The role of excise duties on tobacco products and their effect on the quality of life of citizens in Greece

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Abstract

The determination of excise duties is an important decision of the state, given that a significant part of the state's revenue depends on it. Understanding the importance of excise duties on tobacco products in the Member States of the European Union, combined with exploring their effectiveness, advantages and disadvantages, as well as assessing their impact on the quality of life of citizens, are important issues explored here. Our survey in Greece examines the effect of excise duties on tobacco products and their effects on the quality of life of citizens.

The results of the survey in Greece are mapped by region to enable the creation of a complete picture of the effects of excise duties on tobacco products through mapping with the contribution of geographic information systems (GIS).

Keywords: excise duties, tax, tobacco, quality of life, GIS

1. Introduction

The way in which rates of excise duty on tobacco in the Member States of the European Union are determined, as well as the assessment of their impact on government revenue and citizens, are important issues that need exploring. An important part of this study is the impact of these excise duties on citizens' health and quality of life.

It was also important to capture the results of this survey through mapping, to create a complete picture of the effects of excise duties on the state and citizens, in relation to the different regions of the country (see Anastasiou et al., 2021a, Anastasiou et al., 2021b).

The increase of excise duties on tobacco products may result in the reduction of state revenues, while at the same time creating conditions for improving the health of citizens. This is supported by the publication of a joint study by the World Bank and Jha & Chaloupka (1999) and the World Health Organization (WHO Tobacco Free Initiative, 2004). Taxation is ultimately seen as the most effective way to reduce the consumption of tobacco products, especially among young people and low-income groups. That means that proper management of excise duties results in an increase in the price of tobacco products, which immediately makes tobacco products less accessible to a large part of the population and, in particular, to groups with less purchasing power (Komninos et al., 2020a; Komninos et al., 2020b; Papageorgiou et al. 2018; Anastasiou et al., 2020; Liargovas et al. 2019).

The decrease in tobacco demand is also affected by the increase in the rates of smokers who quit smoking and the decrease in the percentages of potential users who might start smoking, because of

anti-smoking campaigns. Moreover, young people are particularly sensitive to price increases and may reduce smoking by two to three times as much as older people (Cnossen & Smart, 2005).

Increased excise duties on tobacco products also have a direct effect on government revenues and is often used by governments to improve their budgets. However, over-taxation on the consumption of tobacco products leads to a reduction in consumption, as mentioned above and a subsequent reduction in government revenues.

1.1 Factors that affect health and quality of life

Health and quality of life constitute a multilevel social phenomenon, which operates under the principles of universality, individualisation, reality and the satisfaction of the needs of modern on tobacco products on wellbeing and quality of life, overcharging distorts consumers' choices. The more elastic the demand for a product, the greater will be the excess weight of an excise duty, because there will be a relatively large impact on the consumer's quality of life. Given this result, it is preferable to use a lower excise tax on a wide range of products than a high excise tax on a small number of products (Cnossen, 2005).

Therefore, optimisation can be achieved with a set of selective excise duties (given the amount of revenue to be collected by the state), setting the excise duty rates for different products inversely depending on the elasticity of demand. Such a plan can be effective, in the sense that it minimises excessive burdens (Cnossen, 2005).

2. Research method

The current research is based on a quantitative data method, which allows the systematic collection of objective numerical data for statistical use (Mantzoukas, 2007), based on a typical sequence of research stages. The quantitative research design is predetermined (Bellali & Papazoglou, 2004).

For this research, a questionnaire of 22 questions was created. A total of 1,498 questionnaires was distributed in 13 regions of Greece. Of these, 1,233 were completed (82.31 per cent). This number is considered satisfactory for conducting the survey. The completed questionnaires originated from the different geographic regions shown in Table 1.

