EUR 19 (1 January 2001) / EUR 20 (1 July 2003) per kilogram

Fine-cut tobacco:

1-Jan-1993	overall minimum excise duty of 30% of TIRSP or ECU20/kg
1-Jan-2000	overall minimum excise duty of 30% of TIRSP or EUR24/kg
1-Jan-2001	overall minimum excise duty of 30% of TIRSP or EUR25/kg
1-Jul-2002	overall minimum excise duty of 32% of TIRSP or EUR27/kg
1-Jul-2003	overall minimum excise duty of 33% of TIRSP or EUR29/kg
1-Jul-2004	overall minimum excise duty of 36% of TIRSP or EUR32/kg

The transitional periods:

Most of the member states joining the EU on 1 May 2004 were granted transitional periods until 2010. Therefore, member states may use quantitative limits for imports from third countries even to tobacco products brought to their territory from the new member states.

3.1.2.3 Alcoholic beverages

The minimum levels of taxation applicable to alcoholic drinks (in force since 1993):

Spirits	EUR 550 per hectoliter of pure alcohol
Intermediate products	EUR 45 per hectoliter of product
Wine and sparkling wine	0

[22] TIRSP – Tax Included Retail Selling Price

Beer	EUR 0.748 per hectoliter per degree Plato Or EUR 1.87 per hectoliter per degree of alcohol

There are no transitional periods for implementing the minimum levels.

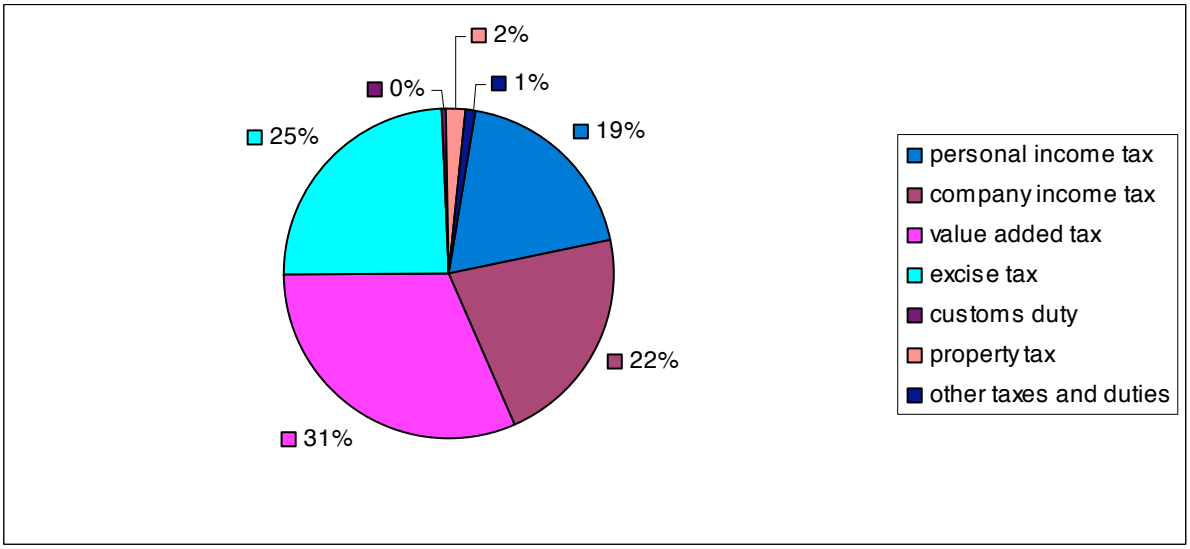
3.2 Data from the Czech Republic and Slovakia

3.2.1 Total tax revenues

Total tax revenue in the Czech Republic amounted to 36.2% of GDP in 2006. The tax-to-GDP ratio in Slovakia was the second lowest in the EU – 29.3% of GDP. Figures below show the structure of the total tax revenue in 2007. We can see that the direct taxes are a more important source of revenue in the Czech Republic. The reason for a higher share of revenue from personal income tax is that there is a flat rate of 19% in Slovakia, whereas the Czech Republic ran a progressive tax system with top statutory income tax rate of 32% in 2007. The top statutory tax rate on corporate income is higher in the Czech Republic, as well. It reached 24% in 2007, while the rate in Slovakia was 19%, the second lowest in the European Union.

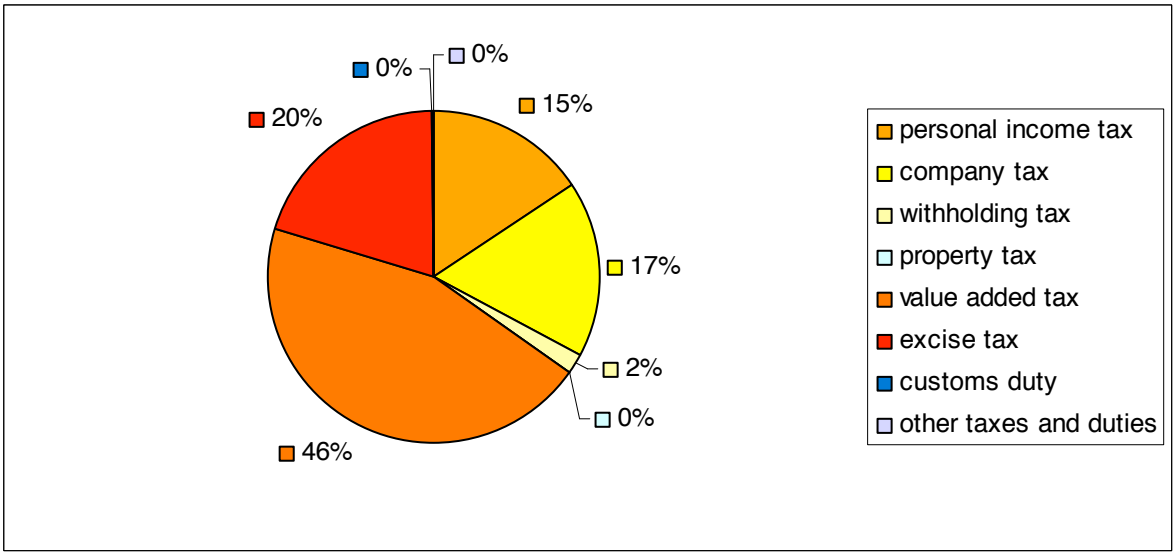
Indirect taxes play a more dominant role in Slovak revenues. The revenue from value added tax and excise taxes account for 66% of the total revenue in Slovakia and 55% of the total revenue in the Czech Republic. This is, again, caused by different tax rates. In 2007, the standard VAT rate was 19% in both countries. The reduced rate applying to certain services and essential goods (e.g. food, drugs and construction works for housing) was 5% in the Czech Republic, while the Slovak government reintroduced a reduced rate of 10% which only applied to medicines and certain other medical/pharmaceutical products. The share of excise taxes on the total revenue was higher by 5 percentage points in the Czech Republic. The excise taxes are the second richest source of government revenue in both countries.

Figure 1: Structure of the total tax revenue in the Czech Republic in 2007



Source: Ministry of Finance of the Czech Republic

Figure 2: Structure of total tax revenue in Slovakia in 2007

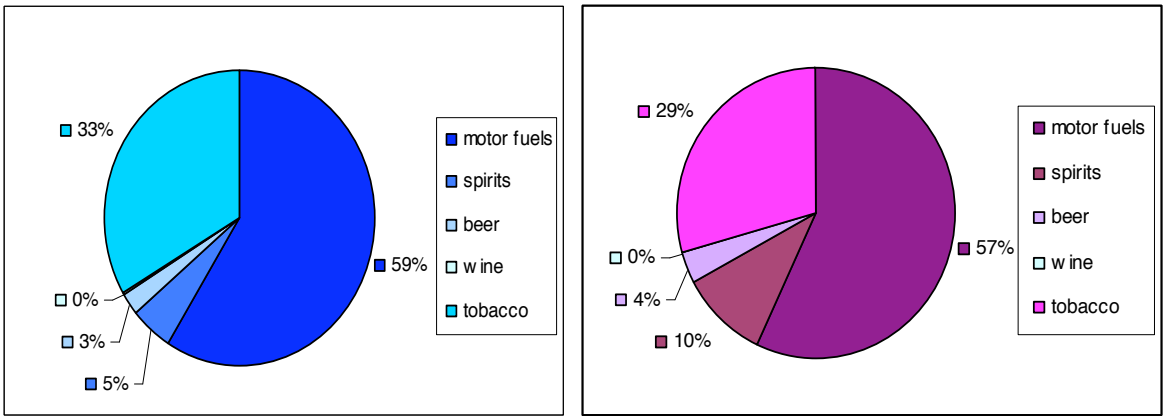


Source: Ministry of Finance of the Slovak Republic

3.2.2 Excise tax receipts

As we can see on the figures above, excise taxes generate 25% and 20% of the total tax revenue in the Czech Republic and Slovakia, respectively. Figures 3 and 4 give a better view of the excise tax receipts.

Figures 3 and 4: Structure of excise tax receipts in the Czech Republic and Slovakia in 2007

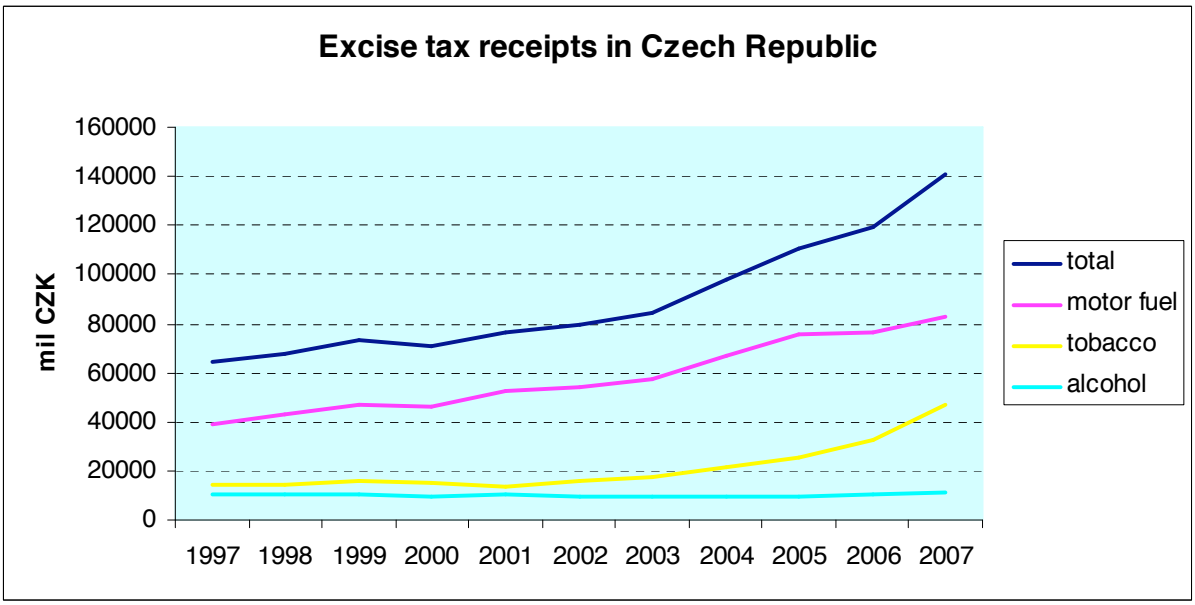


Source: Ministry of Finance of the Czech Republic and Ministry of Finance of the Slovak Republic

The share of receipts from motor fuels on the total excise tax receipts is almost 60% in the Czech Republic (CR) and Slovakia (SR). It has been fluctuating between 56% and 69% in both countries in the past ten years. Receipts from taxes on tobacco products have the second highest share of approximately 30%. This share has increased by 10 percentage points in the CR and by 15 percentage points in the SR. Receipts from alcoholic beverages amount to 8% and 14% in the Czech Republic and Slovakia, respectively. This share has dropped by 12 percentage points in the CR and by 10 percentage points in the SR during the past ten years. For additional details, see Figures 21 and 22 in Appendix B.

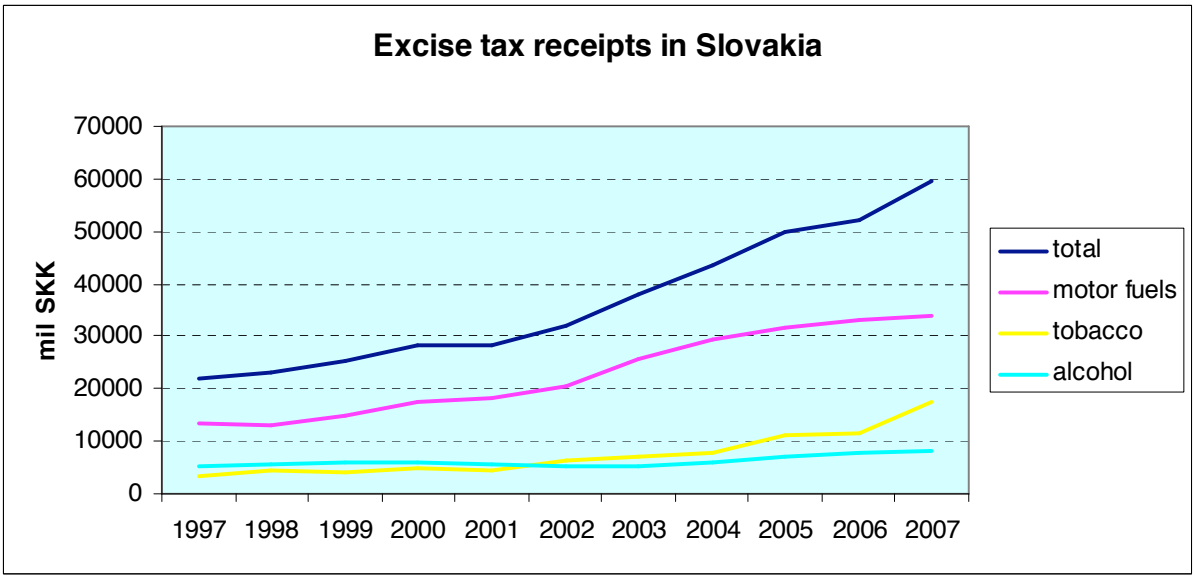
The importance of excise tax receipts for the total government revenue has risen sharply in the past ten years as the amount of tax collected more than doubled in the Czech Republic and almost tripled in Slovakia. Figures 5 and 6 show that the growth of the total sum collected was mainly caused by increased receipts from motor fuels taxes and tobacco taxes after the 2004 EU accession. The revenue from alcohol taxation has been stable in both countries.

