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CONTENTS - ΠΕΡΙΕΧΟΜΕΝΑ

N. GEORGIKOPOULOS – M. PINEDO: Illicit Tobacco Trade in Greece: An Evaluation of its Impact on Public Revenues	5
I. TROFIMOV: The Timing of International Trade Policy Reforms: The Role of Agenda-Setting Processes	35
C. FRANGOS – C. FRANGOS – G. POLYCHRONOPOULOS – V. SOTIROPOULOU: Academic Courses' and Teachers' Evaluation by Students Using the Analytic Hierarchy Process Model	61
M. RODOSTHENOUS – S. GOUMAS – I. GASTERATOS: The Adoption of International Financial Reporting Standards (IFRS) and International Standards of Auditing (ISA) is Required to Fight Shadow Economy Repercussions	77

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τὰ ὁποῖα ἐκπροσωποῦν μόνο τὶς ἀπόψεις τῶν συγγραφέων.

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ILLICIT TOBACCO TRADE IN GREECE: AN EVALUATION OF ITS IMPACT ON PUBLIC REVENUES

N. GEORGIKOPOULOS* M. PINEDO**

Abstract

The aim of this paper is to determine the extent of the illicit tobacco trade in Greece that has considerably increased during the period in which the Greek economy faced the peak of its recession (2012). In this paper, the size of illicit tobacco trade has been estimated using the difference between the registered and/or estimated tobacco consumption and the recorded tobacco legal sales. According to the results the estimated Duty Not Paid consumption as a percentage of Factory Manufactured Cigarettes total consumption has increased considerably in recent years, from 10.9% in 2010, to 14.9% in 2011 and 17.2% in 2012. Moreover, the price elasticity of factory manufactured cigarettes in Greece is also calculated, indicating an increase in tobacco price elasticity. Finally, the paper sheds light into tobacco pricing and taxation issues. The findings of the paper have important policy implications for public finances and the domestic economy.

JEL Classification: M21, H26, H21

Keywords: illicit tobacco trade, taxation, price elasticity, public revenues.

1. Introduction

The illicit trade of tobacco products is defined in Article 1 of the WHO FCTC as “any practice or conduct prohibited by law and which relates to production, shipment, receipt, possession, distribution, sale or purchase including any practice or conduct intended to facilitate such activity”. Illicit trade can cover a wide range of activities (APPG, 2013; FATF, 2012; Joossens and Raw, 2012; Allen, 2010; ITIC, 2010; Joossens et al., 2010). Key categories include (a) smuggling that refers to the unlawful movement of tobacco products from one tax jurisdiction to another, without applicable tax being paid, (b) illegal manufacturing that refers to the production of tobacco products contrary to

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the law, and (c) tax evasion that refers to illegal methods of circumventing tobacco taxes and includes the purchase of smuggled and illicitly manufactured tobacco products.

In general, throughout bibliography several elements have been identified as factors that drive illicit trade. Among the most commonly acknowledged factors, there are the price and taxation of legal tobacco products (Passport, 2013; Siggens et al., 2011; ITIC, 2010), the affordability of legal tobacco products (ITIC, 2010), the price of illegal tobacco products (APPG, 2013), the price differentials (Passport, 2013; Daudelin et al., 2013; Joossens and Raw, 1998). Moreover, factors related to the cost from the illicit nature of the activity (Daudelin et al., 2013, Joossens et al., 2010) and the ease with which products can be smuggled into the target country (Passport, 2013; APPG, 2013; Joossens et al., 2010) are also reported as significant drivers of illicit tobacco trade, along with the consumer attitudes towards illicit product (Passport, 2013; Siggens et al., 2011; ITIC, 2010).

The impact of illicit tobacco trade on both the economy and on society is substantial. Apart from the lost government revenue (FATF, 2012; ITIC, 2010; Joossens and Raw, 2012; Joossens et al., 2010; Joossens and Raw, 2008; Joossens and Raw, 1998) and the financial loss of the legitimate industry and trade (FATF, 2012; ITIC, 2010), illicit tobacco trade promotes organized crime (FATF, 2012; ITIC, 2010) and constitutes a threat for public health (FATF, 2012; ITIC, 2010; Joossens et al., 2010; Joossens and Raw, 1998) also providing increased youth access to tobacco products (FATF, 2012)

Measuring illicit trade is definitely challenging for a variety of reasons. By its nature, every illicit activity is hard to measure and quantify since it is not officially recorded. Moreover, law enforcement agencies often prefer not to publicize their activities for security reasons. In addition, data sources may bias the estimate. In this paper, the size of illicit tobacco trade has been estimated using the difference between the registered and/or estimated tobacco consumption and the recorded tobacco legal sales. According to the results illicit tobacco trade witnessed a considerable increase during the last years. Moreover, the paper sheds light into tobacco pricing and taxation issues. Finally, this paper's objective is also to estimate the price elasticity of cigarette consumption in Greece. The empirical results indicate an increase in tobacco price elasticity. The findings of the paper have important policy implications for public finances and the domestic economy, since most of the relevant literature does not take into consideration the extent of illicit tobacco trade in their policy recommendations.

The rest of the paper is structured as follows: Section 2 provides a literature

review on the measurement of illicit tobacco trade and Factory Manufactured Cigarettes (FMC) price elasticity, Section 3 presents the employed dataset and methodology, Section 4 provides empirical evidence on the illicit tobacco trade and the price elasticity of cigarettes in Greece, Section 5 briefly presents some pricing and taxation issues and their impact on tobacco illicit trade and government revenues based on the empirical findings, and finally Section 6 concludes and provides policy recommendations.

2. Literature review on the measurement of illicit tobacco trade and FMC price elasticity

2.1 Different approaches to measure illicit tobacco trade

There is no universally-recognized methodology to estimate the size of illicit trade. Different approaches have been adopted in accordance with the available data, budget restrictions, and other parameters (ITIC, 2010). It should be noted that most research papers and reports dated before 2000 use the difference between legal exports and legal imports in order to calculate the size of illicit trade (Joossens and Raw, 1995; 1998). The primary reasons for adopting this approach are the availability of data and the assumption that illicit trade is limited to large-scale smuggling of well-known brands. During the past ten years, it became evident that the difference between exports and imports is not comprehensive enough to capture the extent of illicit tobacco trade.

Researchers argue that illicit trade has changed significantly over the last decade and includes small-scale smuggling and illicit manufacturing (Joossens et al., 2010). In recent research the most commonly used methods are Empty Pack Surveys (EPS), consumer surveys, and household surveys. The results from the aforementioned methods are usually coupled with data (e.g., seizure data, international trade data, etc.) received from relevant authorities (FATF, 2012) such as customs services, Financial Intelligence Units/Centers, relevant law enforcement units, and taxation authorities (FATF, 2012). All methods to estimate illicit trade have their limitations. In addition, data sources may bias the estimates. Joossens and Raw (2012) suggest that a combination of methods (including informed expert judgment) and sources, when possible, is often necessary to cross-validate estimates.

Ahermaa (2005) calculated the size of the illegal cigarette market in Estonia through sampling and surveys, comparing the net of estimations. This method determines the share of illegal cigarettes in general consumption by

gathering expert estimations from inhabitants and institutions (in this case, only inhabitants were used) and inhabitants' individual estimations. In inhabitants' individual estimations, people evaluate their own consumption of illegal cigarettes and in inhabitants' expert estimations, people evaluate the general consumption of illegal cigarettes.

Moreover, von Lampe (2006) aimed at providing a comprehensive assessment of the cigarette black market in Germany and the UK within the framework of the study of organized crime. The particular approach upon which this paper was based was a systematic, cross-national review of open sources, including media reports and government documents. The findings revealed that substantial regional variations in black market prevalence exist within each country.

Joossens et al. (2009) estimated the illicit market share in 84 countries based on academic articles, official government publications, estimates from market research companies, tobacco trade journal articles, newspaper articles, and estimates from personal contacts in customs organizations. The authors limited their calculations to estimates that seemed reasonable as far as the country's population, smoking prevalence, and legal infrastructure are concerned. They used a combination of methods, including informed expert judgment, to cross-validate estimates and select the best available country estimates of illicit market share. They concluded that 11.6% of global cigarette market was illicit in or around 2007.

