TAXATION OF "VICES" – EXCISE TAXES ON ALCOHOL PRODUCTS

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Abstract

Alcohol has been a part of humanity for a long time and it is still widely consumed around the world. This fact is not so surprising, as alcohol is a vice, which is hard to overcome. The long-standing relationship between alcohol and the humanity has always brought about controversy, mainly, in terms of its taxation, which has been used to control alcohol consumption and the related problems. Furthermore, governments see taxation of alcohol also as a stable source of state budget revenue. The paper is dedicated to excise taxes levied on beer, wine and spirits. The assessment of coherence between the tax theory and the practical application in the current system of excise taxes on alcoholic beverages in Slovakia are the desired contribution of the paper.

***Keywords*:** *elasticity, vices, taxation, excise taxes, alcohol, beer, wine, spirits*

1 INTRODUCTION

Nowadays when the world economy is in the state of recession or slow increase in the economic growth and individual countries face high deficits of the public finance, ways how to seal the hole in the state budget are sought for. Governments can either use restrictive measures by lowering the public expenditures or they can increase the state budget revenues by increasing the tax rates.

One favorite way of each government is to increase the tax rates on products, which have the lowest effect on reducing their consumption. Such products include for example, alcohol, tobacco or petrol, in other words, products liable to excise taxes.

The paper deals with excise taxes levied on alcoholic beverages - beer, wine and spirits, which are considered to be vices. The main aim of the paper is to examine whether the current system of excise taxes on alcoholic beverages in the Slovak Republic reflects relevant theoretical basis of the tax theory. From the tax theory, the Ramsey's inverse elasticity rule is important, as it explains the relationship between the price elasticity of demand and the tax rate of a product. For this reason, the paper will provide elasticity calculations for beer, wine and spirits.

2 THEORETICAL FRAMEWORK

According to the law of demand, as the price of a good or service rises, the consumption of that good or service falls. In case of alcoholic beverages, this law also applies. However, the degree to which alcohol consumption is influenced by price can be explained by the price elasticity of demand, also referred to as own price elasticity of demand, or just price elasticity. Vicescause consumers to behave differently than in case of other products. This fact is well known to the tax authorities and can be, and usually is, utilized to the disadvantage of the consumers of vices.

2.1 Alcohol is a vice

Vice is a bad habit with morally bad consequences. It is a repeated action, which human performs so often, that it marks ones cognition (he/she begins to excuse his/hers actions), will and therefore also character and this kind of human creates a bad habit, which is hard to overcome and has a tendency to repeat it. Alcohol belongs to vice products. More concretely, alcohol is present in the deadly sin gluttony, which can be defined as insufficient self-control over food and drinking. It is about cumulating pleasure from food or beverages. (Příkaský, 2000)

In the statement "the worst of all the multitude did something for the common good" (Bernard Mandeville, 1997, p.56) Mandeville emphasized that individual vices are beneficial for the economy because they are its driving force. If there were no vices and the society was virtuous, there would be no prosperity. So he believes that private vices are public benefits. (Sedláček, 2009)

The state plays two roles in case of taxation of alcohol. On one hand, the state tries to protect its citizens from alcohol's negative effects. But on the other hand, it also receives revenues from collecting excise taxes.

2.2 Elasticity and optimal taxation of consumption

The problem with alcohol occurs because it causes addiction. Samuelson states that "an addictive substance is one for which the desire to consume depends significantly on past consumption" (Samuelson, 2005, p. 94). Besides this, addictive goods are usually price inelastic, which means that their price elasticity is low and the quantity demanded reacts little to changes in price. It is difficult to regulate these goods, because of the substitution among them. If a price is raised for one substance, it can lead to consumption of their substitutes.

