The Tax Elasticity and the Evasion: A Case Study on the Taxes in Fuels

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ABSTRACT--- ***This study deals with the question whether the increase in the consumption taxes is affected by the elasticity of demand for their goods. Furthermore, it investigates whether the latter is correlated with the increase of the indirect taxes and especially the VAT by increasing the tax evasion. Also, it analyzes the price elasticity of demand and the elasticity of demand on total revenue, as well as the meaning of tax fraud. It identifies the types of elasticity depending on the percentage change on quantity and price. The study refers on the paradox of change of the elasticity factor on the same good over a certain value. Based on the inequality of tax evasion, I examine the reactions of traders in a given increase in the price of goods and the tax losses of the government. Accordingly, I draw conclusions on the increase in tax rates and expected tax revenue of the Government.***

Keywords--- Tax elasticity, tax evasion

1. INTRODUCTION

A very serious issue that has to examine each government is that by increasing the indirect taxes on goods in which way this will ultimately affect to the demand. In other words, how the increase in excise duty is affected by the elasticity of demand for these goods. For example, if we will increase the rate of VAT from 20% to 23% in a commodity, e.g. cigarettes ultimately tax revenues will increase or decrease due to reduced and consumption of goods? In this text I will still try to link the increase in excise duties and tax revenues eventually recovered by increasing tax evasion (tax fraud), because it is known that high tax rates contribute to increased tax evasion.

Definitions

- Price elasticity of demand. The price elasticity of demand determined by the degree of change in the quantity demanded at a given price change of a good.
- Elasticity of demand and total revenue. In this case the elasticity is measured relative to the total increase or decrease of revenues, in case of rise the price of goods due to the increase of the tax rate duty (VAT)
- Tax fraud is the fact of non-tax giving in the public funds (usually indirect taxation as VAT) that the debtor has received by an individual or legal entity.

2. IDENTIFICATION OF THE PROBLEM

If governments need ultimate tax revenues, they tend to increase the rates of indirect taxes, expecting input of money into their funds. This however is not certain and depends on two important factors, the elasticity of demand for particular goods and the growth rate of evasion.

Depending on the percentage change in quantity and price, demand can be:

1. Elastic demand, if the percentage change of the quantity is greater than the percentage change of the value, when the margin value of the elasticity rate is greater than one (1).
2. Inelastic demand, however, if the percentages change in the quantity is less than the percentages change in the price, so the margin value of the elasticity rate is less than one (1).
3. Unitary elasticity, if the margin value of the rate is equal to one (1), which means that price and quantity change in the same proportion.
4. Perfectly inelastic, if the rate is equal to zero (0), so that a certain change in price does not change in quantity demanded.
5. Infinitely elastic, if the margin value of the rate tends to infinity. In such case the demanded quantity changes without any change in the price.

According to the law of demand, we accept that when increasing or decreasing the price of goods, respectively decreases or increases the quantity demanded. The size of the change in the quantity caused by the change of the value is not the same throughout the length of the demand curve and varies from good to good.

So if the demand for goods is inelastic, less than one (1), then the increase of the consumption tax (VAT) increase government revenue because the decrease in quantity demanded is small. Such goods are staples such as food, medicines, energy, etc.

Conversely, if the demand for goods is elastic, greater than one (1), then the increase of a tax in the consumption does not yield large revenues to the state because the price increase causes a large decrease in quantity demanded. If e.g. impose higher tax rate on cigars, is likely to eventually be a reduction in tax revenue because many consumers will not continue to consume this good.

3. THE PARADOX OF CHANGE THE RATE OF ELASTICITY IN THE SAME GOOD

Let's now consider the case of increasing the specific value added tax on fuel. It is a general assumption that increasing the gasoline tax and hence its price, it is the surest source of revenue for the State. This is because the demand for gasoline is classified as inelastic. In other words, it is heavily influenced by fluctuations in the price as it is considered staple. Indeed, several studies define the value of the elasticity of gasoline around 0.5. This means that if you raise the price of gasoline by 10% the quantity demanded will decrease only 5%. So, the tax revenue will increase by a possible increase in the gasoline tax as less petrol consumption will be fully offset by the price increase.

However, the analysis of data in Greek market the last two years gives elasticity of demand 1.15. That is, an increase in the price of gasoline by 10% leads to a decrease in quantity demanded by 11.5%. Why is there so much difference in the price elasticity of gasoline in Greece compared with other developed countries? The answer is given by the fact that at levels of low prices (even at relatively low levels) the elasticity of demand for gasoline shows low values (inelasticity – lower than one). But as the relative price rises, becomes more elastic. The result of this analysis shows that the government revenues would not only raise by the increase in the price of fuels will be reduced.