KPMG (2012) developed a model in order to calculate illicit tobacco trade in EU-27 Member States. They used several sources such as Empty Pack Surveys (EPS), legal domestic sales, consumer interviews, and expert interviews. They calculated overall consumption level using legal domestic sales and EPS. The results were refined taking into account outflows of product from each market (cigarettes sold in one country but consumed in another). In the next step they deducted legal non-domestic purchases from total non-domestic volume to calculate the illicit purchase volume. Legal flows were determined using primary research (consumers' interviews) to quantify how many cigarettes travelers purchased while abroad. They used seizure data and experts' interviews to further refine their results. KPMG created the EU Flows Model, a dynamic, iterative model that is principally based on legal domestic sales, Empty Pack Survey results, and consumer research and is used to calculate the volume of non-domestic inflows and outflows to and from each EU Member State and to quantify the non-domestic (legal) and counterfeit and contraband cigarettes consumed in each country and the EU as a whole. The report showed that the eight largest markets accounted for 75.5% of total EU legal cigarette

sales in 2011. EU legal domestic sales decreased 3.2% in 2011, a fall of over 100 billion cigarettes since 2007. Legal sales of Other Tobacco Products (OTP) in the EU increased 6.5% in 2011, the fourth consecutive year of sales growth. Total counterfeit and contraband (C&C) volumes increased to 65.3 billion cigarettes in 2011.

The North of England Tackling Illicit Tobacco for Better Health programme commissioned NEMS market research to carry out a study across the North-east and Northwest regions in England (Siggins et al., 2011) in order to measure illicit trade and enhance their understanding. A total of 4,111 interviews were conducted across the regions and a minimum sample of 111 interviews was achieved in each of the 36 local authority trading standards areas that make up the two regions. The authors used a mix of both telephone and street interviewing. The final data was weighted in order to be representative of the population in terms of gender, age population, and smoking prevalence. It was found that the proportion of smokers buying illicit tobacco had reduced over the last two years by 2 percentage points to 18% with the highest reduction being among the 16-34 year age group (5-6 percentage points). Young smokers (14-24 years) were more likely to purchase illicit tobacco. Awareness of illicit tobacco among non-smokers had increased by 15 percentage points to 69% in 2011. The research also indicated that price differential is still a key driver to purchase illicit tobacco, however this in conjunction with availability / opportunity to buy, attitudes towards illicit tobacco, and perceived product quality was revealed as a complex relationship of drivers for the purchase of illicit tobacco.

For UK (HM Revenue & Customs, 2012), the illicit trade was estimated by subtracting the legitimate consumption from the total consumption. The total consumption was calculated using estimates of prevalence from the General Lifestyle Survey (GLF) and the Health Survey for England (HSE), estimates of cigarette consumption per smoker from GLF and HSE, estimates of the adult population from the Office of National Statistics (ONS), and an uplift factor to account for under-reporting. Estimates of legitimate consumption had two elements: UK duty-paid consumption (estimates are taken from returns to HMRC on the volumes of cigarettes on which duty have been paid) and cross border and duty-free shopping (based on figures provided by the IPS). The illicit market share for cigarettes was estimated to be 9% (the upper estimate is 16% and the lower estimate 2%) in 2010-2011, with associated revenue losses of £1.2 billion. The illicit market share for hand-rolled tobacco (HRT) was estimated to be 38% (the upper estimate is 44% and the lower estimate 33%) in 2010-2011, with associated revenue losses of £660 million.

There is some evidence that the availability of duty-free sales of tobacco products has facilitated illicit trade in tobacco products in many countries. The evidence includes government statements, internal tobacco industry documents, and other reports on the issue (British American Tobacco, 2009; Collin et al., 2004; WHO, 2009; Canadian Cancer Society, 2010). Cigarettes marked for duty-free sales may end up as contraband, often diverted into illegal distribution channels prior to even reaching duty-free stores¹.

A study by Joossens et al. (2012) examined the level and nature of illicit cigarettes and hand-rolled tobacco in 18 European countries using a face-to-face cross-sectional survey on smoking. For each country, around 1000 subjects representative of the population aged 15 and over were enrolled. Cigarette smokers were asked to show their latest purchased pack of cigarettes or hand-rolled tobacco. A comprehensive measure called an Identification of an Illicit Pack (IIP) was used to study the extent of illicit trade, defining a pack as illicit if it had at least one of the following tax evasion indicators: (1) it was bought from illicit sources, as reported by smokers, (2) it had an inappropriate tax stamp, (3) it had an inappropriate health warning, or (4) its price was substantially below the known price in their market. Overall, the proportion of illicit packs was found to be 6.5%. The highest prevalence of IIP was observed in Latvia (37.8%). Illicit packs were more frequently among less-educated smokers and among those living in a country that shared a land or sea border with Ukraine, Russia, Moldova, or Belarus. No significant association was found with the price of cigarettes. This study indicated that IIP was less than 7% in Europe and suggested that the supply of illicit tobacco, rather than its price, is a key factor contributing to tax evasion.

The use of econometric methodology for estimation purposes is employed either in studies of the US economy or in multi-country or worldwide studies. The lack of single-country econometric applications for the measurement of smuggling for countries other than the US is explained by two main reasons. Constructing a demand curve for tobacco (through which tobacco smuggling for an individual country/region can be thereafter inferred from data on prices, sales, incomes, and other variables for this country/region), requires regression analysis on a sample of countries/regions with different degrees of tobacco smuggling (including countries/regions where smuggling is close to zero). The second reason relates to the data requirements of econometric applications. In multi-country studies and studies of the US, it is possible to assemble an adequate number of observations necessary for regression analysis. More particularly, both in the case of multi-country settings and in the case of the US – a country with 48 contiguous states exhibiting significant variations in tobacco

pricing and therefore in smuggling activity— observations can be obtained for both the dependent and the independent variables.

The basic econometric methodology of large-scale cigarette smuggling includes multivariate regression models. Merriman et al. (2000) gathered estimates of the share of smuggled cigarettes in specific countries published by Market Tracking International in its serial publication titled *World Tobacco File*. Transparency International's index was also used as a measure of the ease with which illegal cigarettes could be imported and distributed. Market file was the source for data on the total value of sales in local currency. Estimates from more than 30 countries were gathered, and supplemented with expert estimates on a number of European countries for a total of more than 40 countries. Regressions on experts' estimates of smuggling around the world were applied with 1995 price per pack in US dollars, transparency index and 1995 GDP per capita as independent variables. Price and GDP per capita were found to have counterintuitive negative signs, suggesting that smuggling falls as price and income increase. The transparency index had the expected negative sign—the less corrupt the government is, the less cigarette smuggling is perceived by experts to occur.

2.2 Literature review on the FMC price elasticity

Demand for cigarettes and tobacco products has been widely investigated in many countries since it affects public policy effectiveness regarding government (tax) revenues as well as public health. The effectiveness of the different policy instruments that are employed depends on the cigarette demand structure.

As expected, previous literature has documented cigarette demand to be a negative function of price and a positive function of income. However, the magnitude of the relative elasticities is of particular importance for the policymakers.

Baltagi and Levin (1992) estimated a dynamic cigarette demand model using panel data from 46 American states for the period 1963-1988. The authors identified a significant but inelastic price effect as well as a (small) significant income effect. Moreover, a significant habit persistence effect and a small but significant border purchasing effect are documented. The documented habit/addiction effect may result in different elasticities over time. Gallet and List (2003), conducting a meta-analysis of 86 studies, confirmed the fact that price elasticity as well as income elasticity tend to be smaller in the short-run than in the long-run.

Moreover, Tansel (1993) examined the cigarette demand characteristics in Turkey for the period 1960-1988, taking also into consideration the effect of health warnings and public education. The author, following the traditional approach to the demand function specification, expressed the quantity of cigarettes consumed as a function of the cigarettes real price and the real disposable income. Furthermore, the author included a series of dummy variables to capture the health warning effect as well as education variables. According to the results, as expected, demand is a negative function of price and a positive function of real disposable income, being both price and income inelastic. The author clearly states that even if a tax increase could reduce consumption it is important to identify how much tax rates could increase without encouraging smuggling. It is also obvious that the effectiveness of cigarette taxation depends on the reliable estimates of the price elasticity and its stability (Laughunn and Lyon, 1971). Additionally, health warnings as well as educational attainments had a statistically significant negative effect on demand, indicating that this approach might be more effective in order to reduce consumption than raising cigarette prices.

A study conducted by Gallus et al. (2006) tried to shed some light into the price and cigarette consumption conducting a cross sectional analysis for 52 countries of the European region in 2000. An interesting finding of the study indicated that the price elasticities for local and for foreign brands were -0.46 and -0.74 respectively, also controlling for male to female smoking prevalence ratio, with a stronger effect on consumption in richer countries. However, the results refer only to 2000 and the estimations should be repeated for the period that covers the global financial crisis as well as the Eurozone debt crisis to come up with useful conclusions regarding the effectiveness of the tax policies.

According to Chaloupka and Warner (2000) the price elasticity estimates for overall cigarette demand in most empirical studies fall in the range from -0.3 to -0.5. IARC (2011) also reports a range of estimates of -0.25 to -0.50 from the USA and other high-income countries. It has to be mentioned though that the demand specification as well as the employed method, dataset and period under examination may significantly affect the reported elasticities. Moreover, smokers' reaction to price increases is clearly dependent on business cycles and their overall health awareness (Boshoff, 2007).