Frank Ramseyanalyzed in his work the efficiency of different types of taxes. He was the first who analyzed optimal taxation of consumption. He tried to analyze in what case the tax revenue would rise by a certain amount while bearing the lowest possible deformation in the economy. In this sense, as pointed out by Zubaľová, he tried to find out how should the optimum consumption tax be levied so that the additional tax burden would be the lowest. (Zubaľová, 2008)

Ramsey stated that a uniform consumption tax is not optimal. He developed the inverse elasticity rule, which states that "the government should levy the heaviest taxes on those inputs and outputs that are most price-inelastic in supply and demand" (Samuelson, 2005, p. 335). The reason for this lies in the fact that if a product is highly price inelastic, the tax levied on this product will have small influence upon the consumption and production. In this way, the government may raise revenue with a small loss of efficiency. As Ramsey states "if any one commodity is absolutely inelastic, either for supply or for demand, the whole of the revenue should be collected off it" because "for taxing such a commodity does not diminish utility at all" (Ramsey, 1927, p. 56-57).According to Zubaľová (2008), the basic principles of Ramsey tax theory can explain the high tax rates levied on products such as alcohol, tobacco and petrol.

2.3 Excise taxes on alcoholic beverages

In Slovakia, the alcoholic beverages that are subject to excise taxes include beer, wine and spirits. Individual laws for these alcoholic beverages were issued in 1994; however, since then, they have undergone many changes. After Slovakia became a member of the European Union, it had to adjust its tax system. Harmonization process was necessary as excise taxes could hinder the free movement of goods by disrupting prices and competition. Table 1 depicts the current tax rates levied on these beverages.

Table 1 Tax rates levied on beer, wine and spirits in Slovakia

Object of tax		Tax rate	Tax base
Beer	Basic tax rate	1.65 €/Plato degree	100 l
	Lowered tax rate	1.22 €/Plato degree	
Wine	Still wine	0 €	100 l
	Sparkling wine	79.66 €	
	Sparkling wine (alcohol content less than 8.5% of volume)	56.42 €	
	Intermediate products	82.98 €	
Spirits	Basic tax rate	1080 €	100 l a.
	Lowered tax rate	540 €	

Source: self-processed based on laws on beer, wine and spirits

3 METHODOLOGY AND DATA

The paper examines whether the current system of excise taxes on alcoholic beverages, i.e. the tax rates of beer, wine and spirits, in Slovakia confirms the Ramsey tax theory. In order to find this out, the price elasticity of demand for each alcoholic beverage needs to be calculated.

3.1 Own-price elasticity of demand

The differential calculus was used to calculate the own-price elasticity of demand E_d for an infinitesimally small change in price and quantity at any given point on the demand curve. The formula of point elasticity is given in the form (Sloman, 2006, p. 55):

$$E_d = \frac{P}{Q_d} \times \frac{dQ_d}{dP}, \qquad (1)$$

where $\frac{dQ_d}{dP}$ is the first derivative of quantity Q_d with respect to price P.In case the elasticity is greater than 1, it is an elastic demand, if elasticity is less than 1, it is an inelastic demand and if elasticity is equal to 1, it is a unit elastic demand.

However, in order to calculate the price elasticities of beer, wine and spirits, the demand function $Q_d = f(P)$ of each alcoholic beverage had to be found out, so that the derivative $\frac{dQ_d}{dP}$ could be calculated. To do so, regression analysis, which studies the functional relationship between the dependent variable Y and independent variable X, was used. The linear model, which has the following form, was used:

$$Y = a + bX, \qquad (2)$$

whereb is the slope of the line and a represents the y-intercept.

The relationship between the per capita consumption $Q$and the average consumer price P of each alcoholic beverage was examined. Therefore, the dependent variable is the per capita consumption and independent variable is the average consumer price.The demand functions for beer, wine and spirits were calculated using a statistical program (Statgraphics Plus) and they are as follows:

- $Q_{beer} = 99.2237 - 16.5658 \times P_{beer}$
- $Q_{wine} = 15.8388 - 0.704667 \times P_{wine}$
- $Q_{spirits} = 15.4612 - 0.748848 \times P_{spirits}$

3.2 Data

The data of this study on the average consumer prices and the per capita consumption come from the Statistical Office of the Slovak Republic. The data presents average consumer prices of selected products. Average prices for spirits, wine and beer were calculated based on the available statistical data about average prices of Rum spirit (38 to 40%), Vodka fine (38 to 40%) and Brandy (38 to 40%), Red grape wine bottled, White grape wine bottled, Sparkling grape wine bottled, 10% Beer – bottled and 12% Beer – bottled. The data on total per capita consumption

include the consumption of beer, wine and spirits per one person expressed in liters consumed.