Figure 5: Excise tax receipts in the Czech Republic, 1997-2007, in million CZK



Source: Ministry of Finance of the Czech Republic

Figure 6: Excise tax receipts in Slovakia, 1997-2007, in million SKK



Source: Ministry of Finance of the Slovak Republic

4 Excise tax analysis

4.1 Data description

The data for analysis were obtained primarily from the Household budget survey (HBS) conducted by the Czech Statistical Office (CSO) and the Statistical Office of the Slovak Republic (SOSR). The CSO uses a designed quota selection to pick 3,000 households that would report for the whole year. The selection of households corresponds with the results of micro-census carried out annually. However, CSO warns that it restricts the option to generalize the data and results on the whole population. Until 2004 the SOSR used the same method of household selection as the CSO but only picked 1,600 households. Therefore, again, we have to note that the option to generalize the data and analysis results on the whole population is restricted. In 2004 the SOSR changed the method to two-step random selection which corresponds with the results of the latest Population Census conducted in 2001. The SOSR selects 4,700 households from all regions according to the number of households living permanently in each region.

The quarterly data on expenditures in categories: *alcoholic beverages, tobacco products, motor fuels and lubricants* for households in total were extracted from the HBS. Unfortunately, statistical offices do not provide a more detailed division into categories in quarterly reports. The expenditures on selected categories were recalculated into national currency per household member per quarter. To take inflation into account, these values were then rescaled into constant prices with the reference year of 2005 using consumer price index (CPI) for specific categories. The CPI was obtained from the European Central Bank Statistical Data Warehouse. As there was a noticeable seasonality pattern in the expenditures on alcoholic beverages (peak in the fourth quarter) and motor fuels and lubricants (peak in the third quarter), the expenditures time series were seasonally adjusted[23] using the Statgraphics Centurion XIV software. The econometric analysis will be conducted in R and TSP.

To carry out the analysis of the excise tax influence on the household spending on fuel we need to know the number of cars per capita for each quarter. However, the statistical offices only provide the number of cars at the end of each year. Thus, we take the difference in the

[23] Detailed figures showing seasonally adjusted and not adjusted expenditures are in the specific sub-sections.

number of cars at the end of two consecutive years and calculate the quarterly values of increases in accordance with the household expenditures in the category *purchase of personal vehicles*. It transpires that households spend the most money on personal vehicles in the second quarter and the least amount of money in the first and fourth quarter.

The values of excise tax receipts in current prices were obtained from reports of ministries of finance and were then worked out to constant prices with 2005 as the reference year. In this case, not the CPI for specific categories but the overall CPI was used because the "general price index is favored when the issue concerns the maintenance of the real level of revenue"[24]. The excise tax rates were acquired directly from legislative acts and were recalculated to constant prices with reference year 2005 using CPI for specific categories as most of the taxes are specific i.e. monetary amount per quantity of product. If the specific tax is not adjusted regularly, it erodes[25] and we need to take that into account.

To make further analysis simpler I decided to choose one representative product from each excise tax category and use its taxation specifications from now on. In the category *motor fuels and lubricants* the unleaded petrol was chosen for the following reasons: the leaded and unleaded petrol had the same tax rates in 1996-2003 in the Czech Republic and the difference in rates was at most 8% in Slovakia for the same time period; since 2004 the use of leaded petrol by households is negligible[26]; the use of diesel by households has been rising steadily since 1996 and nowadays one third of newly purchased personal automobiles have diesel engine[27], however the share of personal cars using diesel does not exceed 12% in the Czech Republic and Slovakia[28]. The tax rate was determined in monetary amount per ton of fuel until 30 June 1999 in the Czech Republic and until 31 December 2001 in Slovakia. Afterwards, the rate was set in monetary amount per 1000 liters of fuel. Thus, the former rates were recalculated using the value of 0.69 kg/l for the density of fuel. Cigarettes represent the category *tobacco products* as they account for nearly 90% of total tobacco product sales in the European Union[29]. The tax on cigarettes has two components – specific and ad valorem,

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[24] Cnossen, 2001, p. 15

[25] Cnossen, 2001

[26] European Automobile Manufacturers' Association

[27] Neuschl, 2006

[28] European Automobile Manufacturers' Association

[29] Cnossen, 2006

which are allowed to be set freely. However, there is a compulsory overall minimum rate fixed in the monetary amount per cigarette by the European Commission. This overall minimum rate will be used in further analysis. And finally, the representative of the category *wine* is the still wine as its consumption amounts up to 85% of the total wine consumption in both Czech Republic and Slovakia[30].

Where the real income is used in the analysis, we input the real GDP per capita, chain-linked to 2005, seasonally and working day adjusted to match the other above mentioned data. Graphs 3a and 3b in Appendix C show the development of real GDP per capita in the Czech Republic and Slovakia.

4.2 Household expenditures

Prior to elaborating household spending on excise taxed goods, let us briefly discuss the structure of household expenditures and its development over the past years. The Table 2 below shows a detailed structure of household final consumption expenditure in the Czech Republic and Slovakia five years before the EU entry and one year after. The CR and the SR are compared to EU-15. We can see that the EU-15 structure of household expenditure has been stable over the years. The structure has changed noticeably in the CR and the SR towards the EU-15 trends: the share of expenditure on food and non-alcoholic beverages decreased although it still accounts for one fifth of expenditures in the CR and approximately one fourth of expenditures in the SR. The share of expenditures on housing, water, electricity gas and other fuels increased by 2.6 and 7.9 percentage points in the Czech Republic and Slovakia, respectively, and is almost equal to the expenditures on food and non-alcoholic beverages. Expenditures on transport have the third highest share on the total spending. This share has been stable in the Czech Republic and only slightly increased in Slovakia even though the excise taxes influencing transport costs rose rapidly. Spending on recreation and culture has the fourth place in total expenditure although its share has been decreasing in the past years. Slovak households spend 1.6 times less money on this category than households in the Czech Republic. Expenditures on clothing and footwear have converged completely to the EU-15 level. The share of spending on alcoholic beverages, tobacco and narcotics was approximately 3.5% in 1999 and decreased to circa 3% in 2005 which is still almost one

[30] CSO, SOSR

percentage point above the share in the EU-15. What is interesting is the simultaneous increase in health expenditures and decrease in alcohol, tobacco and narcotics spending. When comparing the Czech Republic and Slovakia we can see that Slovak households spend higher share of their incomes on necessities such as food and housing while Czech households use bigger part of their incomes on recreation and culture, furnishing and household equipment and miscellaneous goods and services.

Table 2: Structure of household final consumption expenditure (percentage of total):

		Food and non-alcoholic beverages	*Alcoholic beverages, tobacco and narcotics*	*Clothing and footwear*	*Housing, water, electricity, gas and other fuels*	*Fournishing, household equipment, routine maintenance*	*Health*	*Transport*	*Communications*	*Recreation and culture*	*Education*	*Restaurants and hotels*	*Miscellaneous goods and services*
1999	CZ	23.2	3.4	7	17.5	7.7	1.6	11.3	2.5	11.3	0.5	4.8	9.2
1999	SK	29.8	3.6	9.3	15.8	6.2	1.5	8.6	2.6	8.3	0.5	5.5	8.3
1999	EU15	13.8	2.7	6.1	27.8	6.8	3.1	13.4	2.4	9.9	0.8	6.1	7
2005	CZ	20.6	2.9	5.6	20.1	6.7	2	11.1	4.6	10.6	0.5	5.1	10.2
2005	SK	27	3.1	6.1	23.4	4.6	3.1	9.2	4.7	6.6	0.9	4.8	6.6
2005	EU15	13.6	2.2	5.8	28.4	5.8	3.2	12.7	2.8	8.9	0.9	6	9.6

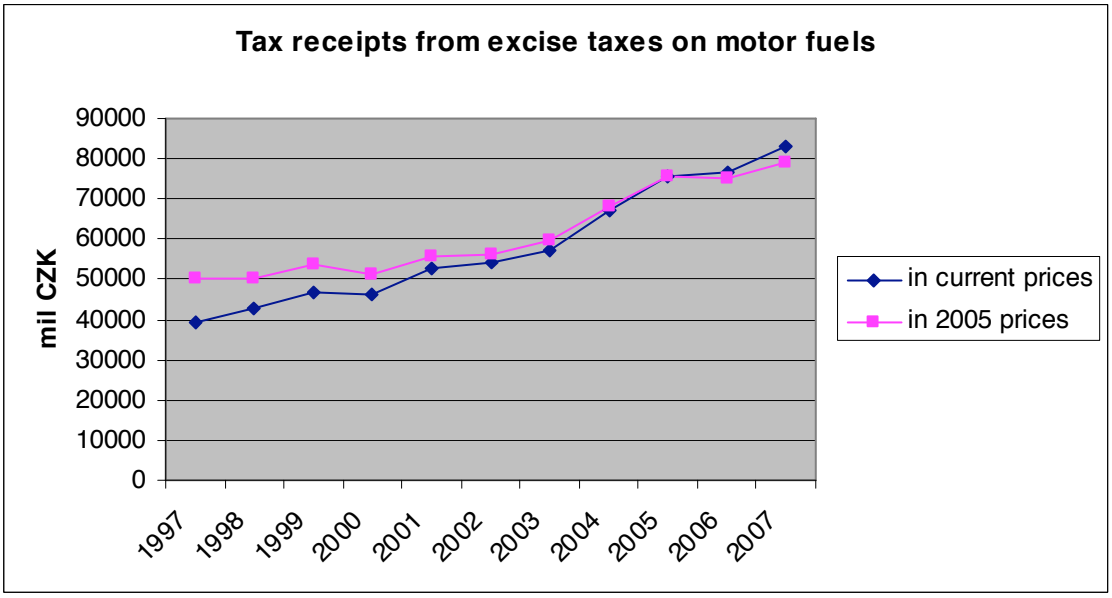
Source: Eurostat: Household budget surveys 1999 and 2005 and own calculations

4.3 Motor fuels

4.3.1 Rates and revenues

The development of revenue from motor fuels excise is shown in figures 7 and 8 below, both in current prices and constant prices with 2005 as the reference year. It is evident that although the revenue in current prices increases regularly, the real growth might even be negative. The reason is that if the tax rate is fixed in monetary amount per quantity of product and remains unchanged for some time the revenue erodes.

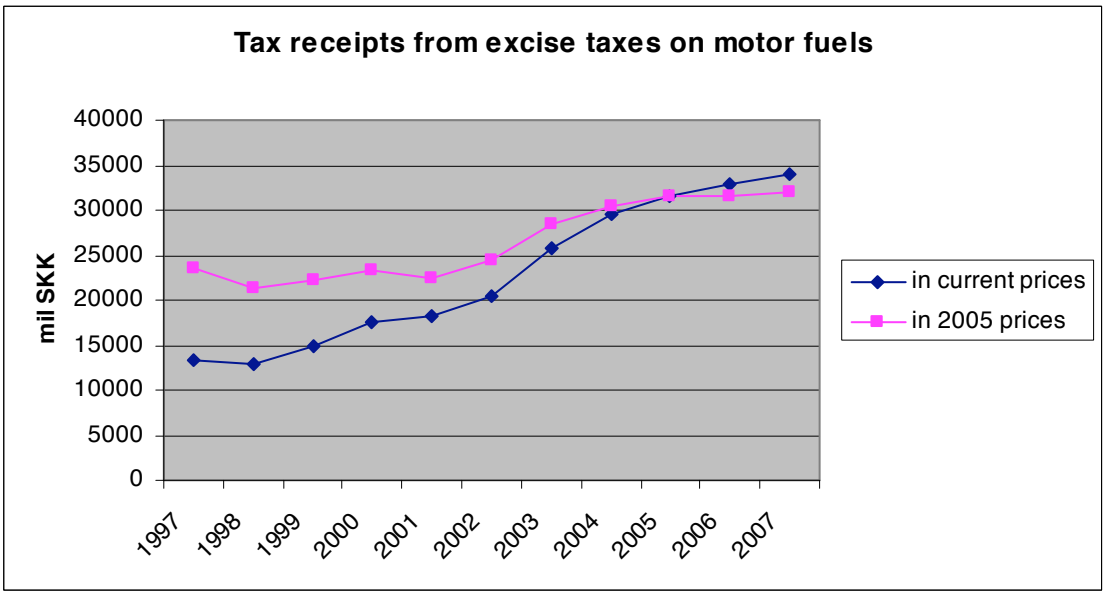
Figure 7: Tax receipts from excise taxes on motor fuels in the Czech Republic, 1997-2007



Source: Ministry of Finance of the Czech Republic and own calculations

Since 1997 the Czech government increased the tax rate on unleaded petrol only three times: in 1998 by 12%, in 1999 by 21% and shortly before the EU accession by 9% to 11840 CZK/1000 l. The figure above shows that there is a significant growth in the revenue collected in these years. The revenue growth slows down in the years after the tax increases. While the tax rate in current prices went up by 48% in the past 11 years, the tax rate calculated in 2005 prices rose only by 20%. On the first sight, the revenue more than doubled. When the inflation is taken care of, the real increase in revenue was 57%. A simple regression analysis where tax rate was explanatory variable and revenue was the dependent variable (both in 2005 prices) showed that the increases in tax rate only explain 50% of the revenue growth. That means there are important influences other than tax increases that spur the revenue growth. Therefore, the tax authorities need to take that into account when estimating the future revenue.

Figure 8: Tax receipts from excise taxes on motor fuels in Slovakia, 1997-2007



Source: Ministry of Finance of the Slovak Republic and own calculations

The Slovak government has been increasing the tax rate on unleaded petrol regularly: in 1997 by 5%, in 1999 by 10%, in 1999 again by 18%, in 2000 by 16%, in 2002 by 11%, in 2003 by 5% and finally shortly before the EU accession by 25% to 15500 SKK/1000 l. The figure above shows that the revenue calculated in 2005 prices decreased in years 1998 and 2001 when the tax rate was unchanged and it has been only slightly rising since 2004. The tax rate in current prices soared by 130% whereas in constant prices it went up by 47%. The revenue grew 2.62 times in current prices. After removing the effects on inflation, the growth was 50%. A simple regression analysis where the tax rate was explanatory variable and revenue was dependent variable (again in constant prices) showed that 85% of the revenue growth can be explained by increases in tax rate. This is probably because unlike in the Czech Republic the rate rises regularly in Slovakia. These regular increases make it easier for the government to estimate the future revenue when applying a new legislative.