Table 1: List of completed questionnaires according to region

No	Region	Number	Percentage
1	Attica	333	27.01
2	Peloponnese	189	15.33
3	Western Greece	65	5.27
4	Sterea Ellada	47	3.81
5	Thessaly	24	1.95
6	Epirus	77	6.24

No	Region	Number	Percentage
7	Western Macedonia	98	7.95
8	Central Macedonia	119	9.65
9	Eastern Macedonia and Thrace	65	5.27
10	Northern Aegean	35	2.84
11	Southern Aegean	33	2.68
12	Ionian Islands	50	4.06
13	Crete	98	7.95
	Total	**1,233**	**100.00**

Source: Authors

The aim was to assess the impact of excise duties on tobacco products on quality of life and consumption ability of citizens. Other objectives of the survey were to investigate the impact of the economic situation and the educational level of the citizens, in a period of economic crisis, in combination with the imposition of excise duties on tobacco products, on the quality of life of the citizens. In addition, the research aimed to investigate the citizens' perceptions on the impact of these excise duties on their quality of life, as well as on their sense of social justice.

Bearing in mind that excise duties can affect the quality of life of citizens differently in different regions of Greece, the research was conducted in such a way that the results could be captured through the GIS system on maps for the 13 different regions of the country.

A quantitative approach was followed, which allowed the research to be conducted in such a way that conclusions could be reached without making arbitrary interpretations, due to the large number of questionnaires. The research followed the process outlined by Cohen and Manion (1994) to generalise the conclusions based on the research sample.

Closed-ended questions were mainly used in a structured questionnaire that had a strictly defined series of written questions. This did not allow unnecessary deviations and provided a structured uniformity in the answers (Berdie, Anderson, & Niebuhr, 1986).

The composition of the population to whom the questionnaire was distributed was considered to have significant similarities to the total active population of the country, in terms of age, income, educational level and marital status. Therefore, its results can be transferred to the total active population through the generalisation process.

3. Results and discussion

The results of the descriptive statistics are presented in Appendix 1 and in Table 2. Table 2 records the proportion of respondents consuming tobacco products as well as their reactions to an increase in the excise duties on tobacco products.

The descriptive statistics show the following demographic and consumption characteristics, as well as opinions of the consumers. Regarding gender, 48.8 per cent of the total population of respondents (602) were men and 51.2 per cent (631) were women. Regarding age, the largest percentage of respondents, 38.0 per cent were aged between 45 and 59 years. Those aged between 30 and 44 years accounted for 35.3 per cent, followed by 13.5 per cent aged up to 29 years. Those aged over 60 years accounted for 13.3 per cent.

Table 2: The proportion of respondents consuming tobacco products and their reactions to an increase in the excise duties on tobacco products

Smoker	**Number**	**Percentage**
Yes	405	32.8
No	828	67.2
Total	1,233	100.0
Increase in the effect of a special tax on tobacco products on quality of life		
Very much	73	18.0
Enough	111	27.4
Moderate	104	25.7
A little	82	20.2
Not at all	35	8.6
Total	405	100.0
Increase in the effect of a special tax on tobacco products in reducing smoking		
Very much	72	17.8
Enough	102	25.2
Moderate	100	24.7
A little	91	22.5
Not at all	40	9.9
Total	**405**	**100.0**

Source: Authors

The largest percentage, 35.6 per cent, of respondents had two children, 31.2 per cent had no children, 21.4 per cent had one child and 11.8 per cent had more than two children.

Regarding the educational level of the participants, the largest percentage, 43.6 per cent, had a university or technical education degree, 30.0 per cent had a high school diploma, 18.2 per cent had a postgraduate or doctoral degree, 4.3 per cent had a primary school diploma, 2.1 per cent attended some school classes and 1.9 per cent had no education.

Regarding the profession of the respondents, 64.4 per cent were employees, 10.5 per cent were entrepreneurs, 8.9 per cent were income earners, 8.4 per cent were retirees, 4.5 per cent were farmers and 3.3 per cent were unemployed.

The annual income of the research population showed that 12.7 per cent had an average annual income from €0 to €5,000, 10.9 per cent from €5,001 to €10,000, 17.2 per cent from €10,001 to €15,000, 15.7 per cent from €15,001 to €20,000, 14.8 per cent from €20,001 to €25,000, 13.2 per cent from €25,001 to €30,000, and 15.4 per cent over €30,000.