4 RESULTS

Based on the calculated demand functions and the point elasticity formula, the price elasticities of beer, wine and spirits were determined for each year in the period 1990 – 2009. They are depicted in Table 2. The price elasticities should be negative. However, in this paper the price elasticity is expressed in absolute value form. From the results it is clear, that all elasticities are less than 1, therefore, the demanded for beer, wine and spirits is inelastic.

When grading the elasticitiesfrom the least inelastic to the most inelastic demand, we can look at the minimum and maximum elasticities reached during the examined period. It needs to be realized, that the maximum number depicts such elasticity when the demand for beer, wine and spirits was the least inelastic. On the other hand, the minimum number depicts such elasticity, when the demand for beer, wine and spirits was the most inelastic. The highest price elasticity (maximum) for spirits is recorded in the year 2003, for wine in 2005 and for beer in 2009. For all alcoholic beverages the lowest price elasticity (minimum) is recorded in the year 1990. So it can be concluded that the demand for alcoholic beverages has become more elastic than it was at the beginning of the presented period. This means that people have become more sensitive to price increases. And this also supports the idea that when it comes to vices, a longer time period is necessary to see a certain change in the consumers' consumption pattern.

From Table 2, it is clear that the most inelastic demand had beer until the year 2003. Since 2004 demand for wine is the most inelastic. The least inelastic demand have spirits. When we look at the average price elasticity, a tax increase that raises beer prices by 1 percent might reduce beer consumption by as little as 0.136 percent. The same is true for wine, as its average price elasticity of demand is the same as that of beer. In case of spirits, a tax increase that raises spirits prices by 1 percent might reduce spirits consumption by 0.5 percent. This means, that spirits are more sensitive to price changes than is wine or beer, because they are more elastic.

Because wine and beer have the same average price elasticity of demand, their median values were taken into considerationby determining which is more or less inelastic. For spirits it is clear that they are the least inelastic, because their value is the closest to 1. Its median is 0.521. When it comes to wine and beer, the median is 0.150 and 0.135 respectively, suggesting that beer has the most inelastic demand of all three alcoholic beverages. The use of median instead of mean is better, because it is less sensitive to the extreme numbers.

In Table 2 are also depicted percentage changes of the price elasticities of the examined alcoholic beverages. A positive percentage change indicates a situation when the quantity demanded became more sensitive to price increases, that is, the demand was more elastic. On the other hand, a negative percentage change indicates a situation

when the demand became more inelastic, so in this period consumers did not respond to price increase so sensitively.

Table 2 Price elasticity of demand for spirits, beer and wine in Slovakia

	Spirits	% change	Beer	% change	Wine	% change
1990	0.183	-	0.043	-	0.061	-
1991	0.202	10.4%	0.067	54.5%	0.075	22.8%
1992	0.228	12.6%	0.068	2.1%	0.078	4.1%
1993	0.288	26.8%	0.094	37.3%	0.094	21.2%
1994	0.431	49.5%	0.094	0.1%	0.100	6.2%
1995	0.463	7.4%	0.102	8.8%	0.118	17.8%
1996	0.449	-3.0%	0.103	0.6%	0.124	5.2%
1997	0.471	4.7%	0.108	4.7%	0.125	0.6%
1998	0.511	8.7%	0.122	13.8%	0.137	10.2%
1999	0.523	2.3%	0.134	9.0%	0.151	9.7%
2000	0.562	7.4%	0.137	2.9%	0.159	5.4%
2001	0.613	9.0%	0.144	4.7%	0.152	-4.6%
2002	0.635	3.6%	0.143	-0.4%	0.153	1.3%
2003	0.763	20.1%	0.166	15.8%	0.169	10.3%
2004	0.661	-13.4%	0.190	14.5%	0.170	0.6%
2005	0.518	-21.5%	0.188	-1.0%	0.193	13.2%
2006	0.684	32.0%	0.188	0.1%	0.150	-22.2%
2007	0.582	-14.9%	0.193	2.7%	0.170	13.7%
2008	0.565	-3.0%	0.212	9.8%	0.177	3.7%
2009	0.670	18.6%	0.219	3.4%	0.158	-10.6%
Mean	0.500	-	0.136	-	0.136	-
Median	0.521	-	0.135	-	0.150	-
Standard deviation	0.166	-	0.051	-	0.038	-
Maximum	0.763	-	0.219	-	0.193	-
Minimum	0.183	-	0.043	-	0.061	-