4.3.2 The model

The model used for examining the impact of motor fuel tax is based on paper by Baltagi and Griffin (1997) – Pooled estimators vs. their heterogeneous counterparts in the context of dynamic demand for gasoline. They recommend the flow adjustment model suggested by Houthhakker and Taylor in 1970 to analyze the demand for gasoline. In this model, the stock of energy using equipment is presumed to be fixed in the short run and its utilization is a

function of normal economic influences. Eventually, observed utilization is adapted to desired utilization. The desired gasoline consumption per car (GAS/CAR)* is a log-linear function of the real price of gasoline (P_{MG}/P_{GDP}), real income per capita (Y/N) and cars per capita (CAR/N).

$$\left(\frac{GAS}{CAR}\right)^{*} = \alpha\left(\frac{P_{MG}}{P_{GDP}}\right)^{\beta}\left(\frac{Y}{N}\right)^{\gamma}\left(\frac{CAR}{N}\right)^{\delta} \tag{1}$$

The last term is included to take into account that households which posses two cars do not necessarily drive twice as much as households possessing one car.

In our analysis we are interested in the influence of excise tax on the gasoline consumption and therefore we replace the real price in the equation (1) by real tax (tax in constant prices).

$$\left(\frac{GAS}{CAR}\right)^{*} = \alpha\left(T_R\right)^{\beta}\left(\frac{Y}{N}\right)^{\gamma}\left(\frac{CAR}{N}\right)^{\delta} \tag{2}$$

Baltagi and Griffin suggest that the adaptation to the desired gas consumption follows a simple process:

$$\left(\frac{GAS}{CAR}\right)_t \Big/ \left(\frac{GAS}{CAR}\right)_{t-1} = \left(\left(\frac{GAS}{CAR}\right)_t^{*} \Big/ \left(\frac{GAS}{CAR}\right)_{t-1}\right)^{\theta} \tag{3}$$

Adding time subscripts and taking logs, the resulting standard dynamic demand equation is

$$\ln\left(\frac{GAS}{CAR}\right)_t = \theta \ln\alpha + \theta\beta \ln\left(T_R\right)_t + \theta\gamma \ln\left(\frac{Y}{N}\right)_t + \theta\delta \ln\left(\frac{CAR}{N}\right)_t + \left(1-\theta\right)\ln\left(\frac{GAS}{CAR}\right)_{t-1} + u_t \tag{4}$$

Baltagi and Griffin further argue that this model, although extensively applied, may be overly restrictive. The reason is that the lagged effects of price, income, and cars per capita are a priori presumed to have identical lags. Therefore, they suggest generalizing the equation (4) by allowing differential lags and including lagged variables for cars per capita and real income:

$$\begin{aligned}\ln\left(\frac{GAS}{CAR}\right)_t &= \theta \ln\alpha + \theta\beta \ln\left(T_R\right)_t + \theta\gamma \ln\left(\frac{Y}{N}\right)_t + \theta\gamma^{*} \ln\left(\frac{Y}{N}\right)_{t-1} \\ &+ \theta\delta \ln\left(\frac{CAR}{N}\right)_t + \theta\delta^{*} \ln\left(\frac{CAR}{N}\right)_{t-1} + \left(1-\theta\right)\ln\left(\frac{GAS}{CAR}\right)_{t-1} + u_t\end{aligned} \tag{5}$$

The main purpose of Baltagi and Griffin's paper was to compare different approaches and methods using the same model and to find the one that provides the most suitable results and has appropriate forecast properties. The methods used for the analysis include standard estimators such as OLS, Within estimator, GLS and GLS-AR(1), instrumental variables estimators, e.g.: 2SLS, Within 2SLS, EC2SLS, EC-AR(1) 2SLS, and heterogeneous

estimators such as Shrinkage estimators. In the overall forecast ranking the GLS-AR(1) ranked 1st, followed closely by OLS, GLS and Within estimator. They claim that the "more traditional GLS, OLS and Within models … perform quite well, especially compared to other rival estimators"[31]. In conclusion, they place emphasis on these estimators and add that the choice of which estimator to use is up to the researcher as all the traditional estimators scored quite similarly in the overall forecast performance. Therefore, we will verify whether the OLS assumptions hold in our case. If they do, the traditional OLS estimation will be used in further analysis.

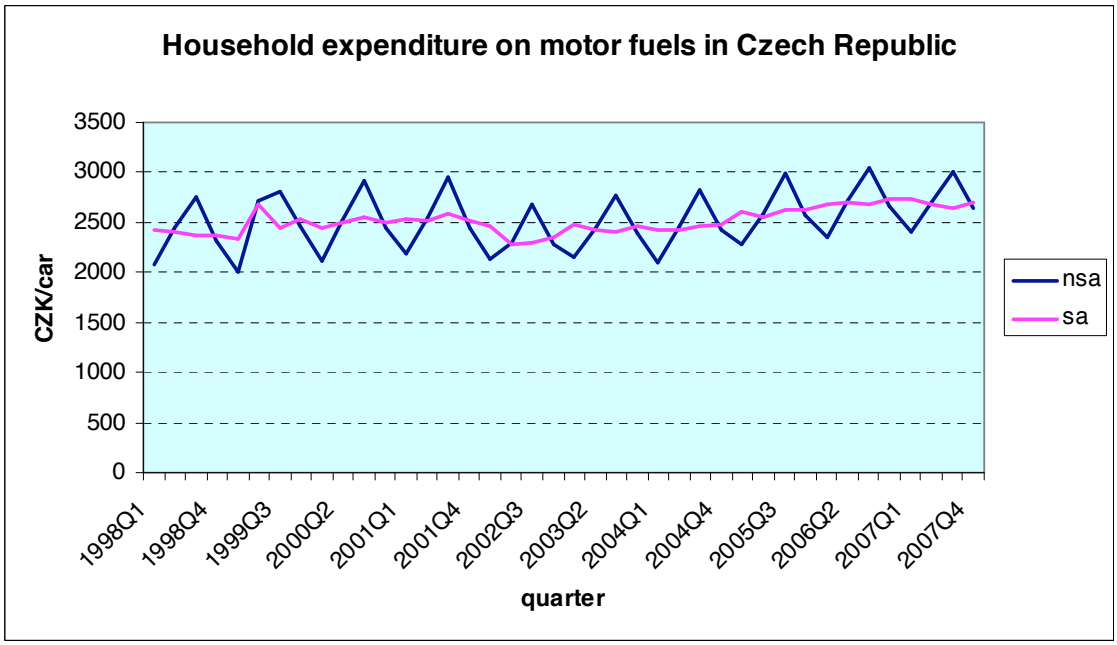
To sum it up, the model (5) will be employed to estimate the influence of the excise tax on the consumption of motor fuels. Although this theoretical model includes two multiplied coefficients for every explanatory variable, we will only estimate the multiples without breaking them down to single coefficients. The estimate of $\theta\beta$ is crucial in our analysis and it represents the "tax elasticity", i.e. the change of gas consumption in reaction to tax change. As was already mentioned, the tax rate of unleaded petrol is used to represent the category. Moreover, to better capture the behavior of households, the unit of monetary amount per 1000 liters is recalculated to monetary amount per 1 liter. Since the number of cars at the end of 2008 is not yet available for the statistical offices the analysis will be carried out until the year 2007.

4.3.3 Expenditures

Figures 9 and 10 show the development of household expenditures on motor fuels and lubricants. Based on annual reports of statistical offices the expenditures on lubricants are assumed to be negligible in comparison with expenditures on motor fuels and thus we will speak only about expenditures on motor fuels from now on. The expenditures are measured in monetary amount per car per quarter in constant prices with 2005 as the reference year. Figures show both seasonally adjusted and not adjusted values.

[31] Baltagi, 1996, p. 316

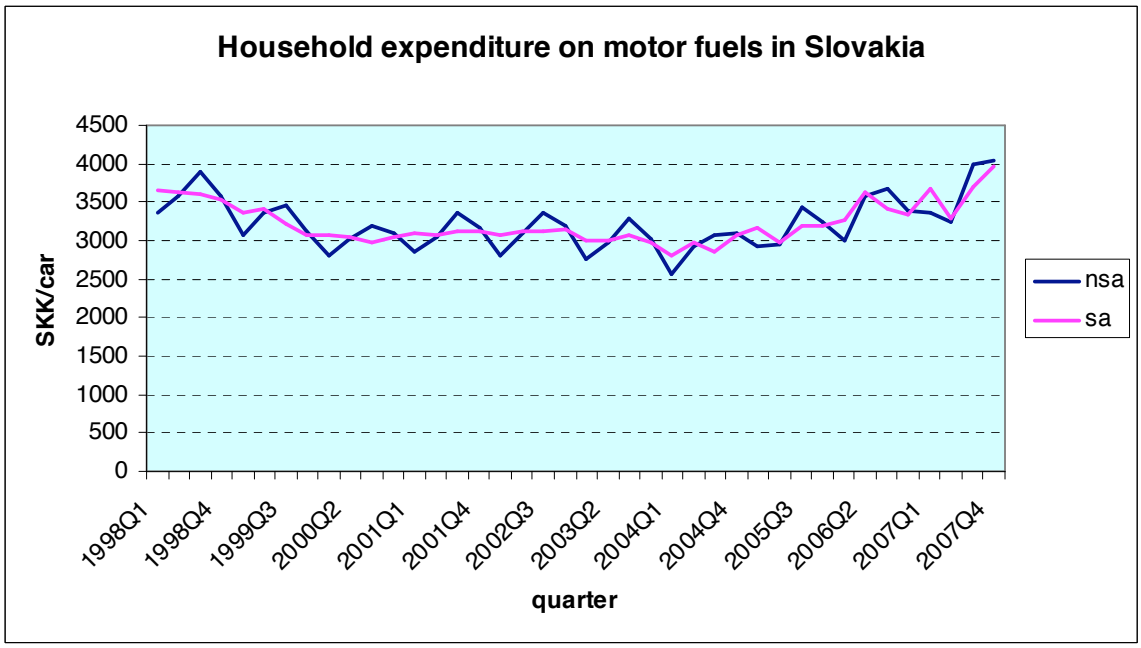
Figure 9: Household expenditure on motor fuels in the Czech Republic, in 2005 prices



Source: Household budget surveys of the Czech Statistical Office and own calculations

The adjusted expenditures in the Czech Republic range from 2,274.76 CZK/car in the second quarter of 2002 to 2,741.04 CZK/car in the first quarter of 2007. The mean value is 2,519.17 and the expenditures vary within ±9% from the mean.

Figure 10: Household expenditure on motor fuels in Slovakia, in 2005 prices



Source: Household budget surveys of the Statistical Office of the Slovak Republic and own calculations

The adjusted expenditures in Slovakia moved from the minimum of 2,802.08 SKK/car in the first quarter of 2004 to the maximum of 3,977.96 SKK/car in the fourth quarter of 2007. They vary between -13% and +23% from the mean which is 3,226.51 SKK/car. The household expenditures on motor fuels in Slovakia are more variable than in the Czech Republic.

4.3.4 Results

Let us recall the OLS assumptions before carrying out the analysis:

i. explanatory variables are deterministic

ii. E(u)=0 – model has no systematic error

iii. $\mathrm{var}(u_i) = \sigma^2, i = 1,...,n$ - disturbances are homoscedastic, which means that all observations are equally reliable

iv. $E(u_i u_j) = 0, i \neq j, j = 1,...,n$ - disturbance are not correlated

v. $u \sim N(0,\sigma^2), \sigma^2 \in (0,\infty)$ - disturbances are normally distributed.

If the last assumption holds, OLS is not only the best linear unbiased estimator but it is the best unbiased estimator, as well. We need to be cautious in situations when it does not hold. If the disturbances of large samples are not normally distributed, the OLS estimation is not efficient and therefore it is not the best. However, when dealing with finite samples, which is actually our case, the OLS is the best linear unbiased estimator even if the assumption of normality is broken[32].

The table below presents the results of the OLS estimation conducted for both countries.

Table 3: Results of the OLS estimation – Motor fuels

Czech Republic

Coefficients:

	Est.	Std. Er.	t value	Pr(>|t|)
(Intercept)	-0.308	1.589	-0.194	0.847
lnREALTAX	-0.342	0.119	-2.880	0.006
lnREALY	0.498	0.185	2.686	0.010
lnREALYL1	-0.050	0.210	-0.235	0.815
lnCARN	-2.473	1.126	-2.195	0.034
lnCARNL1	2.078	1.044	1.990	0.053
lnGASCARL1	0.483	0.120	4.034	0.000

Multiple R-squared: 0.6531
Adjusted R-squared: 0.6011
F-statistic: 12.55 on 6 and 40 DF, p-value: 6.6e-08

Slovakia

t test of coefficients:

	Est.	Std. Er.	t value	Pr(>|t|)
(Intercept)	0.299	0.983	0.304	0.763
lnRealtax	-0.483	0.133	-3.641	0.001
lnRealY	0.299	0.134	2.229	0.033
lnRealYL1	0.280	0.176	1.592	0.121
lnCARN	-0.113	0.609	-0.186	0.853
lnCARNL1	-0.057	0.690	-0.083	0.934
lnGASCARL1	0.320	0.161	1.981	0.056

Multiple R-squared: 0.7781
Adjusted R-squared: 0.7365
F-statistic: 18.7 on 6 and 32 DF, p-value: 3.303e-09

[32] Greene, 1997, p. 271

We need to test whether the OLS assumptions for disturbances hold to make sure our estimates are the best among all linear and unbiased estimates.

When testing Czech data for OLS assumptions we obtain the following results:

Homoscedasticity of disturbances: BP = 5.6863, df = 6, p-value = 0.4592

Non-autocorrelation of disturbances: DW = 1.8407, p-value = 0.146

Normality of disturbances: W = 0.949, p-value = 0.03953

Thus, on the 5% level of significance we do not reject the null hypothesis that the assumptions of homoscedasticity and non-autocorrelation hold. On the significance level of 5% we reject the null hypothesis of the normality of disturbances. Since our sample is finite, the OLS method provides estimations with the desired properties.

When testing Slovak data for the OLS assumption we get the following:

Homoscedasticity of disturbances: BP = 14.7139, df = 6, p-value = 0.02260

Non-autocorrelation of disturbances: DW = 2.4183, p-value = 0.7699

Normality of disturbances: W = 0.9725, p-value = 0.4461

Thus, on the significance level of 5% we cannot reject the null hypothesis of normality and non-autocorrelation of disturbances. On the 5% level of significance we reject the null hypothesis of homoscedasticity of disturbances. Since the assumption of homoscedasticity is broken the standard errors of estimates were calculated utilizing the robust estimation of asymptotic covariance matrices[33].