As shown in Table 2, almost one third of the respondents declared that they smoked, while almost 45 per cent declared that an increase in the excise duties on tobacco products affected their quality of life to a remarkable level. Also, almost 43 per cent declared that the increase in the excise duties on tobacco products affected their reduction in smoking to a remarkable level.

3.1 Results of Spearman non-parametric correlations

The non-parametric Spearman correlations are presented in detail in Appendix 2 and summarised in Table 3. All Spearman correlations are statistically significant.

Table 3: Non-parametric Spearman correlations

Variable 1	Variable 2*	Spearman's (rho) correlation value
To what extent is the quality of your life negatively affected by the tobacco excise duty?	Family income (1=lower, 7=higher)	0.327 (p=0.000)
	Education (1=higher, 6=lower)	-0.148 (p=0.001)
To what extent would an increase in the tobacco excise duty generally reduce your consumption ability?	Family income (1=lower, 7=higher)	0.286 (p=0.000)
	Education (1=higher, 6=lower)	-0.187 (p=0.000)

*According to the questionnaire, for family income: 1 = €0 to €5,000, 2 = €5,001 to €10,000, 3 = €10,001 to €15,000, 4 = €15,001 to €20,000, 5 = €20,001 to €25,000, 6 = €25,001 to €30,000, and 7 = €30,000.

For educational level: 1 = postgraduate or doctoral degree, 2 = university or technical education degree, 3 = high school diploma, 4 = primary school diploma, 5 = some school classes, 6 = no education.

Source: Authors

From these non-parametric Spearman correlations, it appears that:

a. The negative impact on the quality of life of consumers, as well as the possible reduction of their consumption ability due to the increase of excise duties on tobacco products, have a linear and positive Spearman's rho correlation with family income. That is, the higher the family income, the smaller the negative impact on the quality of life and the consumption ability of the citizens brought about by the increase in excise duties.

b. The negative impact on the quality of life of consumers, as well as the possible reduction of their consumption ability due to the increase of excise duties on tobacco products, have a linear and negative Spearman's rho correlation with education. That is, the higher the level of education, the smaller the negative impact on the quality of life and consumption ability of citizens brought about by the increase in excise duties.

3.2 Linear regression results

The results of the linear regression are presented in detail in Appendix 3 and the linear correlations between the dependent and independent variables are described and summarised in Table 4. The findings of these correlations through linear regression are statistically significant and are fully consistent with the Spearman correlations analysed in the previous section.

Table 4: Results of linear regressions

Dependent variable y	Independent variable x*	Coefficient a	Constant b	P
To what extent is the quality of your life negatively affected by the tobacco excise duty?	Family income (1=lower, 7=higher)	0.203	1.924	0.000
	Education (1=higher, 6=lower)	-0.145	3.099	0.018
To what extent would an increase in the tobacco excise tax generally reduce your consumption ability?	Family income (1=lower, 7=higher)	0.179	2.092	0.000
	Education (1=higher, 6=lower)	-0.153	3.192	0.014

*According to the questionnaire, for family income: 1 = €0 to €5,000, 2 = €5,001 to €10,000, 3 = €10,001 to €15,000, 4 = €15,001 to €20,000, 5 = €20,001 to €25,000, 6 = €25,001 to €30,000, and 7 = €30,000.

For educational level: 1 = postgraduate or doctoral degree, 2 = university or technical education degree, 3 = high school diploma, 4 = primary school diploma, 5 = some school classes, 6 = no education.