An important factor that has been underestimated or even neglected in the estimation of cigarette demand is the level of illicit tobacco trade, since official tobacco sales are usually employed as a proxy for consumption. In a recent study, Boshoff (2008) clearly states the problem of biased elasticity estimations due to illicit tobacco trade that serves as an alternative during periods of rising

prices. According to Boshoff (2007), even though price elasticity has increased in South Africa over the recent years of the study, there is an upward bias in the estimations due to the lack of illicit trade data.

Stavrinos (1987) examined cigarette demand in Greece using data from 1960 to 1982. The empirical results indicated the fact that a 10% increase in the price would reduce consumption only by 1% in the short-run and by 1.4% in the long-run. In fact, according to the results, the anti-smoking campaign proved to be more effective in reducing cigarette consumption. Hondroyianis and Papapetrou (1997) estimated higher price elasticities for the period 1960-1990 at the level of -0.33 in the short run and -0.6 in the long-run, while the income elasticity was estimated at 0.35 and 0.54 respectively. In the same spirit with Stavrinos (1987), health warnings were more effective in reducing cigarette consumption. Nikolaou and Velentzas (2001) studied the Greek cigarette price and income elasticity from 1960 to 1995. The authors have identified relatively low price and income elasticities in the short run (-0.24 and 0.19 respectively), which are definitely larger in the long run (-0.48 and 0.40 respectively). The small effect of income on cigarette consumption indicates that as income increases smokers tend to prefer more expensive brands. Dritsakis (2003) has also investigated cigarette consumption in Greece from 1960 to 2000 employing the net disposable income (per capita), the cigarette price index and expenditures for education (per capita). The results also confirm the negative relationship among cigarette consumption and cigarette price index and expenditures for education, as well as the positive relationship between cigarettes consumption and net disposable income. The empirical results indicate that expenditures for education are more effective than raising prices in order to reduce cigarette consumption.

However, the economic conditions have dramatically changed since these studies and the empirical results cannot be considered to be representative of the current economic conditions in Greece. The prolonged economic recession accompanied by severe austerity measures and a dramatic decrease in the disposable income have also affected cigarette price elasticity. Taking also into consideration the extent of illicit trade in recent years, price and income elasticities should be seriously reconsidered in order to come up with effective policies.

Recently, Alpert et al. (2013) examined the public health and economic benefits of cigarette taxation in Greece based on the cigarette price elasticity derived from previous studies at the level of -0.4. The authors conclude that the increase in cigarette excise tax in 2011 created €558 mil. new tax revenue and a 16% yearly decrease in cigarette consumption (per capita). Moreover, they

support that an additional price increase would produce additional tax revenue. However, the tax increase in November 2012 did not confirm this hypothesis, clearly showing the need to re-estimate price and income elasticities taking into consideration recent data that account for the prolonged recession and the reduced disposable income as well as the sharp increase of illicit tobacco trade.

In conclusion, it is very important for policymakers to understand the structure and the dynamic of the demand relationship, since taxation is closely tied to the price elasticity of demand.

3. Data and methodology

By its very nature, illicit trade is difficult to estimate. There are no official data and the researcher has to resort to different approximation methods in order to provide estimates on its size and evolution. Illicit tobacco trade (referring only to FMC) has been approximated in this study by use of the most recent data released by ELSTAT and the Ministry of Finance. The method used in order to estimate the size of illicit tobacco trade was to calculate the difference between the registered and/or estimated tobacco consumption and the recorded tobacco legal sales.

The consumption data were provided by ELSTAT's National Accounts, refer only to FMC and are expressed in Euros (as stated by ELSTAT officials). In order to convert consumption in sticks we used the price per stick provided by the Household Budget Surveys (HBS) conducted by ELSTAT. Since data for FMC consumption for 2012 have not yet been released, we have estimated the 2012 consumption based on total household consumption provided by ELSTAT and the Bank of Greece for 2012 and the average share of FMC consumption on total consumption of the previous four years (years of economic crisis).

The sales data were calculated based on monthly taxed quantities released for consumption, provided by the Ministry of Finance. The sales data are expressed in sticks but have one major disadvantage: they refer to taxed quantities and not to actual sales from the POS (points of sale). This means that in certain months, when a tax increase was expected, larger than usual quantities were taxed, as pointed out by Tobacco Experts and European Commission reports². This trend was evident and affected the yearly data in December 2009 and December 2011. In order to avoid these discrepancies we estimated the sales for December 2009 and December 2011 using the average of the previous three months, while the remaining quantity (taxed quantity-estimated sales) was added to the next year. Moreover, this paper's objective is to estimate

the price elasticity of cigarette consumption in Greece. For this purpose we estimate a demand model for the consumption of duty-paid cigarettes using monthly time-series data for the period 01/2007 to 9/2013. The dependent variable of the model is measured as the number of cigarette sticks removed from tax warehouses each month and is provided by the Ministry of Finance. We recognize that discrepancies might exist between the volume of cigarettes removed from tax warehouses and real consumption of duty-paid cigarettes due to delays and stocks on supply chain channels. Moreover, releases for consumption are artificially high in certain months as compared to normal patterns due to forestalling i.e. tobacco companies tend to remove increased amount of cigarettes sticks from tax warehouses immediately prior to an expected tax increase³. These cigarettes are not expected to be consumed only on the specific month but also on subsequent months. We attempt to adjust the time series of cigarette consumption for this discrepancy. More specifically, on December 2009, April 2010 and December 2011 when a tax increase was expected we replace the increased volume of cigarette consumption with the average of the last three months and we add the difference between the original and the adjusted volume on the subsequent months.

Demand theory suggests that cigarette consumption is influenced by a number of factors including cigarette price, disposable income, marketing expenses, anti-smoking policy, magnitude of addiction, price of substitutes (e.g. illicit) etc. Due to lack of available data for the specific period and frequency we only include in our model as explanatory variable cigarette price as measured by the Consumer Price Index for tobacco products from Hellenic Statistical Authority (ELSTAT). The demand equation to be estimated is the following:

$$\ln(\text{Cons}_t) = a + b \ln(\text{Price}_t) + c \ln(\text{Cons}_{t-1}) + u_t \quad (1)$$

where

Cons_t is the consumption of duty-paid cigarettes in sticks at month t ,
 Price_t is the Consumer Price Index of tobacco products at month t ,
 \ln is the natural logarithm and u_t is the residual term.

By including the first lag of cigarette consumption we estimate a demand model with partial adjustment in order to account for the habit forming nature of smoking. The speed of adjustment is measured by the coefficient $d=(1-c)$. Equation (1) is derived from the following partial adjustment model:

$$\ln(\text{Cons}_t) - \ln(\text{Cons}_{t-1}) = d (\ln(\text{Cons}_t^*) - \ln(\text{Cons}_{t-1})) \quad (2)$$

where Cons_t^* is the desired or long-run demand for cigarettes.

and the long-run demand equation:

$$\ln(\text{Cons}_t^*) = a/d + (b/d) \ln(P_t) + u_t \quad (3)$$

Coefficient b measures short-run price elasticity while b/d measures the long-run price elasticity. A double log specification is used.

4. Empirical results

According to the employed approach, the size of illicit tobacco trade can be estimated using the difference between the registered and/or estimated tobacco consumption and the recorded tobacco legal sales. Table 1 presents the estimation of FMC consumption. The illicit tobacco trade estimation for Greece is presented in Table 2. As observed from the results, the Duty Not Paid (DNP) incidence in Greece as estimated using government provided data is significant and increasing, reaching 17.2% in 2012.

Table 1: Estimating consumption in mn sticks

	Total household consumption mn € (domestic approach)	FMC consumption in mn €	Price per stick	FMC consumption in sticks
2010	166,895.1	4,596.2	0.156	29,432.9
2011	160,039.9	4,595.8	0.163	28,180.3
2012	147,902.9*	4,257.3**	0.166	25,641.4

* estimated from ELSTAT'S National Accounts and data from Bank of Greece

** estimate based on total consumption provided by ELSTAT for 2012 and the average percentage of FMC consumption of the previous three years

Table 2: Estimating DNP in mn sticks and as a percentage of total consumption

	Consumption in mn sticks	Sales in mn sticks	DNP in mn sticks	% DNP
2010	29,432.9	26,243.0	3,189.9	10.8%
2011	28,180.3	23,970.4	4,209.9	14.9%
2012	25,434.0	21,058.8	4,375.1	17.2%

Furthermore, we estimate the price elasticity of duty-paid cigarette consumption in Greece. Given that tax revenues have been in decline since 2011 we expect the elasticity of DP tobacco to be more than 1 (in absolute value), that is, elastic. It is true that tobacco in general is inelastic. However, in our model we estimate the *duty-paid* tobacco price elasticity. This makes a big difference: On one hand we have the continuous decrease in disposal income which makes consumers more and more sensitive (i.e.: elastic) in DP tobacco price changes and, on the other hand, we have a very close substitute for DP tobacco: the DNP (i.e.: illicit) tobacco.