We shall now continue with interpretation of the results. In case of the Czech Republic explanatory variables *real tax, real income, cars per capita, and expenditure on motor fuels in t-1* are statistically significant on the 5% level. The explanatory variable *cars per capita in t-1* is statistically significant on level of 10%. The *intercept* and *real income in t-1* are insignificant. In case of Slovakia only *real tax* and *real income* are clearly significant on the 5% level. *Expenditure on motor fuels in t-1* is significant on the 10% level. Other explanatory variables and intercept are insignificant. The R-squared suggests that our model explains the data in Czech Republic by 65% and the data in Slovakia by 77%.

[33] Greene, 1997

We compare our results with the results from papers mentioned in Section 2.3. Baltagi and Griffin (1996) showed that the price elasticity is -0.26 in short-run and -0.78 in long-run. Our model includes real tax instead of real price; therefore our values cannot fully correspond with these findings. Our "tax elasticity" is -0.34 in Czech Republic and -0.48 in Slovakia. Since the excise tax is an important part of the total price of motor fuels our results make sense. The negative values suggest that the higher the tax is, the less the households spend on motor fuels. However, since the elasticity is less than unitary an increase in excise tax would not be fully reflected in the expenditure decrease. If the tax rate was increased by one monetary unit (which means by 8% in CR and by 6% in SR), ceteris paribus, the household expenditure measured in monetary amount per car per quarter would only slightly decrease. This gives both governments the option to collect higher revenue from motor fuel excise taxes without significantly discouraging household expenditures.

Baltagi and Griffin (1998) further showed that the income elasticity computed from models including the vehicle stock lies between 0.6 and 0.87. However, their study revealed that the average income elasticity estimated through the OLS method for individual European countries is 0.12. Our values are 0.5 for the Czech Republic and 0.3 for Slovakia which means they are in the appropriate range. The positive value of income elasticity means that motor fuels are normal goods from the economic point of view. The higher the real income per capita, the higher is the household expenditure on motor fuels per car per quarter. This means that even if excise taxes rise, the household expenditures do not necessarily have to decrease as long as the real income is rising, as well.

The long-run vehicle stock elasticity is supposed to be negative[34]. As was already mentioned, this is due to the fact that a household which possesses two cars does not necessarily drive twice as much as a household possessing just one car. The value for the Czech Republic is -2.47. This variable is insignificant for Slovak data. The insignificance might be caused by the fact that there are only 0.266 cars per capita in Slovakia which could mean that there are not many households that possess more than one car. For details about cars per capita, please see Appendix D.

[34] Baltagi and Griffin, 1997

4.4 Tobacco

Tobacco demand and tobacco excise are the most interesting and current topics as the European Commission submitted a report and a proposal on 16 July 2008 aimed at reducing tobacco consumption by 10% in the next five years. The reason for such a strict decision is based on the finding that "smoking is still the biggest single form of avoidable death in the Community and one of the leading causes of morbidity and mortality in the European Union, with about 650,000 smoking-related deaths per year in the Community"[35]. Commission further claims that according to the World Bank price increases of tobacco products are the most effective way of preventing smoking. We could see how that works in practice quite recently. Between 2002 and 2006 tobacco excise duties went up by more that 30%. Consequently, average retail selling price (including all taxes) increased by 12%. Commission proudly announced that this increase was accompanied by a real decline in cigarette consumption by 13%. Experts added that consumption of fine cut tobacco to "roll-your-own" increased by 10% and circumvention rose by 13% (9% being illegitimate circumvention)[36]. This time, Commission suggests a thorough change of the tobacco excise structure.

Experts warned the Commission long ago that the concept of the Most Popular Price Category (MPPC) is ill-defined and subject to manipulation[37]. Commission admitted that the concept worked well 30 years ago when national markets were dominated by one brand but it is time for a deeper market analysis now. Average market share of MPPC is 35%. MPPC tends to fluctuate and that makes government revenue volatile. Moreover, the concept distorts price competition as the dominant manufacturer is able to increase tax burden of competitors. With MPPC a uniform level of tax across the European Union cannot be ensured because the MPPC is low price category in some member states and high price category in other. In addition, the concept is not in line with the Internal Market objectives and it is not justifiable from the health perspective[38]. In recent years, the share of cheaper cigarettes has soared in majority of member states which either reduced revenue receipts or the impact on cigarette consumption was lowered. Therefore, the Commission promises a greater flexibility in tackling cheaper brands.

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[35] EC Proposal COM (2008) 459/2

[36] KPMG external study

[37] Cnossen, 2006

[38] EC Report COM (2008) 460/2

The objectives of the Commission proposal include smooth operation of the internal market, high level of health protection and modernization of existing legislation. EC finally proposes to abolish the MPPC concept and recommends replacing it by WAP (weighted average price). WAP is calculated as total price of all quantities divided by total quantity. That would incorporate new tax floor applicable to all cigarettes. Furthermore, the World Bank suggested the price elasticity of tobacco products is -0.43 in the European Union[39]. Thus, a 25% price increase is needed to achieve a 10% decline in consumption. Consequently, EC proposes a gradual increase of the minimum requirement from 57% to 63% of WAP and an increase of the minimum total excise duty from current EUR 64 to EUR 90 over the next five years. If the minimum total excise duty exceeds EUR 122 member state needs not to comply with the 63% criterion. The band for specific tax should be widened from 5-55% to 10-75%. There are supposed to be extra transitional periods 5+1 and 5+2 for member states which still have derogations. To make sure consumers do not switch to fine-cut tobacco and "roll-your-own" EC plans to induce a decrease in the currently rising consumption by 20% in the next 5 years. The rates on fine-cut tobacco should not be less than two thirds of the rates on cigarettes. Thus, there will no longer be the option to choose between proportional and specific rate. Both will be compulsory. The specific rate should be firstly increased to EUR 43 and then gradually to EUR 60 per kilogram. The proportional rate is supposed to rise to 38% at first and then to 42%[40].

The expected impact of this change in structure and rates includes the above mentioned decline in consumption by 10% in five years. EC further expects a significant increase of the revenue from tobacco and decrease in illicit trade and cross-boarder shopping. However, experts claim that "there are conceptual and empirical limits to excessively high tobacco taxes"[41]. The cost of smoking was estimated between 1.04 and 1.39% of the EU GDP in 2000. The revenue from tobacco and alcohol went up to 1.2% of the EU GDP in that year[42]. The revenues have sharply increased since then and so smokers seem to pay their way. Moreover, Cnossen (2006) warns that cigarette smuggling is a growing threat to health and tobacco

[39] EC SEC (2008) 2267

[40] Proposal COM (2008) 459/2

[41] Cnossen, 2006

[42] Taxation trends, EU

revenues. He also claims that the tobacco taxes are more discriminatory and regressive than any other tax in the world. The tax burden on cigarettes is already more that 300% of the pre-tax retail price, which is the highest tax on any single product. Stakeholders argue that a rational person should be free to smoke as long as she is fully informed about the consequences and does not impose costs on others. That could be simply taken care of by bans on smoking in public places. However, "the fact that nicotine is addictive undermines the consumer-sovereignty argument against government intervention"[43].

Let us get back to the Czech Republic and Slovakia. The share of total excise in retail price was 36% and 31% in 2001 in the CR and the SR, respectively. Due to EU entry conditions, both countries had to increase this share to 57% and were granted transitional periods until 31 December 2008. If the EC proposal is adopted both will probably have the option to prolong the transitional periods. However, further tax increases are unavoidable, sooner or later.

4.4.1 Rates and revenues

All member states face the choice of predominantly specific or predominantly proportional excise tax rate. Optimal tax considerations would favor the ad valorem taxation as it leaves the relative prices unchanged and consumer chooses the brand according to cost rather than tax difference. However, "ad valorem taxation creates a clear incentive to downgrade product quality"[44]. Specific taxation, on the other hand, does not distort the decision to invest into product quality. Moreover, specific tax is more productive of revenue, more effective in reducing tobacco consumption and increases the predictability of the revenue collected[45]. And, more importantly, specific tax is favored over ad valorem tax in correcting externalities. From the Pigouvian perspective, the costs of smoking are independent of the price of a pack of cigarettes. Both Czech Republic and Slovakia chose predominantly specific excise tax. Further analysis will show whether the revenue is predictable and tobacco consumption reduced.

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[43] Cnossen, 2001, p. 10

[44] Cnossen, 2006, p. 7

[45] Cnossen, 2001

Development of cigarette excise in the Czech Republic and Slovakia is described in table 4 below. Figures 25 and 26 in Appendix E compare cigarette excise tax structure and cigarette prices across the European Union.

Table 4: Cigarette excise taxes in the CR (CZK/pc) and the SR (SKK/pc)

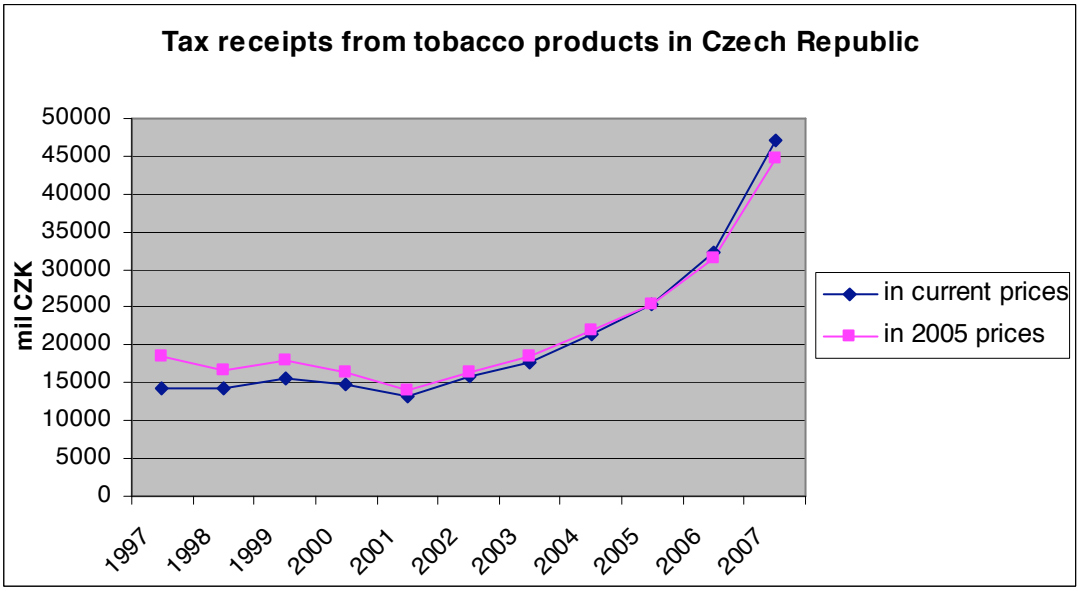
Date	Specific excise duty	Ad valorem % of TIRSP	Minimum excise duty	Date	Specific excise duty	Ad valorem % of TIRSP	Minimum excise duty
1-Jan-1998	0.74	-	-	1-Jan-1998	0.8	-	-
1-Jul-1999	0.79	-	-	1-Jul-1999	0.85	-	-
1-Aug-2001	0.36	22%	0.79	1-Jan-2000	0.9	-	-
1-Jan-2004	0.48	23%	0.96	1-Jan-2002	0.95	-	-
1-May-2004	0.48	23%	0.94	1-Aug-2003	1.4	-	-
1-Jul-2005	0.6	24%	0.73	1-May-2004	0.91	20%	1.4
1-Apr-2006	0.75	26%	1.36	1-Jan-2006	1.1	23%	1.7
1-Jan-2007	0.88	27%	1.64	1-Jan-2008	1.41	24%	2.1
1-Jan-2008	1.03	28%	1.92				

Source: Ministry of Finance of the Czech Republic and Ministry of Finance of the Slovak Republic

Table 4 shows that even though the Czech Republic adopted the compulsory structure of cigarette taxation earlier, both countries reached the minimum requirement of EUR 64 per 1000 pieces in the MPPC on 1 January 2008. The role of proportional and specific excise tax is quite similar in both countries since the EU accession.

The effect of excise tax changes on the government revenue can be observed from figures 11 and 12. The revenue is calculated in current prices and in constant prices with 2005 as the reference year to capture the real increase in revenue.

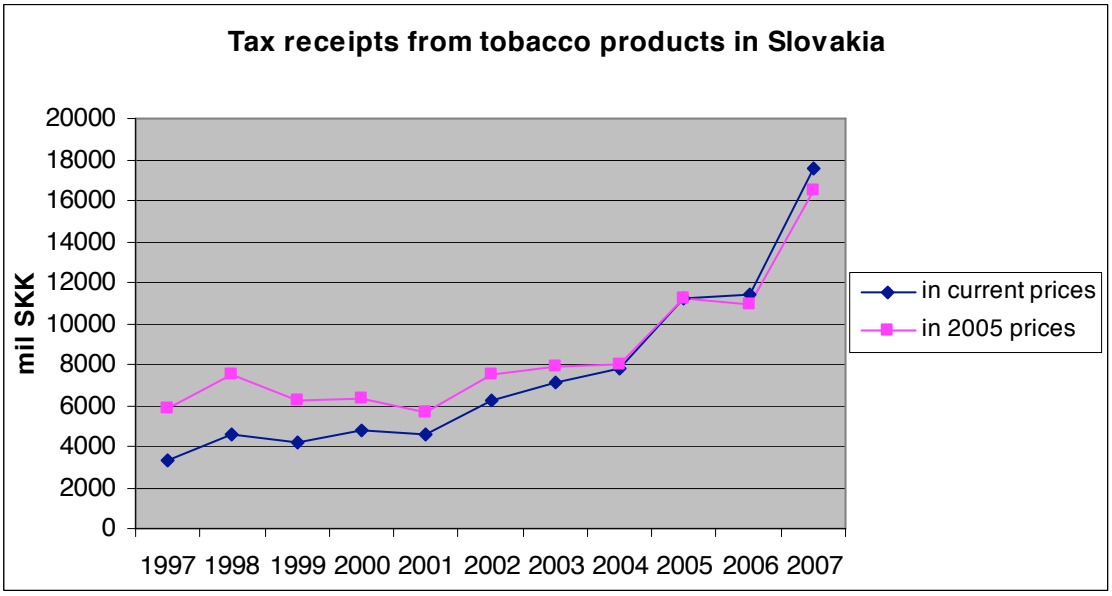
Figure 11: Tobacco excise tax revenue in the Czech republic, 1997-2007, in million CZK



Source: Ministry of Finance of the Czech Republic and own calculations

The increase in the tax rate by 7% in 1999 caused the first noticeable revenue growth. Afterwards, the revenue was eroding for two years because the rate remained unchanged. The legislative that entered into force on 1 August 2001 only changed the tax structure. However, the introduction of proportional tax rate has been bringing in significantly increased revenues and put an end to the revenue declines. There have been five revenue increases after the EU entry and each of them spurred the revenue to further growth. The 2007 increase of minimum total excise duty by 20% was accompanied by a real increase in revenue by 42%. In 1997-2007 the tax rate increased by 152% in current prices and by 70% in constant prices. The real percentage rise in tax was three times higher than in case of motor fuels. In the same time, revenue grew by 227% in current prices and by 142% in constant prices. The real growth almost three times surpassed the real growth in motor fuel revenue. A simple regression analysis where the real tax was explanatory variable and real revenue was dependent variable (both in constant prices) showed that the tax increases explain 75% of the revenue growth. Revenues could be quite well predicted in case of a new legislation.