Source: Authors

From these correlations of the linear regression, it appears that:

a. There is clearly a proportionally positive linear relationship between the negative impact on quality of life or the reduction of consumption ability due to the increase in excise duties on tobacco products as dependent variables and the family income as the independent variable. Those with the highest incomes have a smaller sense of the negative impact on quality of life and a more limited reduction in their consumption ability, due to an increase in excise duties on tobacco products.

b. There is also a clear proportionally negative linear relationship between the negative impact on quality of life or the reduction in consumption ability due to increased excise duties on tobacco products as dependent variables and the level of education as an independent variable. Those with higher levels of education have a smaller sense of the negative impact on quality of life and more limited reduction of their consumption ability, due to increased excise duties on all products.

3.3 Results of the geographic representation (GIS)

Using ArcMap software, the data were entered in tabular form. These data were plotted as graphs in the corresponding geographical locations on the maps, providing a complete picture of the impact of excise duties on quality of life and consumption ability.

Some examples of how these results are presented using GIS are shown in the maps in Appendix 4.

4. Conclusions

Our survey examined the effect of excise duties on tobacco products and their effects on the quality of life of citizens in Greece. The main results of this survey are summarised as follows:

- People with the highest incomes have a smaller sense of the negative impact on quality of life and a more limited reduction in their consumption ability, due to an increase in excise duties on tobacco products.
- People with higher levels of education have a smaller sense of the negative impact on quality of life and more limited reduction of their consumption ability, due to increased excise duties on tobacco products.

Some of the results were plotted in maps, using ArcMap software, providing a complete picture of the impact of excise duties on quality of life and consumption ability in different areas of the country.

It should be emphasised that the reliability of this research depended to a large extent on the honesty of the participants and their understanding of the questions in the survey. In this area, efforts were made to help the participants understand as much as possible about both the aims of the research and the content of the questions.

Given the usefulness of tax policy research, we propose to examine, in a new survey, the indirect effects of the increase of excise taxes on tobacco products on economic life, such as, for example, the reduction of industrial activity, the reduction of the turnover of some specific sectors of commercial activity and the increase in unemployment.

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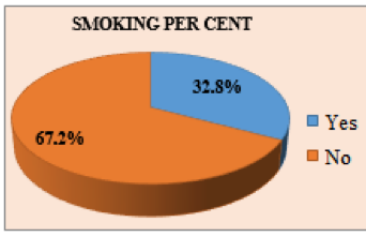
APPENDIX 1: Sample characteristics

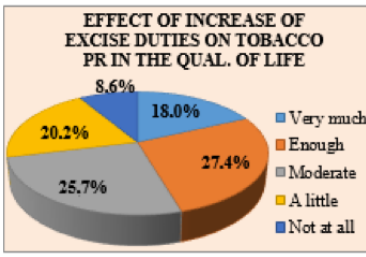
Figure 1. Smoking per cent



SMOKING PER CENT

		Frequency	Per cent	Valid Per cent	Cum. Per cent
Valid	Yes	405	32.8	32.8	32.8
	No	828	67.2	67.2	100.0
	Total	1,233	100.0	100.0	
Missing	System	0	.0		
Total		1,233	100.0		

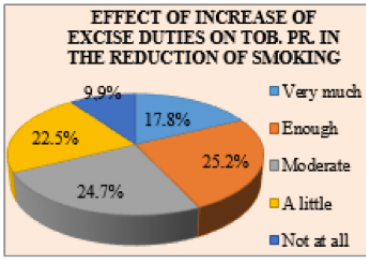
Figure 2. Effect of increase of excise duties on tobacco products on the quality of life



EFFECT OF INCREASE OF EXCISE DUTIES ON TOBACCO PR. IN THE QUAL. OF LIFE

		Frequency	Per cent	Valid Per cent	Cum. Per cent
Valid	Very much	73	5.9	18.0	18.0
	Enough	111	9.0	27.4	45.4
	Moderate	104	8.4	25.7	71.1
	A little	82	6.7	20.2	91.4
	Not at all	35	2.8	8.6	100.0
	Total	405	32.8	100.0	
Missing	System	828	67.2		
Total		1,233	100.0		

Figure 3. Effect of increase of excise duties on tobacco products in the reduction of smoking