Economic theory predicts that when these two factors (strong income effects from decreasing disposal income and, strong substitution effects from a very close substitute such as the illicit tobacco) work in combination, then elasticity is expected to be very high (in absolute value). The question is: how much do we expect elasticity to be? The fact that government revenues decreased since 2011, shows that the elasticity must be above a certain value. What is this value?

Well, when elasticity is 1 a 10% increase in price drives DP consumption down by 10%, so industry revenues will not increase. How about a 10% increase in taxes? What will the effect to government revenues be? For illustration reasons only, if we take the weighted average retail price (WAP) of cigarettes in Greece for 2012 (€3.28) taxes are 87.45% of this price, that is, €2.87. A 10% increase of this value (€0.287), assuming the industry will entirely pass it to the consumers, makes 8.75% (€0.287/€3.28) increase of the average retail price. This increase is basically the product of the 10% increase of taxes times the proportion of taxes on the retail price (87.45%). We see that a 10% increase in taxes translates to an 8.75% increase in price which will cause (recall, elasticity is 1) an 8.75% decrease of DP consumption, so government

revenue will still increase by the difference between the 10% tax increase and the 8.75% DP consumption decrease.

The threshold value of elasticity above which government revenues will decrease is provided by the formula $e=1/t$ where t is the percentage of tax on retail price. In our case $t=87.45\%$ or 0.8745 and the threshold value of elasticity is $1/0.8745=1.144$. So, if government revenues are in decline given that tax makes 87.45% of the average retail price we should expect an elasticity value of at least 1.144, in absolute terms.

We now estimate the demand function in order to measure the price elasticity of duty-paid cigarette consumption. The coefficients of the regression have been estimated using the method of ordinary least squares. The estimated coefficients and p-values (in parenthesis) are as follows:

$$\ln(\text{Cons}(t)) = 13.8834 - 0.8854 \ln(\text{Price}(t)) + 0.3337 \ln(\text{Cons}(t-1)) + u_t$$

(0.0000) (0.0002) (0.0024)

All coefficients have the appropriate sign and are statistically significant at the 1% level of confidence. The short-run price elasticity is equal to -0.8854 and reveals a relatively elastic cigarette demand. The long run elasticity is equal to -1.3288 which is pretty elastic for tobacco and above the threshold value of 1.144 as expected. This demonstrates clearly and corroborates the fact that, indeed, government revenues are in decline since 2011 as it is shown by the ministry data. The adjustment coefficient is equal to 0.6653 and indicates that 66.53 percent of the adjustment in a price increase takes place during the current month. The coefficient of determination (R squared) is equal to 44.6% indicating that 44.6% of the variability in duty-paid cigarette consumption is explained by changes in the explanatory variables of the model. The null hypothesis of a non statistically significant model i.e. all coefficients equal to zero is rejected at the 5% and 1% significance level. Moreover, the null hypotheses of no serial autocorrelation and homoscedasticity in the residuals are not rejected at the 5% and 10% significance levels based on the Breusch-Godfrey and ARCH LM test, respectively.

The lack of available data on monthly total cigarette consumption (including illicit) and monthly income does not enable us to estimate empirically income elasticity and the effect of price changes on illicit cigarette consumption. However, based on the empirical price elasticity estimate for duty-paid cigarette consumption a number of important conclusions are drawn on the following section.

The results of the above described demand model may seem unexpected

compared to older studies for other countries which usually show a lower price-elasticity for tobacco. However, some recent studies which take into consideration the impact of the last global financial crisis which signified a dramatic shift in tobacco price elasticity of demand demonstrate similar results. For example, a study by Citigroup⁴ for the USA revealed a price elasticity of -0.8 not far from our result. The World Health Organization (WHO) (2012) cites a study in Turkey conducted with 2003 data (prior to the global financial crisis) by Onder and Yurekli (2007) showed an average price elasticity of -0.87. Specifically, the elasticity was between -1.1 (for the poorest part of the population) and -0.77 (for the upper middle class). Interestingly, for the richest part elasticity was -0.82, higher than the upper middle class.

These elasticities show a dramatic shift compared to older studies which, as mentioned earlier, show tobacco price elasticity between -0.25 and -0.50 for the high income countries and -0.50 and -1 for the low income countries. Another interesting study by Kostova et al (2010) focuses specifically on youth smoking incidence in developing countries. The price elasticity for youth population is revealing: -1.8! Comparing this elasticity to the elasticity of youth population in the US (depending on the study it varies from -0.7 to -1.44) they argue that low income makes people in developing countries more sensitive (i.e. more elastic) in price changes.

Coming back to our case, Greece, under the current circumstances of deep economic recession these results are in accordance with economic theory and very much in accordance with what we expected. Specifically, the dramatic decrease of disposable income adds a strong income effect on the values of elasticity. Moreover, the increasing gap between the prices of DP tobacco vs. DNP tobacco offers consumers a very close and much cheaper substitute putting thus a strong substitution effect on the elasticity of DP tobacco.

5. Pricing and taxation issues and their role in tobacco illicit trade and government revenues

The price of FMC has increased significantly in Greece during the last five years although disposable income has decreased due to the economic crisis, making cigarettes less affordable and suppressing legal consumption. On the other hand, as discussed in the previous chapter, illicit trade has increased dramatically. The following table presents the weighted average price (WAP), the minimum retail price (MIN PRICE) and the most popular price category (MPPC) during the last five years. Note, that the 2013 calculations were based on data until the end of September 2013. In order to calculate the minimum

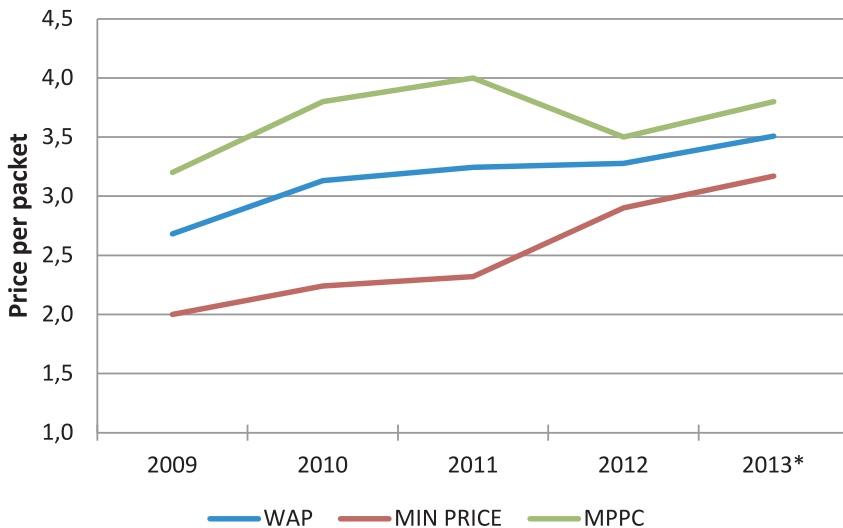
price each year only price options that had a market share (quantity sold from the specific price category / total quantity sold) greater or equal to 0.5% were taken under consideration. The data were provided by the ministry of Finance. Prices were calculated based on a 20-stick packet.

It should be highlighted that while the most popular price category increased by 19% since 2009, the weighted average price increased by 31% and the minimum retail price increased by 59%. The following graphs illustrate the price evolution and the y-o-y percentage change of the prices.

The second step in order to examine in more detail the price evolution of FMC during the last five years was to group all available price categories of cigarettes into two price categories, low-price cigarettes and high-price cigarettes based on the WAP of each year. This means that for each year a different threshold value is taken into account, as low-price cigarettes are characterized as those that their price is less than the year's WAP and high-price cigarettes are characterized as those that their price is greater or equal than the year's WAP.