Figure 12: Tobacco excise tax revenue in Slovakia, 1997-2007, in million SKK



Source: Ministry of Finance of the Slovak Republic and own calculations

The 33% rise in tax rate in 1998 caused a significant increase in revenue. Until 2003 the tax rate was regularly increased by 5-6% due to inflation. We can observe two revenue declines, in 1999 when the rate was inflation adjusted in the third quarter and in 2001 when the rate was not adjusted at all. The real increase in rate by 32% in 2003 came in the third quarter and that is probably the reason why the revenue grew only slightly. It is, however, strange that the increased tax rate and new structure of taxes brought no revenue growth in 2004. The final state finance report suggests that tobacco companies and consumers might have made some stocks while the rate was still low. That could be the reason why the revenue grew almost by a half in 2005. And again in 2006, there was no revenue growth right after the tax rate increase. The revenue grew by a half again in 2007. In total, the tax rate was increased by 180% in current prices and by 50% in constant prices – more than twice as much as motor fuel tax rate. The revenue grew more than 5 times in current prices and almost tripled in constant prices. The real increase is four times as big as in the case of motor fuel tax revenue. A simple regression showed that revenue growth could be better explained by last year's tax rate increase than by current tax rate increase. Therefore, it is difficult for tax authorities to predict the revenue in the same year when a tax rise is introduced.

4.4.2 The model

According to Baltagi and Levin (1986), Baltagi, Griffin and Xiong (2000), Huang, Yang and Hwang (2004) cigarette demand is formulated as follows:

$$Q = f(P, Y, Pn, Z) \tag{6}$$

where Q is per capita consumption of cigarettes, P is the retail price of cigarettes, Y is the real income per capita, Pn is the average price of cigarettes in neighboring countries and Z represents other explanatory variables, specific for the country.

We will, again, slightly modify the theoretical model. As the focus of this thesis is on the tax change effect on the household consumption, the retail price is replaced by tax (in constant prices). We are going to omit Pn since the aim of the EC proposal is to equalize prices across the Union. Further, we assume there are no significant differences between Czech Republic and Slovakia that would have to be captured in the model and so we omit Z, as well.

There are two major strands of cigarette demand models in the econometric literature. The first is the rational addiction model invented by Becker and Murphy (1988). They argue that both past and future consumption have impact on current demand. However, the rational addiction model is found to be inconsistent with cigarette demand by Bask and Melkersson (2004) for European data. The second is the partial adjustment or habit persistence model which emphasizes only the past consumption (7). Gruber and Koszegi (2002) explain that the past consumption has two effects: reinforcement and tolerance. The reinforcement means that as consumers become addicted to nicotine, the marginal utility of cigarette consumed today is higher than yesterday. The tolerance means that as the body "gets used to" drugs it is harder and harder over time to reach the same "high" – the consumer needs to consume more to achieve the same level of utility[46].

$$\ln Q - \ln Q_{-1} = \rho(\ln Q^* - \ln Q_{-1}) + u \tag{7}$$

where Q^* is the expected or desired level of consumption of cigarettes given by

$$\ln Q^* = \alpha + \beta_1 \ln T + \beta_2 \ln Y \tag{8}$$

where T is the tax per pack of 20 in constant prices. Substituting (8) into (7) the model becomes:

$$\ln Q_t = \alpha\rho + \beta_1\rho \ln T + \beta_2\rho \ln Y + (1-\rho)\ln Q_{t-1} + u_t \tag{9}$$

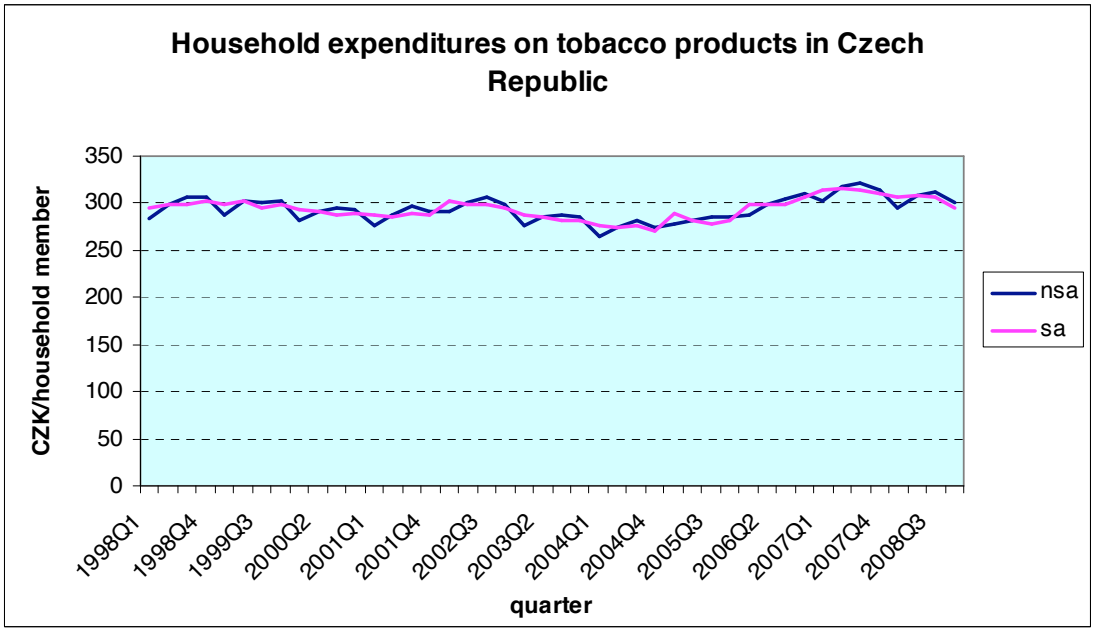
[46] Gruber, Koszegi, 2002, p. 10

Baltagi, Griffin and Xiong (2000) used various methods of estimation to find out which performs the best. The outcome is that "the traditional estimators (OLS, Within, and GLS) results are comforting as they systematically perform well in forecasting for five years or longer"[47]. This finding echoes a similar finding in Baltagi and Griffin (1997) for gasoline consumption. Thus, we will verify whether the OLS assumptions hold for our data. If they do, we will use the OLS method to analyze the influence of tax changes on the consumption of cigarettes. Again, we are going to estimate the multiples of the two coefficients accompanying every explanatory variable in the theoretical model. Estimate of $\beta_1\rho$ is crucial as it represents the "tax elasticity", i.e. change in cigarette consumption in reaction to tax change.

4.4.3 Expenditures

Figures 13 and 14 show the development of household expenditures on tobacco products in years 1998-2008. Both seasonally adjusted and not adjusted values are displayed. Unlike in case of motor fuels and alcoholic beverages there seems to be no significant pattern of seasonality. We can observe that the expenditures on tobacco products are more stable in the Czech Republic during the 11-year time period.

Figure 13: Household expenditures on tobacco products in the Czech Republic, in 2005 prices

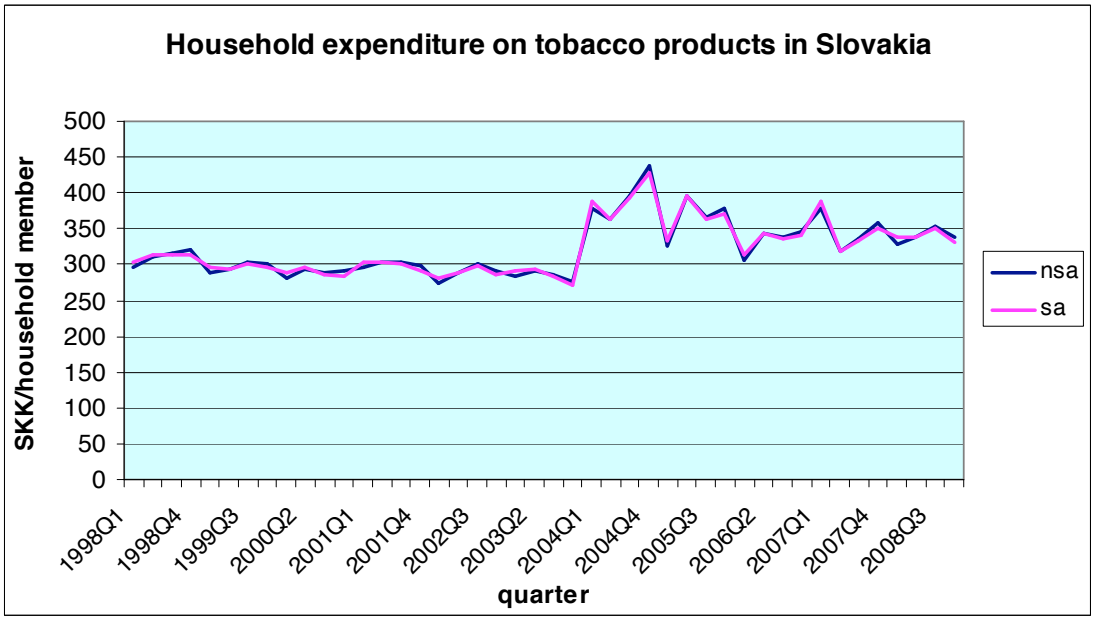


Source: Household budget survey of CSO and own calculations

[47] Baltagi, Griffin, Xiong, 2000, p. 15

The expenditures vary between 270.09 CZK/household member in the fourth quarter of 2004 to 316.86 CZK/household member in the second quarter of 2007. Mean value is 293.94 and expenditures lie within ±8% from the mean.

Figure 14: Household expenditures on tobacco products in Slovakia, in 2005 prices



Source: Household budget survey of SOSR and own calculations

Until 2003, the development of household expenditures on tobacco products was quite similar as in the Czech Republic – stable and varying around mean value 297 SKK/household member. The major increase in excise tax rate in 2003 and the following change in structure of taxes in 2004 had significant impact on household expenditures. The minimum value of 271.40 SKK/household member was reached in the fourth quarter of 2003. Expenditure rose by 57% year-on-year to the maximum of 427.42 SKK/household member in the fourth quarter of 2004. After that, the expenditures have been varying noticeably. The mean expenditure for the whole 11-year time period is 322.68 SKK/household member. Values vary between -16% and +32% from the mean.

4.4.4 Results

The table below presents the results of the OLS estimation for both countries.

Table 5: Results of the OLS estimation – Tobacco

Czech Republic					Slovakia				
Coefficients:					Coefficients:				
	Est.	Std. Er.	t value	Pr(>|t|)		Est.	Std. Er.	t value	Pr(>|t|)
(Intercept)	1.172	0.898	1.306	0.198	(Intercept)	1.545	1.247	1.239	0.223
lnRealtax	0.017	0.027	0.611	0.544	lnRealtax	0.083	0.171	0.485	0.630
lnRealY	-0.010	0.044	-0.240	0.811	lnRealY	0.100	0.154	0.650	0.520
lnCIGNL1	0.805	0.107	7.530	0.000	lnCIGNL1	0.498	0.143	3.483	0.001
Multiple R-squared: 0.7301					Multiple R-squared: 0.4707				
Adjusted R-squared: 0.7129					Adjusted R-squared: 0.43				
F-statistic: 42.39 on 3 and 47 DF					F-statistic: 11.56 on 3 and 39 DF				
p-value: 2.049e-13					p-value: 1.463e-05				

We need to verify that the OLS assumptions for disturbances hold and that our estimates have the desired properties.

Testing the OLS assumptions for Czech data:

Homoscedasticity of disturbances: BP = 2.6144, df = 3, p-value = 0.455

Non-autocorrelation of disturbances: DW = 2.0731, p-value = 0.4551

Normality of disturbances: W = 0.9554, p-value = 0.05335

We do not reject the null hypothesis of homoscedasticity, non-autocorrelation and normality of disturbances on the 5% significance level. The OLS method is appropriate.

Testing OLS assumptions for Slovak data:

Homoscedasticity of disturbances: BP = 1.0157, df = 3, p-value = 0.7975

Non-autocorrelation of disturbances: DW = 2.3135, p-value = 0.7589

Normality of disturbances: W = 0.8871, p-value = 0.0005185

We do not reject the null hypothesis of homoscedasticity and non-autocorrelation of disturbances on the 5% significance level. We reject the null hypothesis of the normality of disturbances on the same level of significance. However, we could still employ the OLS method as the sample is finite.

We can proceed with interpretation of the results. Only one explanatory variable is significant on the 5% significance level in both countries. It is the past consumption, or past household expenditures on tobacco products. That confirms Gruber's and Koszegi's theory about the importance of past consumption on the present expenditures in case of cigarettes and tobacco

products in general. Other explanatory variables are clearly insignificant. Our model explains the Czech data by 73% and Slovak data by mere 47%. That means we could have used a better model with more explanatory variables. Wasserman (1991) suggests including variables such as age, sex and family size in cigarette demand model. These could help in explaining the data fully.

We shall now focus on comparing our results with the results from papers mentioned in Section 2.3. Baltagi and Levin (1986) and Baltagi, Griffin and Xiong (2000) estimated the value of lagged coefficient of consumption on American data. It lies between 0.49 and 0.97 and it is always significant. Our values are 0.8 for Czech households and 0.49 for Slovak households which means they are in an appropriate range. The fact that the values are positive indicates that the higher the past consumption is, the higher the present consumption will be. This effect seems to be stronger for Czech households.