EFFECT OF INCREASE OF EXCISE DUTIES ON TOBACCO PR. IN THE RED. OF SMOKING

		Frequency	Per cent	Valid Per cent	Cum. Per cent
Valid	Very much	72	5.8	17.8	17.8
	Enough	102	8.3	25.2	43.0
	Moderate	100	8.1	24.7	67.7
	A little	91	7.4	22.5	90.1
	Not at all	40	3.2	9.9	100.0
	Total	405	32.8	100.0	
Missing	System	828	67.2		
Total		1,233	100.0		

APPENDIX 2: Spearman correlations (non-parametric analysis)

Correlations[a]				
			Family income	**Reduction of quality of life due to increase of excise duties on tobacco products**
Spearman's rho	Family income	Correlation Coefficient	1.000	.327**
		Sig. (1-tailed)	.	.000
	Reduction of quality of life due to increase of the excise duties on tobacco products	Correlation Coefficient	.327**	1.000
		Sig. (1-tailed)	.000	
a. Listwise N = 405 **. Correlation is significant at the 0.01 level (1-tailed).				

Correlations[a]				
			Family income	**Reduction of smoking due to increase of excise duties on tobacco products**
Spearman's rho	Family income	Correlation Coefficient	1.000	.286**
		Sig. (1-tailed)	.	.000
	Reduction of smoking due to increase of the excise duties on tobacco products	Correlation Coefficient	.286**	1.000
		Sig. (1-tailed)	.000	.
a. Listwise N = 405 **. Correlation is significant at the 0.01 level (1-tailed).				

Correlations[a]				
			Education	**Reduction of quality of life due to increase of excise duties on tobacco products**
Spearman's rho	Education	Correlation Coefficient	1.000	-.148**
		Sig. (1-tailed)	.	.001
	Reduction of quality of life due to increase of the excise duties on tobacco products	Correlation Coefficient	-.148**	1.000
		Sig. (1-tailed)	.001	.
a. Listwise N = 405 **. Correlation is significant at the 0.01 level (1-tailed).				

Correlations[a]				
			Education	**Reduction of smoking due to increase of excise duties on tobacco products**
Spearman's rho	Education	Correlation Coefficient	1.000	-.187**
		Sig. (1-tailed)	.	.000
	Reduction of smoking due to increase of the excise duties on tobacco products	Correlation Coefficient	-.187**	1,000
		Sig. (1-tailed)	.000	.
a. Listwise N = 405 **. Correlation is significant at the 0.01 level (1-tailed).				

APPENDIX 3: Linear regressions

Regression A

Variables entered/removed[b]			
Model	Variables entered	Variables removed	Method
1	Family income[a]	.	Enter

a. All requested variables entered

b. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Model summary[b]				
Model	R	R Square	Adjusted R square	Std. error of the estimate
1	.320[a]	.102	.100	1.154

a. Predictors Q (Constant), FAMILY INCOME

b. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

ANOVA[b]						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	61.270	1	61.270	46.024	.000[a]
	Residual	536.507	403	1.331		
	Total	597.778	404			

a. Predictors Q (Constant), family income

b. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Coefficients[a]						
Model		Unstandardised coefficients		Standardised coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.924	.133		14.418	.000
	Family income	.203	.030	.320	6.784	.000

a. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Residuals statistics[a]					
	Minimum	Maximum	Mean	Std. deviation	N
Predicted Value	2.13	3.34	2.74	.389	405
Residual	-2.140	2.874	.000	1.152	405
Std. Predicted Value	-1.578	1.547	.000	1.000	405
Std. Residual	-1.855	2.491	.000	.999	405

a. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Regression B

Variables entered/removed[b]			
Model	Variables Entered	Variables removed	Method
1	Family income[a]	.	Enter

a. All requested variables entered

b. Dependent Variable: reduction of smoking due to increase in the excise duties on tobacco products

Model summary[b]				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	.276[a]	.076	.074	1.199

a. Predictors Q (Constant), Family income

b. Dependent Variable: reduction of smoking due to increase in the excise duties on tobacco products