It should be highlighted that in 2009 high-price cigarettes were on average

Figure 1: Price evolution of a 20-stick packet



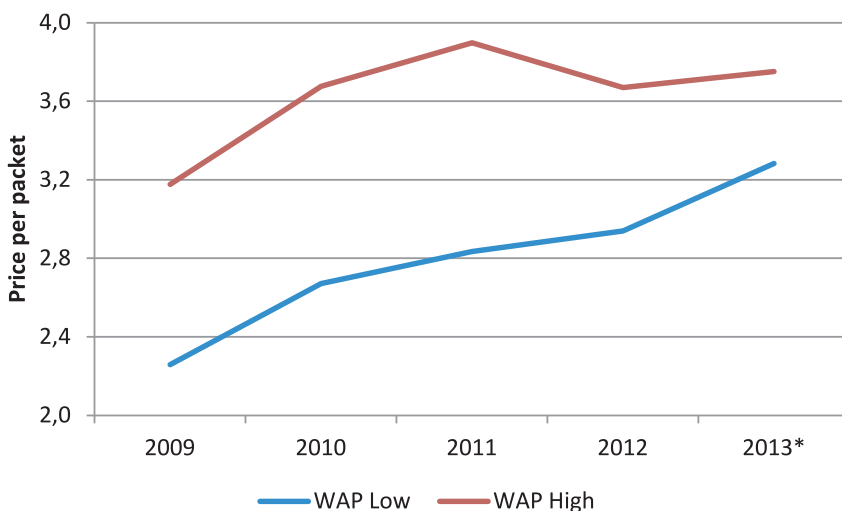
* calculations for year 2013 were based on data up until 30/09/2013.

40.7% more expensive than the low-price cigarettes while in 2013 high-price cigarettes were on average 14.3% more expensive than the low-price cigarettes. The WAP of low-price cigarettes increased by 45.3% from 2009 to 2013, while the WAP of the high-price cigarettes increased by 18.1% during the same period. The tremendous increase in the price of low-price cigarettes, coupled with the decrease of disposable income in Greece during the last years has, made cigarettes much less affordable especially for the low-income consumers and has given them an incentive to turn to illicit cigarettes.

Taking a look at the yearly change of the WAP of low and high price cigarettes it is evident that while in 2010 and 2011 both increased almost at the same pace, in 2012 the WAP of high-price FMC decreased and the WAP of low-price FMC continued to increase. Moreover in 2013 the WAO of the low-price FMC increased significantly by 11.7% while the WAP of the high-price FMC increased only by 2.2%. These differences in the rate of change of the WAP of the two pricing categories could be attributed to the change of structure of taxes that took place in November 2012.

More precisely in November 2012 an important change in the structure

Figure 2: The weighted average price of low-price and high-price cigarettes



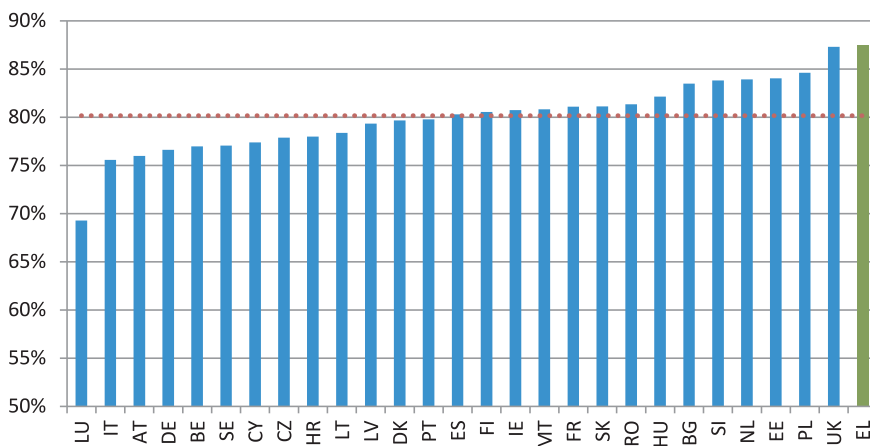
* calculations for year 2013 were based on data up until 30/09/2013.

of excise taxes came to effect. The specific excise tax per 1000 cigarettes increased by 300%, the MCE per 1000 cigarettes increased by 8.5% while the ad valorem excise decreased by 61.9%. This change, as it became evident from the above analysis, resulted in a significant increase in the price of low-price cigarettes and a decrease of the gap between the low and high priced cigarettes.

Greece is among the EU-27 countries with the highest specific excise. On the other hand Greece has one of the lowest Ad Valorem excises. In general, Greece exhibits the highest total tax among the EU-28 countries, as illustrated in Figure 3.

While the tax rate and tax revenues are often thought to have a positive relationship, with a higher rate of taxation generating more tax revenue, economic theory and actual practice do not always support this perception. The Laffer curve, a well-established theoretical construct of the relationship between the tax rate and the corresponding revenue, suggests that, as taxes rise from low levels, the tax revenue collected by the government also increases. When the tax rate reaches a critical point (T^*) any further rise in taxation will actually reduce revenue. In the case of a tax on consumption, the reasons for such a reduction in revenue may be, first, that a high rate of taxation discourages consumption (the disincentive effect of higher taxation) and second, that it urges consumers to avoid paying taxes by switching to the shadow economy.

Figure 3: Total tax (including VAT) as % of WAP



Source: European Commission, Directorate General, Taxation and Customs Union, July 2013

In the case of tobacco taxation in Greece, taxes have increased five times from year 2010 onwards, and therefore a simple graphical representation of the evolution of tax revenues over this period can help to identify which region of the Laffer curve Greece has been moving along following these increases. In Figure 4, tobacco tax revenue developments (other than VAT) are illustrated in the form of their 12-month moving average, a transformation that helps to smooth out the significant seasonal variations these revenues exhibit, hence recognizing more easily the underlying trend. Figure 4.10, depicts annual tobacco tax revenues (other than VAT) for the period 2009-2012 and the corresponding revenues during the period from January to October, together with the relevant budget target for the whole year 2013. As evident from these figures, the final tax increase imposed in November 2012 has clearly placed tobacco tax revenues on the declining revenue region of the Laffer curve, inducing a fall, rather than a rise in tax revenues. Indeed, in 2012 government tobacco excise tax revenues decreased 11% relatively to 2011, with a further reduction in revenues expected for 2013 as a whole.

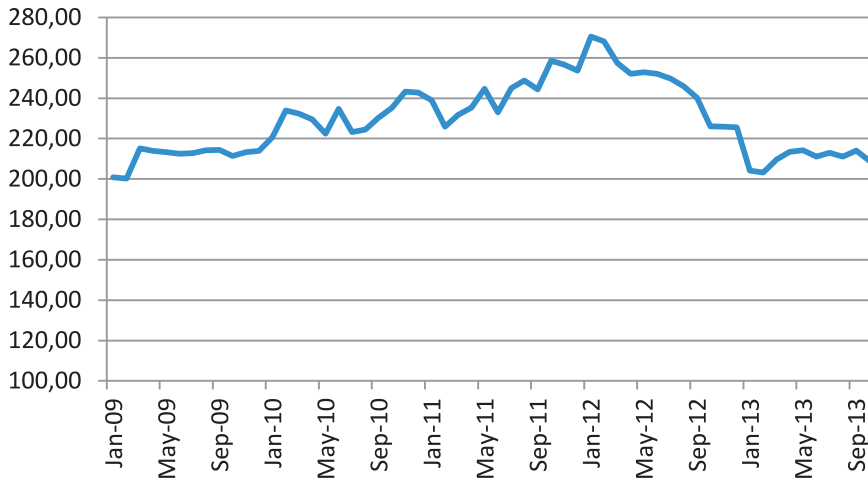
The sharp reduction in tax revenues following the latest tobacco taxation shock in Greece raises the question as to why this shock has placed Greece on the declining revenue region of the Laffer curve. In attempting to answer this question, one needs to examine the current size of tax rates in Greece compared to other countries, since on the basis of the Laffer curve excessive taxation is counterproductive in terms of generating tax revenues.

On the basis of the above, it appears plausible that the sheer height of the tax rate on cigarettes in Greece has exceeded the critical point T^* on the Laffer curve. Consumers of tobacco products are driven out of the duty paid market, and those of them that remain smokers are driven into illicit tobacco consumption.

Conventional wisdom suggests that as long as tobacco products are inelastic, increasing prices and tobacco taxation will increase industry and government revenues respectively. This statement holds true in the absence of a black market. It does not necessarily hold in the presence of a black market (i.e.: illicit trade), as in the case with tobacco trade in Greece. Previous studies, which were based upon this conventional wisdom and overlooked illicit trade, erroneously concluded that the relation between tax ratio and government revenues is always positive.

Once taxation becomes too high, thus also driving tobacco prices high, the price difference between duty-paid (DP) and illicit (or DNP) tobacco products increases. This directly affects the incentive for smokers to shift to DNP tobacco products. It is true that tobacco is generally inelastic. This is the reason

Figure 4: The evolution of Greece's tax revenues on tobacco products in million € (12-month moving average).



why smokers will first shift to DNP before they decide to stop smoking. Once the option of a cheaper cigarette (i.e.: the DNP cigarette) is on the table and given the inelastic nature of smoking there is no reason for the smoker to stop smoking. S/he will simply shift to the cheaper DNP tobacco. This shift to illicit products is exacerbated in the case of Greece by the dramatic decrease of the disposable income due to the continuing recession. It is no wonder illicit trade increased the last few years at the pace we have experienced. This is mainly due to the combination of a) tax hikes and b) consumers' income decrease.