Source: self-processed

The tax rates of spirits increased in 1994, 2000 and 2006. Table 2 shows that during these years, the percentage change in price elasticities of demand was a positive

and quite a high number. Thus, tax rate increases followed by rising spirits' price caused the demand to be more sensitive, therefore, more elastic. For example, a price increase of 6% in 2006 caused the demand to become more elastic by 32%. However, before 2006, percentage changes in price elasticity were negative, suggesting the effect of stocking up before the announced rising of spirits' tax rates. In the years 2007 and 2008, again the same effect is visible, until the economic crisis hit in 2009, when prices did not grow by much, but the demand became more sensitive.

When it comes to beer and wine, the percentage changes in price elasticity were not as notable as those of spirits. For example, beer's tax rate increase followed by price increase of 12.3% in 2003 caused the demand to become more elastic by 15.8%. In case of wine, a change in tax rate followed by price increase of 4.7% in 2001 caused the demand to become more inelastic by 4.6%. The reason behind the smaller fluctuation in the sensitivity to price changes in case of beer and wine when compared to spirits could be due to the fact, that beer is Slovak's favorite alcoholic beverage, as it has the highest consumption in liters, and wine had introduced the zero-tax rate for still wines and the tax rate had been increasing only for intermediate products.

What is important to point out, is that during the first years of the examined period, the prices were increasing by jumps due to price liberalization, which had also impact on the falling consumption of alcoholic beverages. Therefore, the percentage changes in price elasticities were in these years positive and high numbers.

5 CONCLUSION

Drinking alcohol is a bad habit of many people. It marks their cognition, will and character, thus it is hard to overcome. Therefore, alcohol is considered to be a vice. Slovaks are considered heavy drinkers, and are placed in the top ranks from a worldwide perspective. Alcohol belongs to the number one drug in Slovakia when it comes to its widespread usage. The reason behind this is our culture. We are considered a hospitable nation, and with hospitality is also connected offering our guests with "something" to drink. Alcohol is an inseparable part of all our celebrations, like birthday, wedding, festivals or welcoming of the New Year.

The government uses several tools to suppress this high alcohol consumption trend. One of them are the excise taxes. However, the main reason behind levying excise taxes is actually a relatively significant income for the state budget, which is well predictable and stable, because of the low price elasticity of demand of goods on which these taxes are levied. In case of alcohol, these goods are spirits, wine and beer.

The main aim of the paper was to examine whether the current system of excise taxes on alcoholic beverages in the SlovakRepublic reflects relevant theoretical basis of the tax theory. The main idea was based on the inverse relationship between the price elasticity of demand and the excise tax rate, that is, the lower the elasticity, the higher the tax rate.

The results of research show that all alcoholic beverages examined have price inelastic demandand that the demand for beer, wine and spirits has become more elastic than it was at the beginning of the examined period. This means that people have become more sensitive to price increases, so excise taxes as a tool to decrease alcohol consumption work. And this also supports the idea that when it comes to vices, a longer time period is necessary to see a certain change in the consumers' consumption pattern.

The alcoholic beverages were graded according to the most to the least inelastic demand in order to make further assessments. From the tax theory, Ramsey's inverse elasticity rule suggested levying the highest taxes on those products, which are the most inelastic. In this study, it was beer, which had the most price inelastic demand of the examined alcoholic beverages, however, was taxed the lowest, if we exclude the zero tax rate levied on still wine. Therefore, the current system of excise taxes on alcoholic beverages in the SlovakRepublic does not reflect the theoretical basis of the tax theory. The reason for this resides in the fact that the Ramsey's inverse elasticity rule was not fulfilled.

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