ANOVA[b]						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	47.936	1	47.936	33.355	.000[a]
	Residual	579.175	403	1.437		
	Total	627.111	404			

a. Predictors Q (Constant), family income

b. Dependent Variable: reduction of smoking due to increase in the excise duties on tobacco products

Coefficients[a]						
Model		Unstandardised coefficients		Standardised coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.092	.139		15.092	.000
	Family income	.179	.031	.276	5.775	.000

a. Dependent Variable: reduction of smoking due to increase in the excise duties on tobacco products

Residuals statistics[a]					
	Minimum	Maximum	Mean	Std. deviation	N
Predicted Value	2.27	3.35	2.81	.344	405
Residual	-2.168	2.729	.000	1.197	405
Std. Predicted Value	-1.578	1.547	.000	1.000	405
Std. Residual	-1.809	2.276	.000	.999	405

a. Dependent Variable: reduction of smoking due to increase in the excise duties on tobacco products

Regression C

Variables entered/removed[b]			
Model	Variables entered	Variables removed	Method
1	Education[a]	.	Enter

a. All requested variables entered

b. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Model summary[b]				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	.118[a]	.014	.011	1.209

a. Predictors Q (Constant), education

b. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

ANOVA[b]						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	8.324	1	8.324	5.691	.018[a]
	Residual	589.453	403	1.463		
	Total	597.778	404			

a. Predictors Q (Constant), Education

b. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Coefficients[a]						
Model		Unstandardised coefficients		Standardised coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	3.099	.162		19.172	.000
	Education	-.145	.061	-.118	-2.386	.018

a. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Residuals statistics[a]					
	Minimum	Maximum	Mean	Std. deviation	N
Predicted Value	2.23	2.95	2.74	.144	405
Residual	-1.954	2.625	.000	1.208	405
Std. Predicted Value	-3.560	1.485	.000	1.000	405
Std. Residual	-1.616	2.171	.000	.999	405

a. Dependent Variable: reduction of quality of life due to increase in the excise duties on tobacco products

Regression D

Variables entered/removed[b]			
Model	Variables entered	Variables removed	Method
1	Education[a]	.	Enter

a. All requested variables entered

b. Dependent Variable: reduction of smoking due to increase in the excise duties on tobacco products

Model summary[b]				
Model	R	R Square	Adjusted R square	Std. error of the estimate
1	.122[a]	.015	.012	1.238

a. Predictors Q (Constant), Education

b. Dependent Variable: Reduction of smoking due to increase in the excise duties on tobacco products

ANOVA[b]						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	9.261	1	9.261	6.041	.014[a]
	Residual	617.850	403	1.533		
	Total	627.111	404			

a. Predictors Q (Constant), Education

b. Dependent Variable: Reduction of smoking due to increase in the excise duties on tobacco products