4. THE TAX EVASION AND THE INCREASING OF THE TAX RATES

If we look the tax evasion as a whole, the inequality is:

$$P^* f > g$$

Where:

p = the probability of disclosure the tax evasion by the tax authorities

f = the penalty (financial, criminal, etc.)

g = financial or other benefit from the realization of tax evasion.

From the inequality, we see that the smaller the value of (p) and (f), the greater the tendency for tax evasion.

Let us now try to give an example to make it more understandable.

Someone puts fuel each week 100 € which include VAT 15%, corresponding to 100 liters. Consequently, the net value of the fuel as we can find with tax remission amounts to 86.96 € and the amount of the tax 13.04 € (It is assumed that the value of the fuel contains no other duty to facilitate reader). Now, if the price of gasoline increases by 10%, then the consumer for 100 liters will have to pay 110 €. But given the elasticity of demand of 1.15, the quantity demanded is now 88.5 liters and the total amount to be paid by the consumer will be 88.5 liters x 1,10 € = 97.35 €. Assuming that the rate of VAT has remained stable, we can see through the tax remission that the indirect tax (VAT) attributable to the State is (97.35 / 1.15) – 97.35 = 12.70 € and therefore the government revenue will decrease by 0.34 €.

5. THE ELASTICITY OF A GIVEN INCREASE IN THE RATES OF THE INDIRECT TAXES

In the previous example it is assumed to increase by 10% the net worth of gasoline and the rate of indirect tax (VAT) remains stable at 15%. Let's see what will happen if the increase in consumer prices derived from increasing by 10 points the coefficient indirect taxation, i.e. if the tax rate increased from 15% to 25%. Then, given the demand of elasticity to 1.15 and the additional demanded quantity to 88.5 liters, the consumer will pay back the amount of 97.35 €. In this case the indirect tax will be attributed to the State is (97.35 / 1.25) – 97.35 = 19.47 € and so the government revenue will increase by 6.43 €.

Apparently the reader can see in this case that despite the elasticity of demand the state increases its revenue. But we must take care on two important parameters:

- Many professionals in the field of fuel see their turnovers reduced and consequently a vast amount of them will leave the profession, especially all those who operate their business close to break-even point.
- Those who remain employed will have an increased incentive to tax fraud. Specifically if on the above inequality $p * f > g$ assume that initially: p = 15%, f = 100€ and g = 13.04 € hence inequality would 15% * 100 > 13.04 therefore 15 > 13.04 and consequently there was not tax fraud, inequality will reach 15% X 100 < 19.47 therefore 15 < 19.47 consistently the tax payer acquire incentive for tax evasion. So if we assume that the tax evasion in the country reaches 20%, then the expected revenue from the increased tax rate will amount to 19.47 € - 20% = 15.58 € and thus the actual increase in state revenues would be 2,54 €.

6. CONCLUSIONS

From the above analysis we can draw the following conclusions:

- Each government should be very careful in tax increases and therefore the final price of goods with elasticity of demand greater than one (1).
- The increase in the tax rate directly increases the tendency for tax evasion and tax fraud
- Increased price to intermediate goods affects a number of other sectors of economy (in this case the transport sector)
- The taxes collected will eventually not at all certain that it will be many more of the time before the increase.

7. REFERENCES

1. Bohi, Douglas R. Analyzing Demand Behavior: «A Study of Energy Elasticities». Baltimore, Maryland: John Hopkins University Press, 1981
2. Brons, Martijn et al. «A Meta-Analysis of the Price Elasticity of Gasoline Demand. A System of Equations Approach». In Tinbergen Institute Discussion Paper. TI 2006-106/3. Nov 2006. Tinbergen Institute.
3. Gately, Dermot, and Hillard G. Huntington. The Asymmetric Effects of Changes in Price and Income on Energy and Oil Demand. In Working Papers. 01-01. Jan 2001. C.V. Starr Center for Applied Economics, New York University.
4. Lipow W. Gar «Price – Elasticity of Energy Demand», Colorado School of Mines
5. Melas D. «The causes of tax evasion and ways of mitigation». Study funded by the Research Committee of the University of Macedonia, Salonika – Greece 1996
6. Melas D. «International Tax Planning and Offshore Companies». Edition of the magazine "Tax and Thracian Approach." Xanthi – Greece 2010
7. Melas D. & K. «International Tax Planning - Development & Current Developments». Publications' «Imia» Thessaloniki Greece September 2013
8. Varoufakis G. & Patokos T. (University of Athens, Department of Economics,) Study on "Taxing businesses through crisis" for the Center for Study and Research of ACCI. Greece Athens, March 2011
9. Xionis D. «Elasticity of demand on Gasoline» Dimokrition University. Komotini – Greece 2010