Once we have explained the big picture concerning the role of tobacco taxation in general to the increase of illicit trade, we need to become more specific and elaborate more on one very important detail. The detail refers to the different cigarette brands and their different prices as well as the taxation scheme, which differs based on the type of cigarette. This way it will become clearer how specific taxation schemes on different cigarette brands affect illicit trade. Our analysis will help authorities to design a better taxation scheme from a tax revenue perspective as well as consumers' health perspective.

We know there is a plethora of cigarette brands with a large variety of prices. For reasons of simplicity and in accordance to the literature we distinguish two major price categories, high-price and low-price. Following

economic logic we can assume that, on average, high-price cigarettes have a clientele of relatively higher income than the low-price cigarettes, which appeal mostly to lower income customers. Income elasticity is an important factor affecting consumer behavior. When income goes down, as it is currently the case in Greece, income elasticity predicts that customers will be more sensitive in price changes of a specific product.

It is at this point that the price difference between high-price and low-price tobacco in combination with the taxation scheme can significantly affect illicit trade prevalence. As the economic crisis kicks in and consumers' income decreases there is a propensity of smokers to shift to lower price cigarettes⁵. The greater the variety of prices and the larger the price difference between different brands the more choices a consumer has. This was the case in Greece in 2009 when the average price of the high-price cigarettes was around €3.2 per pack while the average low-price cigarettes was at around €2.3 per pack. Similar was the situation in 2010 although an increase in taxes raised the average prices at €3.7 and €2.7 respectively. We see that a lower income consumer or a consumer who experienced important decrease of income had the choice of shifting from a relatively expensive to a much cheaper brand, which on average cost 70% of the price of the expensive one.

Since 2011 this picture changed dramatically. The price difference between high- and low- price brands drastically decreased mostly due to the applied taxation scheme, which put the burden on the cheaper brands. At the same period (2011-2013) the disposable income of the Greek consumers sharply decreased thus eliminating price-wise considerably the set of choices for cigarette brands. At this time (end of 2013) while the average high-price brands cost €3.8 the average low-price brands do not cost less than €3.3, that is, more than 86% of the average high-price cigarettes. According to KPMG (2013) as of 2012 Greece has the least price difference between high and low price tobacco among all EU-27 countries.

What is the major result of this decrease in the price difference between high and low price tobacco? A consumer who experiences considerable decrease in the disposable income and at the same time faces higher tobacco price due to taxation may shift to a legal cheaper cigarette brand. When the cheaper cigarette brand is not cheap anymore the consumer is driven towards DNP tobacco. Back in 2009-2010 there were low-price brands at even less than half the price of some high-price brands. Now it is the illicit tobacco that costs half and even less than half the average DP price. Economically speaking, it is no wonder why illicit trade has become so rampant.

It should be clear by now that low-price cigarettes play a significant role of

cushion between DP and illicit tobacco use. In the current period of economic stressful conditions tobacco consumers have been deprived of this cushion due to the taxation scheme, which has put the burden on the low-price cigarettes eliminating thus the price difference between high- and low-price tobacco. In other words the taxation scheme eliminated the cushion between DP and DNP tobacco products.

Moreover, the estimated price elasticities can be used to examine the effect of a tax increase on DP cigarette consumption and tax revenues. In Table 3 four examples-scenarios are presented.

Table 3: Scenarios on tax changes and their effect on DP tobacco demand as well as on government revenues.

4 Scenarios on 2013 WAP (€3.51)	Tax/WAP (current: 87.45%)	Change of retail price (%)	Change of tax (%)	Estimated change on long-run consumption (e= -1.3288) (%)	Estimated net change in government revenues** (%)
<i>1st</i> : €0.50 tax increase*	89.02 %	14.25	16.30	-18.94	-5.73
<i>2nd</i> : €0.57 tax decrease	85.00 %	-16.33	-18.68	21.70	-1.03
<i>3rd</i> : €0.36 tax decrease	86.00 %	-10.36	-11.84	13.76	0.29
<i>4th</i> : €0.05 tax increase	87.63 %	1.43	1.63	-1.89	-0.29

* In all scenarios we assume full shift of any tax changes to the final retail prices.

** Calculations on government revenues change are based on long-run elasticity.

Assuming that pre-tax prices remain constant and tax increases are fully reflected on prices, an average tax increase of €0.5 per pack (1st scenario) will increase the average retail price from €3.51 to €4.01 (or 14.25% increase) and DP cigarette consumption will decrease by 18.94% during the first 3 months (long run elasticity). At the same time an undefined increase of illicit tobacco use will take place because part of this consumption decrease will be shifted to illicit tobacco.

Let us now see the effect on government revenues: prior to the new tax burden of €0.5 per pack, the total tax revenue was 87.45% of the €3.51 weighted

average retail price (WAP), that is, €3.07. The €0.5 tax increase signifies a 16.30% tax increase from €3.07 to €3.57. But, the total decrease in consumption (within 3 months after the application of the new tax) will be -18.94% a greater decrease than the increase in tax, hence a net decrease in government revenues, let alone the effect on the illicit trade which will partly absorb the DP consumption decrease.

Specifically, the decrease in tax revenues will be 5.73% (Table 3). This is calculated the following way: prior to the tax increase one average pack of cigarettes added €3.07 of tax revenue. After the €0.5 or 16.30% increase of tax there will be an 18.94% decrease of consumption, that is, instead of one average pack of cigarettes, just 81.06% of that average pack will be sold. This translates to tax revenue of 81.09% of the expected €3.57, that is, €2.89. So, after the tax increase government will receive €2.89 down from the current €3.07, which is a decrease of €0.18 or 5.73% (differences in decimals are due to rounding).

Let us now suppose a scenario (2nd scenario) which slightly reduces the total tax ratio from 87.45% down to 85% of the weighted average retail price. Specifically, the current WAP for 2013 (weighted average retail price) is €3.51, 87.45% of which is tax. This equals €3.07. Only 44 cents (€3.51-€3.07) goes to the whole industry supply chain. If total tax goes down to 85% of the WAP and assuming that the tax cut will be fully reflected to the final price we talk about a price decrease of €0.57. The new WAP now becomes €2.94, a 16.33% decrease of the price and 18.68% decrease of the tax amount. This will cause an increase of consumption of DP tobacco of 21.70% within 3 months after the tax cut (Table 5.1). Interestingly, tax revenues will also fall by 1.03%.

On Table 3 we also include the scenario of the recently decided policy of 5 cents per packet tax increase (4th scenario) as well as another (3rd scenario) under which tax decreases to a point where total tax makes 86% of WAP, that is, a €0.36 decrease. Only in the third scenario, from the scenarios considered in this study, it is observed an increase of expected tax revenues by 0.29%.

We need to stress at this point that these scenarios are simple calculations based on a change of the average tax on the WAP. They do not take into consideration (due to lack of data) what part of the tax will change (i.e. the specific excise, the ad valorem, etc). Accordingly the scenarios are simple theoretical exercises on hypothetical total tax changes. The example of the recently announced increase of €0.05 tobacco tax is also general and does not correspond to the specificities of the tax design which have been announced.

However, it is particularly interesting that even the scenario of the generous tax decrease of €0.57 shows a decrease of tax revenues. This may be the result

of the taxation scheme which needs to be revised. It is exactly the taxation scheme that has increased the difference between DP and DNP tobacco making thus the latter particularly attractive to the detriment of government revenues. Further research is needed on the elasticities of high- and low-price cigarettes in order to be able to construct specific scenarios closer to reality and more valuable policy-wise. For this purpose accurate data on prices and quantities are particularly needed.

The greater than 1 long-run price elasticity of tobacco calls for immediate revision of the taxation scheme. Even under a ‘do nothing’ scenario, that is, keeping the taxation status quo, government revenues will have a slight tendency to keep eroding till they reach an equilibrium point, which depends on the decreasing disposable income. Similarly, the illicit trade will keep increasing at a decreasing rate till it reaches an equilibrium point, which depends on when the disposable income will stop falling. The longer period of time the income will keep falling, the longer the illicit trade will have an increasing tendency and government revenues will keep eroding.

Policy makers should also keep in mind that it is easier to push a smoker to illicit tobacco consumption by increasing taxation rather than getting him/her back to legal consumption when taxation declines. This is the result of human inertia and habit which cannot be easily depicted in numbers and estimated elasticities. Consequently, while an estimated elasticity shows by how much DP tobacco consumption will decrease after a specific price (tax) increase, this same elasticity may overestimate how much DP tobacco consumption will increase after a price (tax) decrease.