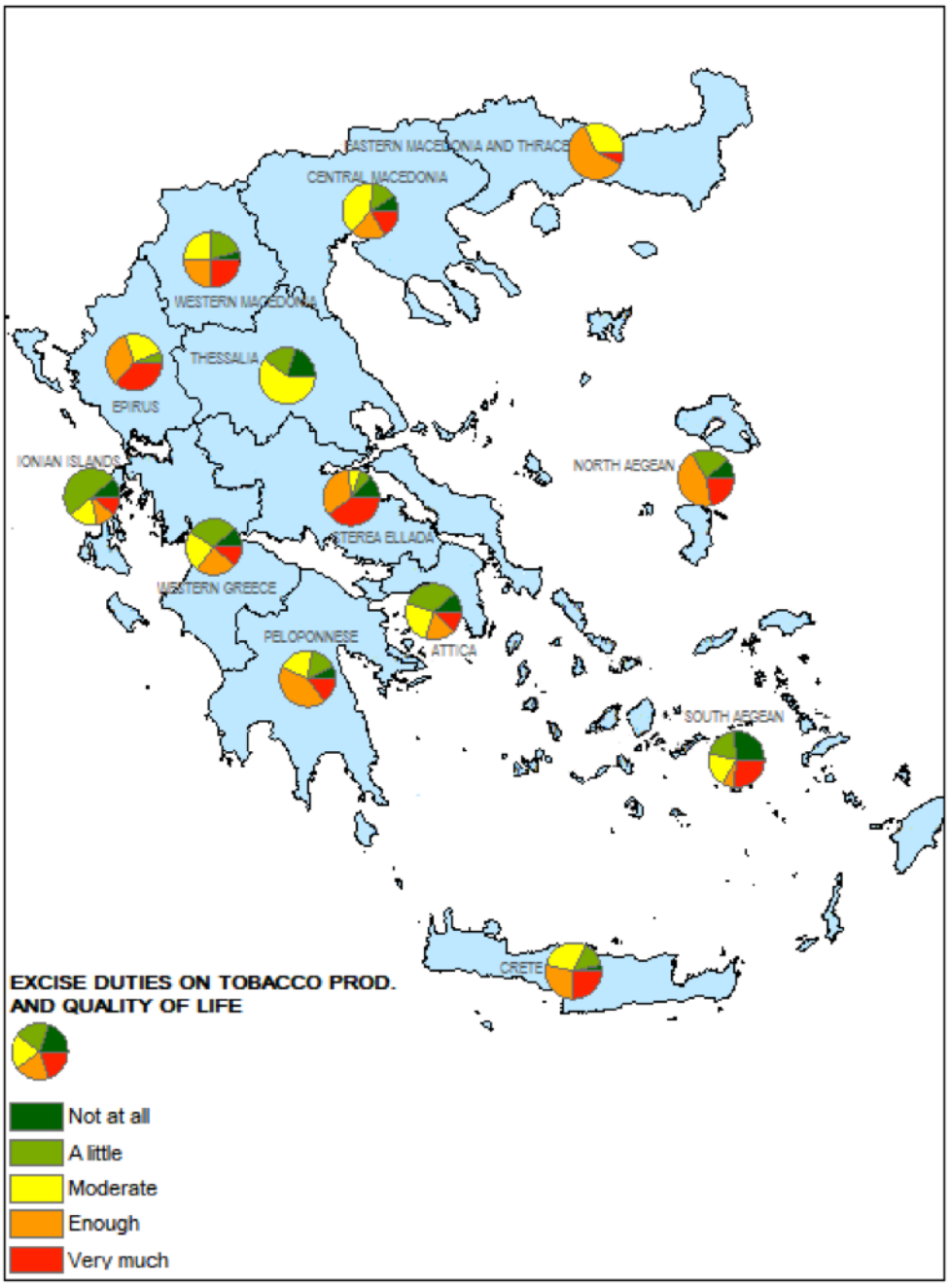
Coefficients[a]						
Model		Unstandardised coefficients		Standardised coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	3.192	.165		19.292	.000
	Education	-.153	.062	-.122	-2.458	.014