Baltagi, Griffin and Xiong (2000) further estimated that the income elasticity is covered by range (-0.03,0.1) in the short-run and (-1,0.47) in the long-run while it is mostly insignificant. The real income is an insignificant explanatory variable in our case, as well. The values are -0.01 and 0.1 for the Czech Republic and Slovakia, respectively.

Analyses of European data showed that the price elasticity of cigarette demand lies between -0.8 and -0.1[48]. We estimated "tax elasticity" and it appeared to be statistically insignificant. Chaloupka and Warner (2000) claim that "excise tax comprises an important component of price"[49]. Therefore, we expected different results. However, even the insignificance might be explained. Annual reports of Philip Morris Czech Republic (which has 99% share in Philip Morris Slovakia[50]) indicate that the company has the highest market share in both Czech Republic and Slovakia. The increasing excise forced Philip Morris CR to change its price strategy. The profit margin decreased by 10 percentage points from 30% to 20% in years 2004-2006 as the company tried to absorb part of the excise tax. Moreover, PMCR started to import Chinese brand Red Golden Dragon in the super low price segment. Anyhow, the company announces the same every year – loss of market share to cheaper competitive

[48] Baltagi, Griffin and Xiong, 2000

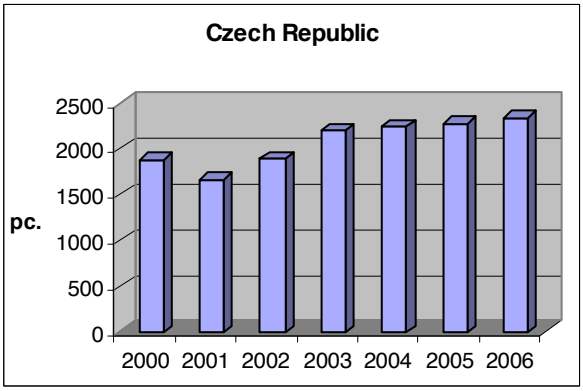
[49] Chaloupka, Warner, 2000, p. 1542

[50] Philip Morris CR: Annual report 2008

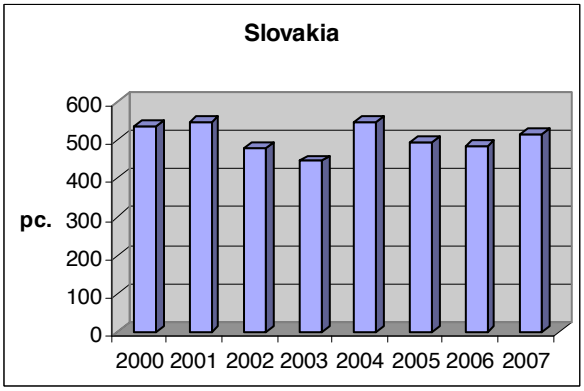
brands. The two companies fighting for the second place in the market reported quite the opposite. British American Tobacco Czech Republic announced a sales growth of 53% in 2007, mainly due to increased popularity of the brands Viceroy and Pall Mall in the low price segment. Imperial Tobacco Czech Republic declared the highest sales in the history of the company, especially of the low priced brands such as Moon and Route 66. Moreover, Imperial Tobacco confirmed absorbing part of the tax by decreasing profit margin. Therefore, we might conclude that the tax increases started a price war between tobacco companies that try to not to loose customers and so the tax has not been fully reflected in an increased price.

Figures 15 and 16 show that excise taxes have not had a significant influence on the cigarettes per capita so far. The cigarettes per capita ratio in the Czech Republic has been rising since the change in excise structure in 2001. The ratio rose steeply in Slovakia in the time of the tax structure change but has been quite steady since. We can conclude that since the cigarette excise is rising, households only slightly increased spending on tobacco products and managed to consume more cigarettes per capita. That probably means there has been a major switch to cheaper brands and the health objective of excise taxes was not achieved.

Figures 15 and 16: Cigarettes per capita



Source: CSO



Source: SOSR

4.5 Alcoholic beverages

4.5.1 Rates and revenues

The European Commission fixed the minimum excise tax rates on alcoholic beverages in 1992 in preparation for the Internal Market and has not changed them ever since. Whether the rates will be increased in the future is not certain. Tables 6 and 7 show the development of

excise tax rates in the Czech Republic and Slovakia. Both decreased the excise on still wine to zero in 2001. Before the EU entry, the systems of taxing beer were changed and the Czech Republic increased the rate on spirits. There was only one alteration after the accession – Slovakia raised the tax on spirits.

Table 6: Excise tax rates on alcoholic beverages in the Czech Republic

		1-Jan-1998	1-Jul-1999	1-Jul-2001	1-Jan-2004
spirits	CZK/1l a.	234	234	234	265
beer	CZK/dg.Plato/hl	-	24	24	24
still wine	CZK/l	2.5	5.1	0	0

Source: Ministry of Finance of the Czech Republic

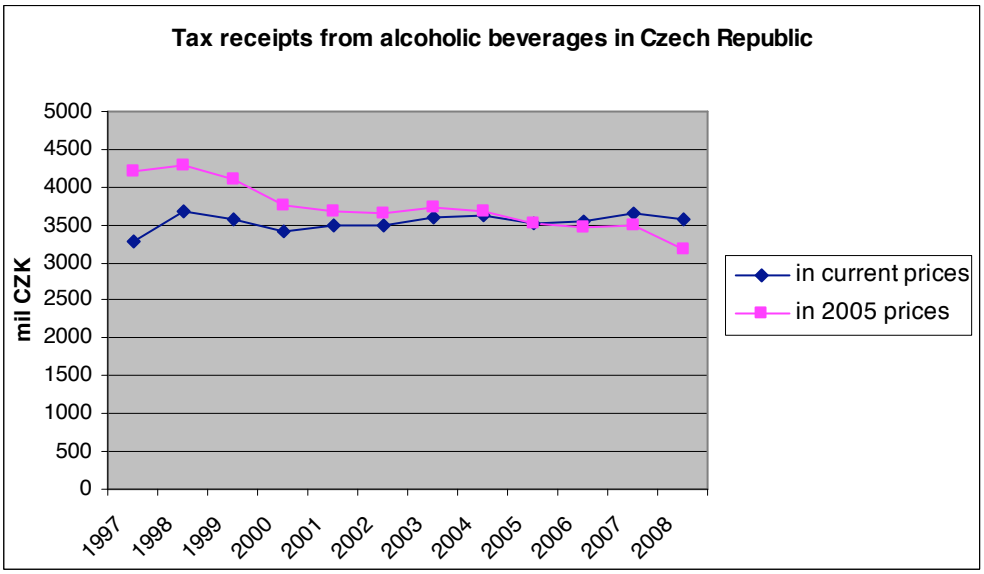
Table 7: Excise tax rates in alcoholic beverages in Slovakia

		1-Jan-1998	1-Jan-2000	1-Nov-2001	1-Jan-2003	1-Aug-2003	1-Jan-2006
spirits	SKK/1l a.	240	250	250	250	250	283
beer	SKK/dg.Plato/hl	-	-	-	30	50	50
still wine	SKK/l	5	5	0	0	0	0

Source: Ministry of Finance of the Slovak Republic

Figures 17 and 18 display the growth of revenue from tax on alcoholic beverages. As there were only a few changes in the rates in the past 11 years the revenue has been eroding.

Figure 17: Tax receipts from alcoholic beverages in the Czech Republic, 1997-2008

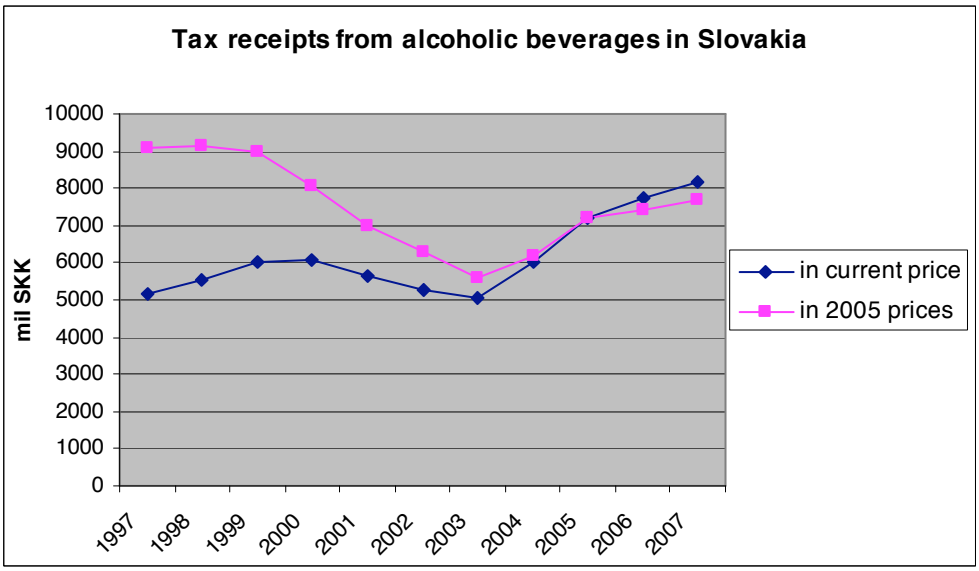


Source: Ministry of Finance of the Czech Republic

The receipts in current prices were quite stable over the years. However, there has been a real decline in revenue by 25%. The rise in spirits excise did not increase the revenue

significantly. If the government does not adjust the rates to inflation there will be further declines.

Figure 18: Tax receipts from alcoholic beverages in Slovakia, 1997-2007



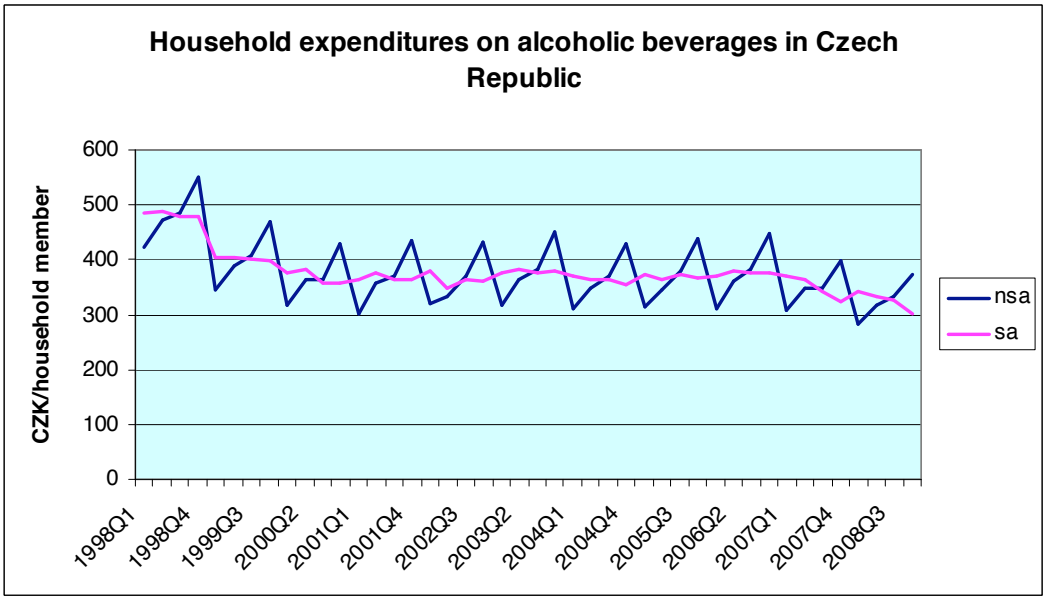
Source: Ministry of Finance of the Slovak Republic and own calculations

There was a real decline in revenue by almost 40% in 1998-2003. The revenue has been rising steadily since 2004. The growth was probably spurred by the increase in beer excise by 65% in 2003. If the rates are not inflation adjusted a real decline in revenue might be expected again in a couple of years.

4.5.2 Expenditures

Figures 19 and 20 show household expenditures on alcoholic beverages in years 1998-2008. Expenditures are in constant prices with 2005 as the reference year. We can observe the same trend in both countries – household expenditures on alcoholic beverages are declining over the time. However, that does not mean people drink less in general. It is possible that people just drink more in pubs and restaurants and less at home.

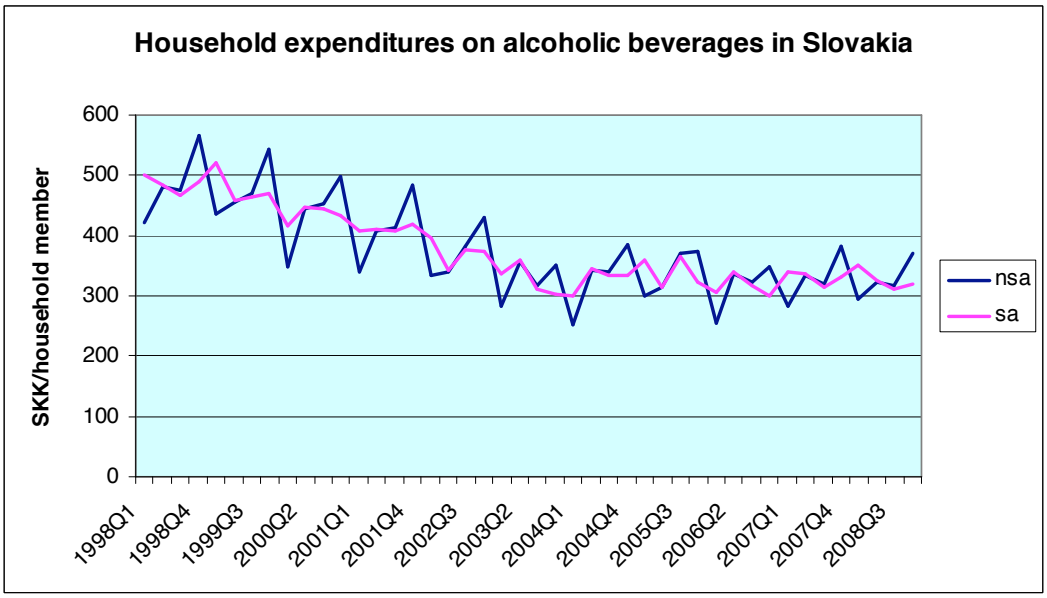
Figure 19: Household expenditures on alcoholic beverages in the CR, in 2005 prices



Source: Household budget survey of CSO and own calculations

There has been a real decline in expenditures by almost 40% in the past 11 years. The expenditures reached minimum in the fourth quarter of 2008. The maximum of 489 CZK/household member appeared in the second quarter of 1998. Average expenditure is 376 CZK/household member. The values vary ±30% from the average.