Greece is currently under critical circumstances. It is exactly these circumstances that drive elasticity of DP tobacco very high. Consumers have experienced and still experience an unprecedented income decrease. Combined with the price difference between DP and DNP tobacco, which in some cases costs just a third of the duty-paid price, it is a lethal combination. Indeed, illicit trade has dramatically increased the last 2-3 years. Although unusually high, the estimated DP tobacco elasticity is far from unexpected. It is exactly the elasticity economic theory predicts based on a) income deterioration and b) readily available cheap substitute (i.e.: illicit tobacco).

6. Conclusions

There exist different methodologies for measuring or at least providing indications on the extent of illicit tobacco trade in general, each one characterized by specific strengths and limitations. At the same time, existing methodologies

are not always comparable and even in cases of studies belonging to the same class of methodological approaches, the obtained results are not to be considered equivalent.

Since illicit tobacco trade is an illegal activity of a wide scope, capturing its extent and measuring its magnitude involves particular difficulties due to the fact that, on the one hand, such illegal activities are not directly recorded and existing data by official agencies are often not freely distributed and, hence, do not easily become available to the researchers. On the other hand, the total of illicit tobacco trade includes different single illegal activities which cannot be measured and/or approximated in the same way.

The most commonly used methods for the measurement or the approximation of illicit tobacco trade are (1) surveys and observational data, by collecting information and investigating tobacco purchases either on the basis of the user's answers or discarded cigarette packs, (2) questioning retailers and tobacco vendors, (3) monitoring tobacco trade, and comparing tobacco sales against consumption, and (4) econometric analyses, in the case of multi-country or worldwide studies.

In this paper, the size of illicit tobacco trade has been estimated using the difference between the registered and/or estimated tobacco consumption and the recorded tobacco legal sales. The consumption data were provided by ELSTAT's National Accounts. The sales data were calculated based on monthly taxed quantities released for consumption, provided by the Ministry of Finance. According to the results obtained, the estimated DNP consumption as a percentage of FMC total consumption has increased considerably in recent years, from 10.9% in 2010, to 14.9% in 2011 and 17.2% in 2012.

Tobacco pricing and taxation issues and their role in tobacco illicit trade and government revenues are of particular interest. The price of FMC has increased significantly in Greece during the last five years although disposable income has decreased due to the economic crisis, making cigarettes less affordable and suppressing legal consumption. On the other hand, illicit trade has increased dramatically. It should be highlighted that while the most popular price category increased by 19% since 2009, the weighted average price increased by 31% and the minimum retail price increased by 50%. Moreover, in 2009 high-price cigarettes were on average 40.7% more expensive than the low-price cigarettes while in 2013 high-price cigarettes were on average 14.3% more expensive than the low-price cigarettes. The WAP of low-price cigarettes increased by 45.3% from 2009 to 2013, while the WAP of the high-price cigarettes increased by 18.1% during the same period.

As far as taxes are concerned, Greece is among the EU-28 countries with

the highest specific excise and the lowest Ad Valorem excises. In general, Greece exhibits the highest total tax among the EU-28 countries. Not only that, but according to KPMG (2013), as of 2012 Greece has the least price difference between high and low price tobacco among all EU-27 countries. Economic theory suggests that although as taxes rise from low levels, the tax revenue collected by the government also increases, when the tax rate reaches a critical point any further rise in taxation will actually reduce revenue. Furthermore, theory suggests that when income decreases people become more sensitive (i.e. elastic) to price changes. Moreover, when a close and cheaper substitute (i.e. DNP) of a relatively expensive product (i.e. DP) exists, the elasticity of DP tobacco is expected to be even higher. Low-price tobacco plays the important role of a cushion between DP and illicit tobacco. This cushion seems to disappear during the last five years, pushing thus low-income smokers to DNP use.

Finally, the price elasticity of FMC in Greece is calculated. A demand model with partial adjustment (in order to account for the habit forming nature of smoking) for the consumption of duty-paid cigarettes was estimated; using monthly time-series data for the period 01/2007 to 9/2013. The dependent variable of the model was measured as the number of cigarette sticks released for consumption and was provided by the Ministry of Finance. Demand theory suggests that cigarette consumption is influenced by a number of factors including cigarette price, disposable income, marketing expenses, anti-smoking policy, magnitude of addiction, price of substitutes (e.g. illicit) etc. Due to lack of available data and its frequency for the examined period, cigarette price -as measured by the Consumer Price Index for tobacco products from ELSTAT- was included as explanatory variable. The short-run price elasticity was estimated to be equal to -0.8854 and the long run elasticity equal to -1.3288 both reveal a relatively elastic cigarette demand.

The results of the above described demand model may seem unexpected compared to older studies for other countries which usually show a lower price-elasticity for tobacco. However, some recent studies which take into consideration the impact of the last global financial crisis showed a dramatic shift in tobacco price elasticity. In Greece, under the current circumstances of deep economic recession these results are in accordance with economic theory. The dramatic decrease of disposable income adds a strong income effect on the values of elasticity. Moreover, the decreasing gap between the prices of DP tobacco vs. DNP tobacco offers consumers a very close and much cheaper substitute putting thus a strong substitution effect on the elasticity of DP tobacco.

It is also important to notice that a greater than 1 long-run price elasticity

of tobacco calls for immediate revision of the taxation scheme. Even under a ‘do nothing’ scenario, that is, keeping the taxation status quo, government revenues will have a slight tendency to keep eroding till they reach an equilibrium point, which depends on the decreasing disposable income. Similarly, the illicit trade will keep increasing at a decreasing rate till it reaches an equilibrium point, which depends on when the disposable income will stop falling. The longer period of time the income will keep falling, the longer the illicit trade will have an increasing tendency and government revenues will keep eroding.

A revision of the taxations scheme with a structural change, which currently puts the burden on the low-price cigarettes, seems to be the only way to a) undercut illicit explosive expansion and b) put a halt to the deteriorating government revenues.

7. Acknowledgements

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Notes

1. http://www.who.int/tobacco/publications/en_tfi_tob_tax_chapter4.pdf
2. European Commission 2013 “Releases for consumption of cigarettes 2002-2012”
3. European Commission 2013 “Releases for consumption of cigarettes 2002-2012”
4. <http://www.forbes.com/sites/thestreet/2013/09/06/big-tobacco-takes-its-last-drag-as-economic-change-looms/>
5. Some will stop smoking but given the addictive characteristic of smoking (hence the inelastic nature of the product) we assume –and it is what we actually observe in real life– that it is mostly probable for a smoker to shift to a cheaper brand before s/he decides to completely quit smoking.

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THE TIMING OF INTERNATIONAL TRADE POLICY REFORMS: THE ROLE OF AGENDA-SETTING PROCESSES

I. TROFIMOV*

Abstract

This paper examines the timing of international trade policy reforms, specifically in the agricultural policy domain. We argue that the readiness for change is present when sufficient number of actors values alternative policies, and when actors have little choice, but to implement change. Negotiation of new policies also becomes possible if analytical instruments allow measurement of policy failures and comparison of policy alternatives. We demonstrate that decision to initiate talks over new, more liberal trade rules in the GATT Uruguay Round (1986-1994) was due to the gradual adoption of new visions of agricultural regulation in the USA and the EC, escalating trade tensions between these economies, and active involvement of expert community in the creation of analytical instruments.

JEL Classification: F13; F51; N70; P1; Q17.

Keywords: reform timing; international trade policy; GATT; framing; agenda setting; readiness for change; analytical instruments

1. Introduction

On 15 April 1994, the parties contracting the GATT (General Agreement on Tariffs and Trade) concluded “The Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations”, with the intention of substantially advancing international trade regulation. In addition to organisational and judicial aspects of international trade governance being strengthened (as attested by the creation of the World Trade Organisation, Dispute Settlement Body and Trade Policy Review Mechanism), and amendments to the existing agreements being made (such as modification of the GATT), a number of sectoral agreements were signed. Specifically, rules contained in the GATT were extended to agriculture for the first time in post war history. Also, new areas, such as trade in services and trade-related aspects of intellectual property became subject of international governance for the first time.

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These achievements were the result of several years of intense negotiations and changes at all levels of governance that took place before and during the GATT Uruguay Round negotiation.