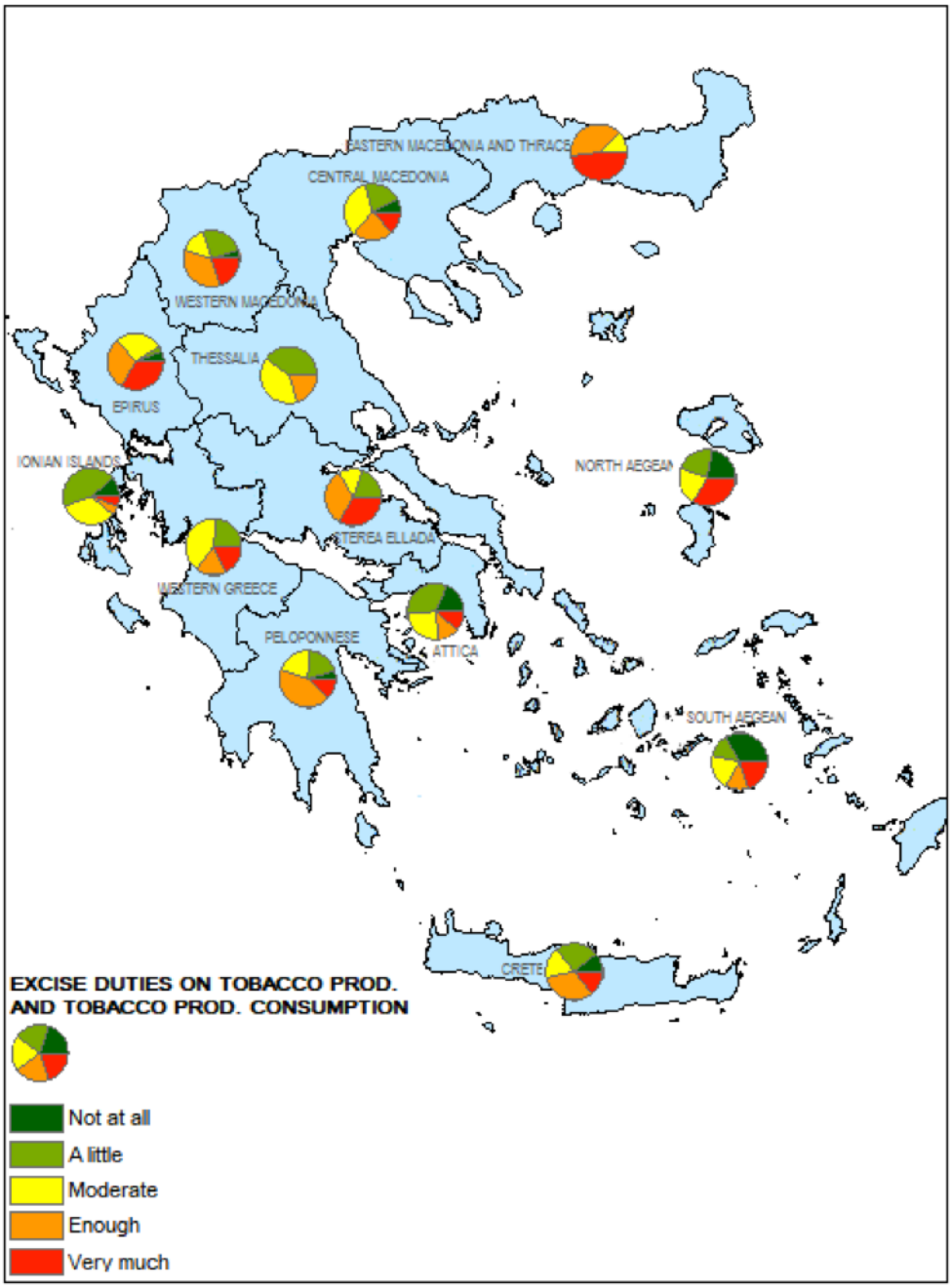
a. Dependent Variable: Reduction of smoking due to increase in the excise duties on tobacco products

Residuals statistics[a]					
	Minimum	Maximum	Mean	Std. deviation	N
Predicted Value	2.28	3.04	2.81	.151	405
Residual	-2.040	2.724	.000	1.237	405
Std. Predicted Value	-3.560	1.485	.000	1.000	405
Std. Residual	-1.647	2.200	.000	.999	405

a. Dependent Variable: Reduction of smoking due to increase in the excise duties on tobacco products

APPENDIX 4: GIS presentation




EASTERN MACEDONIA AND THRACE
CENTRAL MACEDONIA
WESTERN MACEDONIA
THESSALIA
EPIRUS
IONIAN ISLANDS
NORTH AEGEAN
STEREA ELLADA
WESTERN GREECE
PELOPONNESE
ATTICA
SOUTH AEGEAN
CRETE
EXCISE DUTIES ON TOBACCO PROD. AND TOBACCO PROD. CONSUMPTION
Not at all
A little
Moderate
Enough
Very much