Figure 20: Household expenditures on alcoholic beverages in the SR, in 2005 prices



Source: Household budget survey of SOSR and own calculations

The expenditures on alcoholic beverages decreased by 43% between the maximum value of 520 SKK/household member in the first quarter of 1999 and the minimum value of 300

SKK/household member in the first quarter of 2004. Average expenditure is 323 SKK/household member. The values vary within -8% and +60% from average.

In case of alcoholic beverages, regression analysis will not be conducted as the necessary data are not available. Statistical offices only provide information about expenditures on alcoholic beverages in general without further division into categories: spirits, wine, beer. None of these categories could be claimed representative. Additionally, there are wide differences in the structure and units of excise taxes.

5 Conclusion

Excise taxes are the second largest source of government tax revenue in both Czech Republic and Slovakia. They amount to 25% and 20% of the total tax receipts. The motor fuel taxes bring in almost 60% of the excise revenue in both countries. Circa 30% come from the tax on tobacco. The rest is from taxing alcoholic beverages.

Households in the Czech Republic and Slovakia spend 3% of their incomes on alcoholic beverages, tobacco and narcotics. Even though this value has been slightly declining in the past few years it is still one percentage point above the EU-15 average. The spending on transport has been quite stable in the Czech Republic and it has only slightly increased in Slovakia in the past 6 years. However, a more dramatic change was expected since the motor fuel taxation increased sharply. When comparing the two countries we conclude that Slovak households spend higher share of their incomes on necessities such as food and housing while Czech households use bigger part of their incomes on recreation and culture, furnishing and household equipment and miscellaneous goods and services.

The real increase in tax rate on unleaded petrol was 20% in the Czech Republic and 47% in Slovakia in years 1997-2007. Most of the tax rises were introduced after the EU entry. Surprisingly, the real growth in tax revenues was higher in the Czech Republic. To estimate the influence of tax changes on household expenditure the flow adjustment model was employed. The "tax elasticity" is -0.34 in the Czech Republic and -0.48 in Slovakia which means that tax increases have negative influence on household expenditures. Income, on the other hand, has positive influence. The resulting values of income elasticity are 0.5 and 0.3 in the Czech Republic and Slovakia, respectively. The vehicle stock elasticity was statistically significant in the Czech Republic with value of -2.47 and insignificant in Slovakia. The insignificance was probably caused by the fact that there are not many households possessing more that one car in Slovakia.

The real increase in cigarette tax rate was 70% in the Czech Republic and 50% in Slovakia in years 1997-2007. Revenue more than doubled in the Czech Republic and almost tripled in Slovakia, in real values. Household expenditures on tobacco products have been quite stable in the Czech Republic in the past 11 years varying in range ±8% from the average value. The tax changes right after the EU entry caused a shock to the Slovak household expenditures.

They varied between -16% and +32% from the average values and now they are stabilizing again. To estimate the influence of excise tax changes on the household expenditures the partial adjustment model was adopted. Only the past consumption turned out to be a significant explanatory variable. However, the income was found to be insignificant even in research papers. The excise tax is insignificant probably due to the price war between tobacco companies in the Czech Republic and Slovakia. The companies are decreasing profit margin to absorb part of the tax and still cheaper and cheaper brands are being imported.

The tax rates on alcoholic beverages were not significantly altered due to the EU entry. As the rates have remained the same for a long time the revenues stared eroding. Only doubling of beer tax in Slovakia spurred the revenue growth. If the rates are not inflation adjusted soon, the revenues will decline again. There seems to be an overall trend of decreasing alcohol consumption in both Czech Republic and Slovakia. However, that could also mean consumers drink more in pubs and restaurants and less at home.

We may conclude that excise taxes have had a statistically significant negative impact on household demand for motor fuels. The impact on the demand for tobacco products is questionable. As the tobacco companies are doing their best to keep their customers and cutting prices in every possible way, it is unlikely that the further increase in rates planned by European Commission will decrease the consumption by 10%. There is an apparent trend of switching to cheaper brands which could be of less quality and therefore the health objective is still far from being reached in the Czech Republic and Slovakia. The analysis showed there is the opportunity of collecting enough money from excise taxes to cover the costs of negative externalities without significantly decreasing consumption. Whether the excise tax receipts are actually allocated to correct the externalities, such as health care costs, depends on the governments.

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European Union: Summary of legislations: Taxation: http://europa.eu/scadplus/leg/en/s10000.htm

Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/

Ministry of Finance of the Czech Republic: http://www.mfcr.cz

Ministry of Finance of the Slovak Republic: http://www.finance.gov.sk/

Statistical Office of the Slovak Republic: http://portal.statistics.sk/

Appendix A: Transitional periods – energy products

Amending directives 2004/74/EC specifies possibilities to apply temporary exemptions, reductions and transitional periods for countries entering the EU on 1 May 2004.

Council Directive 2004/74/EC amending the Directive 2003/96/EC – Article 1

2. The following Article is inserted:

«Article 18a

1. By way of derogation from the provisions of the present Directive, the Member States specified in Annex III are authorised to apply the reductions in the levels of taxation or the exemptions set out in that Annex.

Subject to a prior review by the Council, on the basis of a proposal from the Commission, this authorisation shall expire on 31 December 2006 or on the date specified in Annex III.

2. Notwithstanding the periods set out in paragraphs 3 to 11 and provided that this does not significantly distort competition, Member States with difficulties in implementing the new minimum levels of taxation shall be allowed a transitional period until 1 January 2007, particularly in order to avoid jeopardising price stability.

3. The Czech Republic may apply total or partial exemptions or reductions in the level of taxation of electricity, solid fuels and natural gas until 1 January 2008.

…

11. The Slovak Republic may apply a transitional period until 1 January 2010 to adjust its national level of taxation on electricity and natural gas used as heating fuel to the relevant minimum levels of taxation. However, the level of taxation on electricity and natural gas used as heating fuel shall be no less than 50 % of the relevant Community minimum rates as from 1 January 2007.

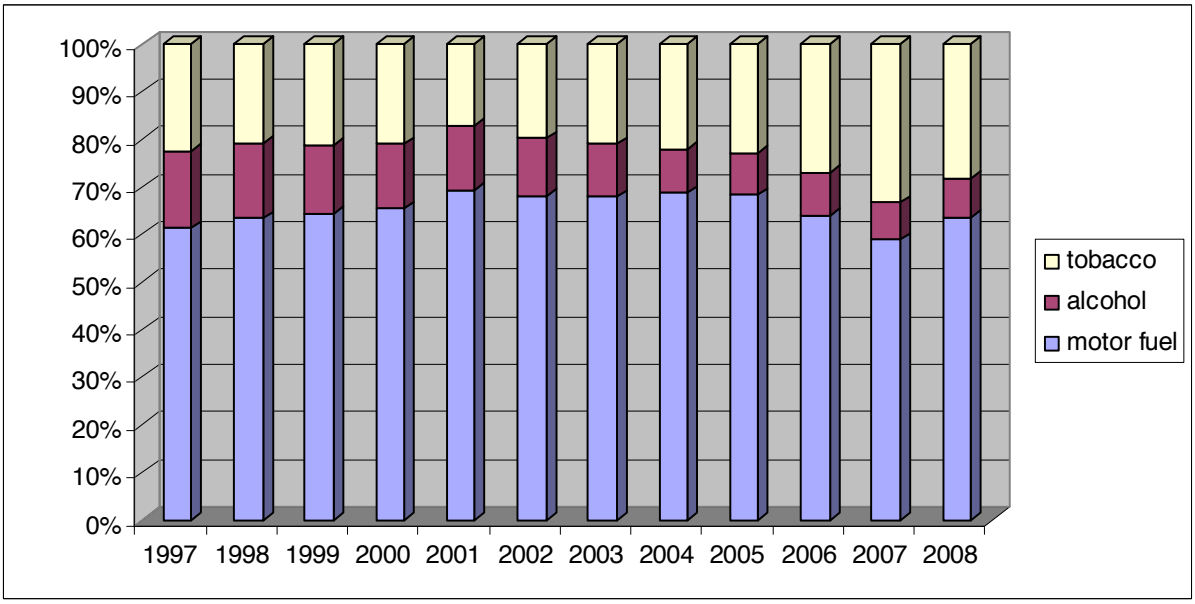
The Slovak Republic may apply a transitional period until 1 January 2009 to adjust its national level of taxation on solid fuels to the relevant minimum levels of taxation. However,

the level of taxation on solid fuels shall be no less than 50 % of the relevant Community minimum rates as from 1 January 2007.

12. Within the transitional periods established, Member States shall progressively reduce their respective gaps with regard to the new minimum levels of taxation. However, where the difference between the national level and the minimum level does not exceed 3 % of that minimum level, the Member State concerned may wait until the end of the period to adjust its national level.

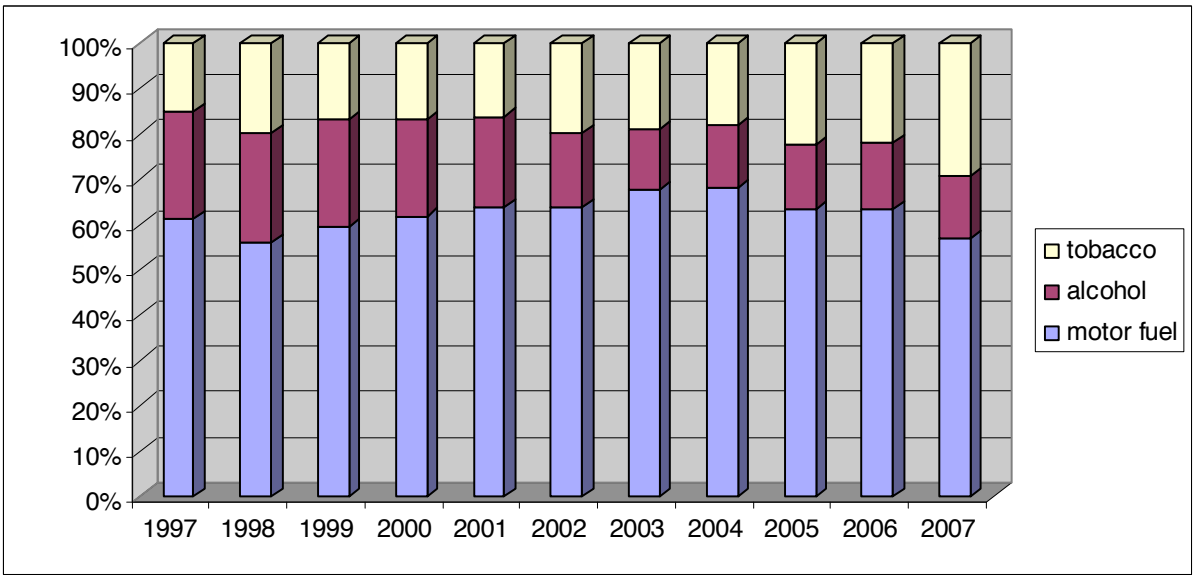
Appendix B: Structure of excise tax receipts

Figure 21: Structure of excise tax receipts in the Czech Republic, 1997-2007



Source: Ministry of Finance of Czech Republic and own calculations

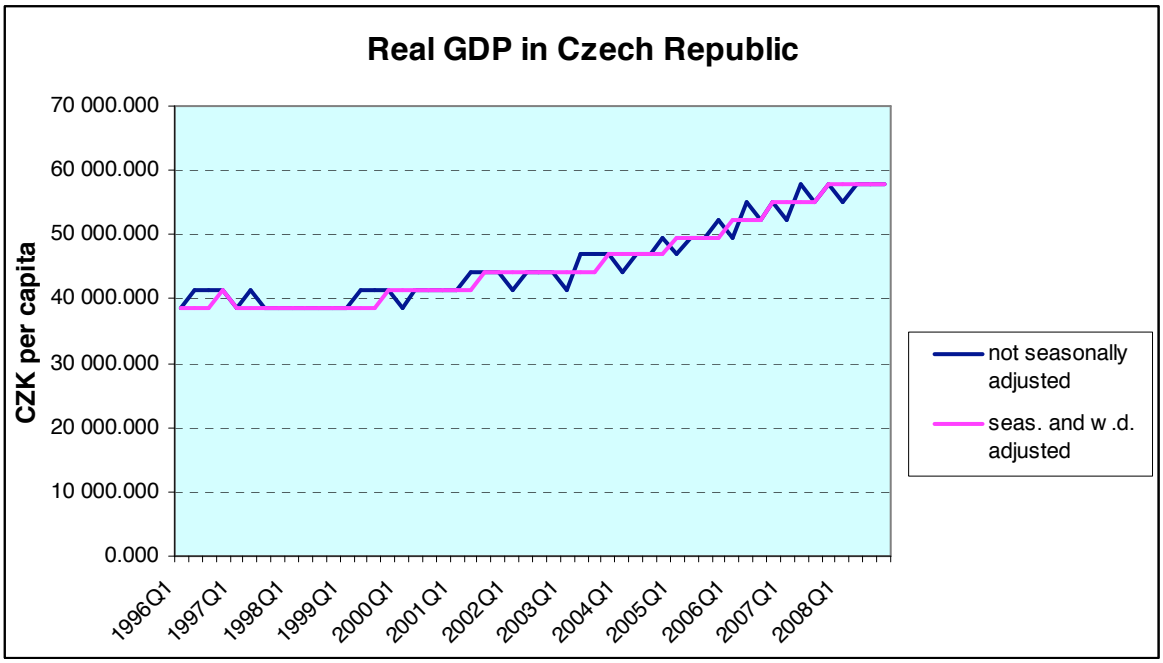
Figure 22: Structure of excise tax receipts in Slovakia, 1997-2007



Source: Ministry of Finance of Slovak Republic and own calculations

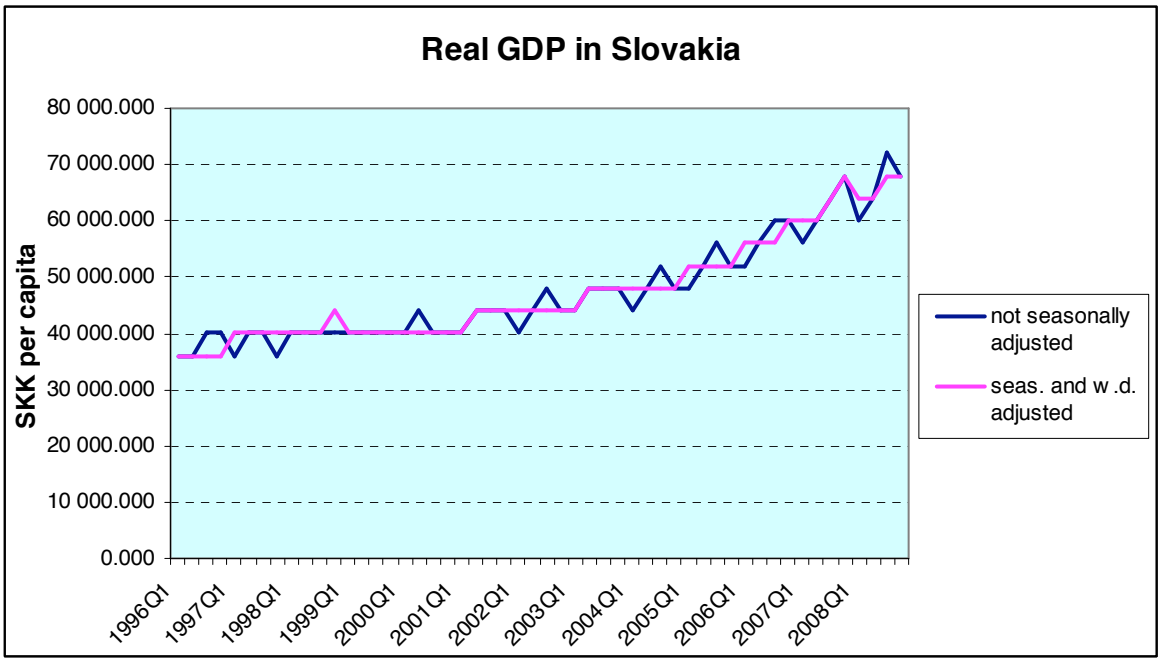
Appendix C: Real GDP per capita

Graph 3a: Real GDP per capita, quarterly values, chain-linked to 2005, the Czech Republic



Source: Eurostat

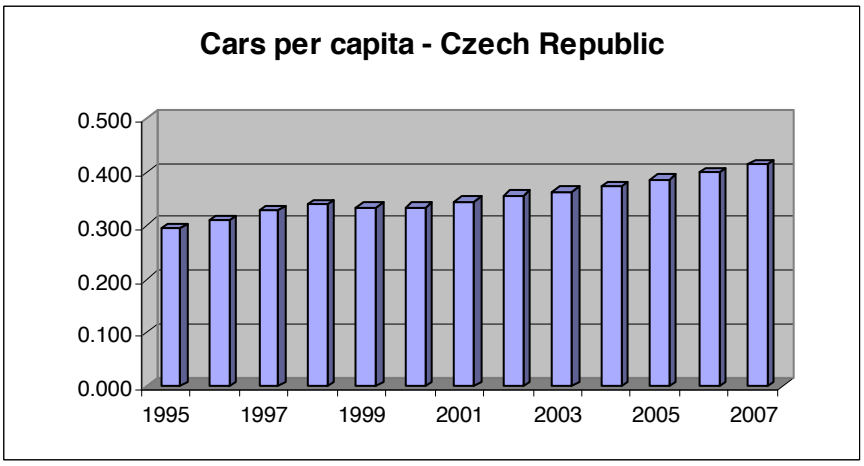
Graph 3b: Real GDP per capita, quarterly values, chain-linked to 2005, Slovakia



Source: Eurostat

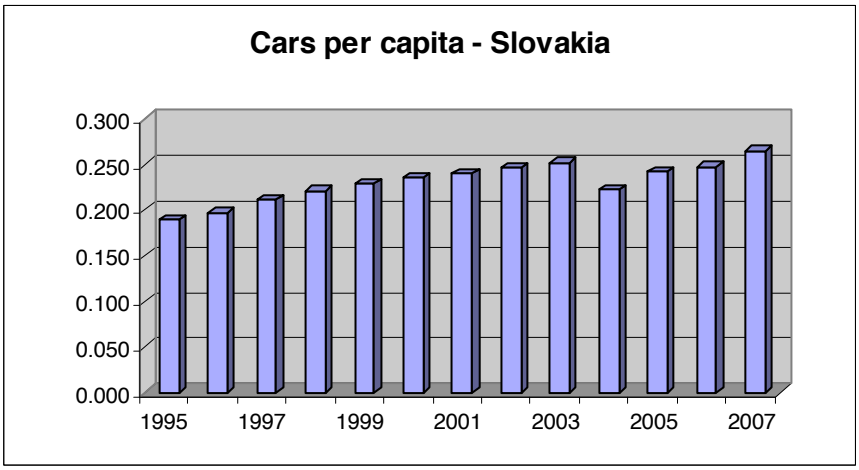
Appendix D: Cars per capita

Figure 23: Cars per capita in the Czech Republic



Source: CSO and own calculations

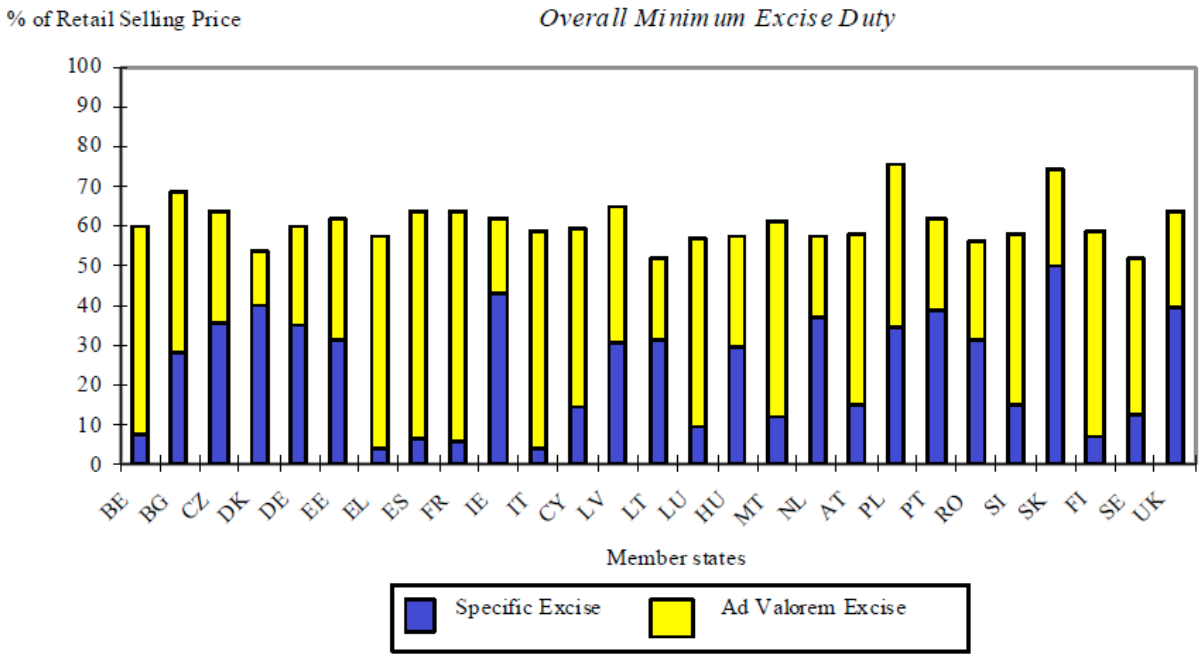
Figure 24: Cars per capita in Slovakia



Source: SOSR and own calculations

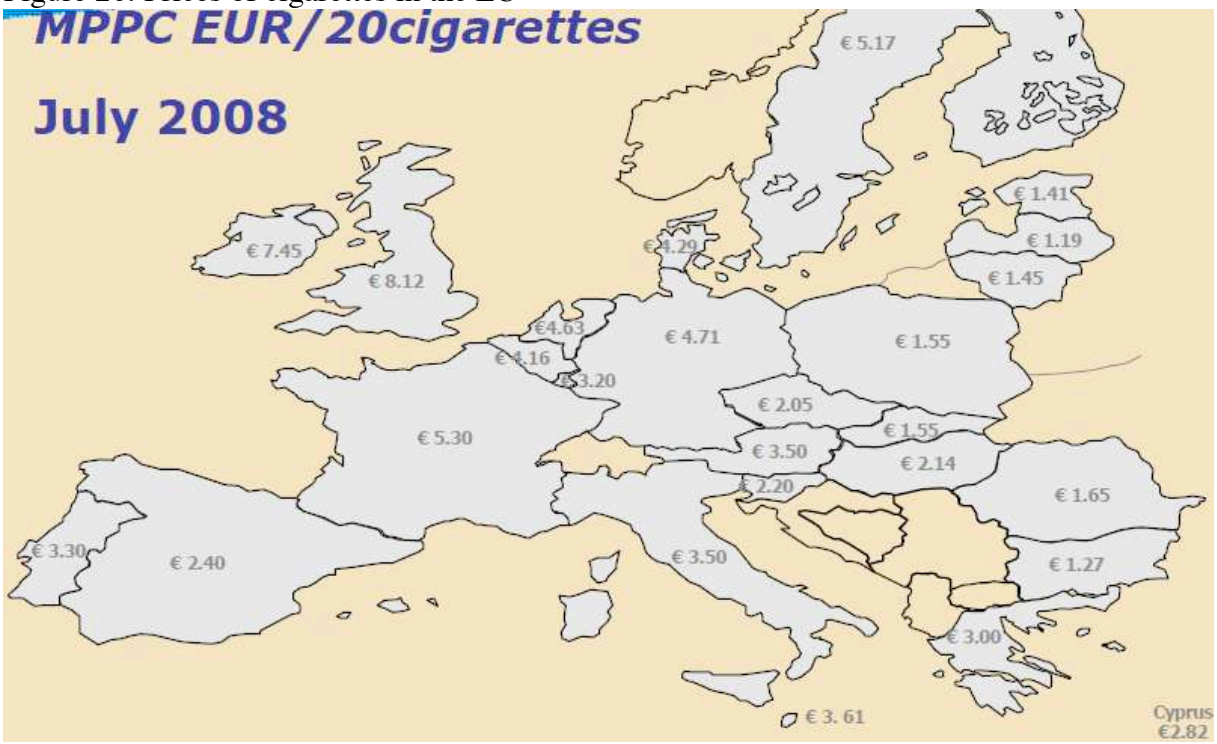
Appendix E: Cigarette taxes and prices in the EU

Figure 25: Structure of cigarette excise taxes in the EU



Source: European Commission Excise Duty Tables, Part III Manufactured Tobacco

Figure 26: Prices of cigarettes in the EU



Source: European Commission, Presentation on the Report and Proposal COM(2008) 459/2

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Předpokládaný název BP:

Analýza vplyvu zmien spotrebných daní na príjmy štátneho rozpočtu a na dopyt po spotrebných tovaroch v rôznych krajinách EU

Charakteristika tématu, současný stav poznání, případné zvláštní metody zpracování tématu:

Nepriame dane tvoria 13.5% celkového HDP EU 27. Podiel spotrebných daní na nepriamych daniach sa neustále zvyšuje, keďže všetky členské krajiny musia postupne dosiahnuť minimálne sadzby dané Európskou úniou. Hlavnou kategóriou sú spotrebné dane na pohonné hmoty, sadzba na bezolovnatý benzín je stanovená na 359 EUR/1000 litrov. Druhý najväčší podiel na spotrebných daniach majú tabakové výrobky s minimálnou sadzbou 64 EUR/1000 kusov cigariet. Najmenšou časťou prispievajú spotrebné dane na alkoholické nápoje.

Uvalenie spotrebných daní má dva základné účely. Prvý je takzvaný „nápravný“ ako ho formuloval Arthur Pigou – tržná cena nezahrňuje negatívne externality (znečistenie životného prostredia, následky fajčenia a. i.), a preto je žiaduce zahrnúť ich do zvýšenej dane a tým napraviť efektivitu alokácie zdrojov. Problematické je však určiť výšku dane tak, aby optimálne vyvážila externality.

Druhou úlohou spotrebných daní je zvyšovanie štátnych príjmov. Považujú sa za istý zdroj financovania, keďže dopyt po spotrebných tovaroch je stabilnejší oproti ostatným statkom. Otázne je, do akej miery je dopyt stabilný v jednotlivých krajinách EU, a teda aké rôzne zmeny môže vyvolať jednotná minimálna sadzba dane. Pokiaľ krivka dopytu nie je

stopercentne vertikálna, nárast ceny nevyhnutne zmení nakúpené množstvo. To sa spätne odzrkadlí na výške daňových výnosov.

Do akej miery sú celkové štátne príjmy ovplyvnené zvyšovaním spotrebných daní a ako je zvyšovanie brzdené zmenou dopytu je predmetom skúmania tejto práce.

Struktura BP:

1. úvod
   - 1.1. teória zdaňovania, vplyv daní na dopyt, dane ako nástroj na nápravu externalít (teória A. Pigoua)
   - 1.2. štruktúra daní v EU
   - 1.3. vymedzenie spotrebných tovarov
   - 1.4. minimálne sadzby spotrebných daní
   - 1.5. doba prispôsobenia minimálnym sadzbám
2. spotrebná daň na pohonné hmoty
   - 2.1. vývoj podielu spotrebnej dane na pohonné hmoty na štátnych príjmoch krajín EU
   - 2.2. vplyv spotrebnej dane na dopyt po pohonných hmotách, autách a cestovaní
   - 2.3. analýza vzťahu medzi zmenami dopytu a zvyšovaním štátnych príjmov
3. spotrebná daň na tabakové výrobky
   - 3.1. vývoj podielu spotrebnej dane na tabakové výrobky na štátnych príjmoch krajín EU
   - 3.2. vplyv spotrebnej dane na zmenu chovania spotrebiteľa – vývoj počtu fajčiarov po daňových zmenách
   - 3.3. analýza vzťahu medzi zmenami dopytu a zvyšovaním štátnych príjmov
4. spotrebná daň na alkoholické nápoje
   - 4.1. vývoj podielu spotrebnej dane na alkoholické nápoje na štátnych príjmoch krajín EU
   - 4.2. zmeny dopytu po alkoholických nápojoch ako následok zmeny dane
   - 4.3. analýza vzťahu medzi zmenami dopytu a zvyšovaním štátnych príjmov
5. záver

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Termín odevzdání:	červen 2009

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