The issues of trade protectionism and policy reforms have been thoroughly examined from economics and political economy, international relations and law perspectives. In the majority of cases the focus has been on the preconditions of the trade policy reform and its feasibility, not the actual processes that bring reforms. Normative economic theory arguments (Kemp, 1972; Corden, 1974) stressed the importance of conformity of policies to economic theoretical principles, if trade liberalization is to be achieved, but provided no indication of how to ensure this, and how to explain an obvious discrepancy between economic theory and policy realities. The political economy approach exposed disproportionate involvement of certain vested interests in the trade policy formulation and associated policy capture (Frey, 1983), demands for protection along industry and class lines (Hiscox, 2002), and pointed to the positive effects on trade liberalization of state autonomy in trade policymaking (Katzenstein, 1978), separation of executive bureaucracy from organised interests (Vernon et al., 1991), and the decision making and voting arrangements that circumvent the strength of protectionist lobby groups (Hawkins et al., 2006; Milner, 1999). In a related stream of literature (Bauer et al., 2007; Kindleberger, 1975), the role of cultural change and the adoption of free-trade ideology in the government apparatus were emphasised. Contractarian-constitutionalist perspective (Moser, 1989; Parisi, 1998; Rowley et al., 1995) highlighted the role of legal constraints and rules as well as constitutional reforms in mitigating protectionist preferences, in particular the benefits of unilaterally imposed free trade and flat tariffs, limitations of the powers of legislatures in trade policymaking, and the need to ensure the enforcement of the GATT rules.

It becomes apparent however that there is no embedded mechanism in the trade policy system that will ensure that the “right” rules and decision-making structures are selected and become effective. Likewise it is not explained where the culture that enables liberalisation is coming from and whether it will automatically lead to liberal policies. In other words, the matter of trade liberalization is a matter of *agency* and policymaking *process*, not solely structures, ideas and rules.

The literature on trade negotiations and on systemic economic factors that influence policy outcomes come closest to address this aspect of policymaking.

Trade negotiations literature (Paarlberg, 1997; Putnam, 1988) states that negotiation is a two-level process and its successful outcome requires strategic action (side payments, reverberation, linkage of issues) towards domestic

constituents in order to have international agreement ratified domestically. The consideration of agenda setting process seems to be missing and little attention has been directed however at the timing of the *start* of international trade policy reforms. Why seminal changes in the international trade governance come at a particular point in time and not earlier or later? In particular why durable liberalization agreements and accompanying institutional reforms were attained in the GATT Uruguay Round (1986-1994), not during the earlier rounds of the 1960-1970s, or during stalled Doha Round of the 2000s?

Systemic effects literature attempts to explain timing of policy reforms. One hypothesis (Gallarotti, 1985; Gourevitch, 1986) is that adverse economic conditions undermine competitive advantage and profits of industries and increase demand for protection. This does not explain why during the fall in agricultural prices in the 1980s some countries (Australia) did not return to protectionist policies and instead campaigned at an international level for a more liberal agricultural trade regime, while others (the USA, EC) continued to provide support to the farm sector.

The alternative hypothesis (Rodrik, 1992) is that adverse systemic factors may be instrumental in protectionism removal by “enabling radical reforms that would have been unthinkable in earlier times.” (p. 89) This is the case when the political costs of sticking to protectionist and interventionist policies become higher than costs of adjustment. The deeper the crisis, the quicker comes the radical reform. Conversely, if reform is not undertaken, the crisis has not yet become severe enough. The willingness with which EC and US policymakers decided to reform their agricultural trade policies in the 1980-1990s is explained from this viewpoint by serious distress of agricultural and trade policy, exploding budget costs and deteriorating balance of payments. It remains unclear though why even acute farm sector crisis of the 1980s did not instantaneously lead to reform (in the EC the gap between the two was almost a decade, in the USA no less than five years) and that in both the stop-gap and ad hoc solutions were tried first.

We argue that to explain the above conundrums one needs to look at the events that took place prior to actual negotiations (i.e. at agenda setting processes). Policy breakthroughs are not solely an outcome of successful deal making among trade diplomats in Geneva or with domestic constituents in national capitals, as has been the common place in the literature on trade negotiations. Nor are they solely a result of exogenous economic forces that induce policy changes, by having impact on a respective protected sector or external economic position of the country.

Preparatory activities by policy entrepreneurs at the agenda setting stage

equally matter and this determines why some otherwise beneficial negotiations never start, why some economically sound proposals are never adopted, why certain external developments are not attended to, and why it takes time to frame issues upon which discussions at the negotiation stage are based.

This paper is divided into three sections. Section 2 elaborates the framework to understand the policy reform timing. In section 3 we apply this framework in the context of the Uruguay Round (1986-1994) agenda setting. The paper ends with concluding remarks in Section 4.

2. Agenda setting processes and timing of trade policy reform

The recognition of policy problems and the formulation of policy proposals have been considered central to agenda setting.

The earliest conceptualizations of agenda setting process in public policy literature and organizational science viewed the process as a linear sequence of decisions.

Simon (1960), in his three-phase decision-making model, proposes to define such activities as “finding occasions for making decisions” and “identifying possible courses of action” as pre-decision processes. Pal (1987) similarly separates problem definition and agenda setting from policy formulation and adoption. Mintzberg et al. (1976), in an elaborate decision-making model, define several pre-decision activities – problem recognition, structuring of the problem, formulation of proposals, assessment of alternative proposals and, importantly, initial iterative search for solutions. Without delving deeply into the details of these phase models, we can stress their principal shortcomings. Apart from being too schematic (with decisions almost never allowed to deviate from a linear, consecutive stages representation), the phase models “trivialize” decision-making reality in that they do not provide or allow for causative factors and forces that drive the decision process. As Sabatier says, the phase model “is not really a causal theory” (Sabatier, 1992: 31).

In later literature, the path of problem recognition was examined. Since in a given policy system participants share a common problem definition (“policy image”, “policy frame”) that gives stability to the system and favors only incremental change, the radical re-definition of the problem is possible only with the radically new policy image (frame). Focusing events, defined along five dimensions (sudden, uncommon, harmful, concentrated on particular space, and known to both policymakers and policy recipients), lead to mobilization of new actors who bring new policy images and thereby enact non-incremental change (Baumgartner and Jones, 1993).

Another alternative model developed by Kingdon (1984, 2003) attempts to remedy the flaws of phase models – to explicitly address pre-decision processes in the public domain and to answer specific questions of how issues are conceptualised as agendas. In this respect, less attention is devoted to subsequent stages of policymaking. Kingdon suggests that agenda setting is a complex undertaking that is not conditioned by a single determinant or driven by a single routine. Kingdon's emphasis on complexity follows from the model of Cohen et al. (1972) that describes choice making in organisations under conditions of “organized anarchy”.

The authors distinguish four streams that are always present in organisational decision making and which are rarely related to others – problems, solutions, participants and choice opportunities. The process of coming to a decision is anarchic, neither following strict logic or passing through well-defined stages. Cohen et al. (1972) use the metaphor of a “garbage can” to describe decision activities in an organisation, when efforts of decision makers to find a solution are useless unless the context is favourable and problems are acute. The opposite also holds true – the problems find no solution unless there exist actors willing to tackle the problems and tentative solutions are floating around. In other words, decision making happens in a rather haphazard way.

Kingdon extended this logic of organisational decision making to policy situations and shifted focus from decision making in general to the more specific problem of how policymakers attend to policy problems. Although Kingdon stated explicitly that agenda setting is not a complete anarchy or “garbage can”, each of three streams – problem recognition and framing (problems stream), the proposal of solutions to the problem (alternatives stream), and political developments within the policy community (politics stream) – are a necessary, but not sufficient condition for policymakers to direct attention to the policy issue. As put by Kingdon (1984: 20), “these streams are largely independent of one another and each develops according to its own dynamics and rules. But at some critical juncture the three streams are joined, and the greatest policy changes grow out of that coupling of problems, policy proposals, and politics.”

The coupling of the streams is possible if the “window of opportunity” is open, i.e. if the following three conditions are satisfied:

1. The policy issue is winnowed down from a list of several issues and framed as a pressing problem that requires policymakers' attention;
2. A feasible solution to the problem is selected from a number of ideas and proposals floating around; and
3. The political context and the composition of the policy community are

propitious – the actors in the political stream are alert to the problems identified in the problem stream and are willing to accept solutions elaborated in the alternatives stream.

Although all the above streams are equally important, the driving force of the window opening is the politics stream. Kingdon (1984: 168) asserts that the actors in the politics stream will be alert to problems and willing to accept solutions if one of the following occurs in the politics stream – a government turnover takes place, the priorities of policymakers change, the national mood and public opinion shift or policymakers become affected by problems or attracted by solutions in any other way. While the three streams above open the policy window, the actual coupling is performed by entrepreneurs defined as actors, willing to make an investment in the success of coupling. Kingdon (1984: 165) states that the coupling is not guaranteed and a misfit between the opening window and the activities of entrepreneurs is frequent. It may happen that entrepreneurs invest resources and apply efforts only to discover that stream conditions are not favourable and no window is open. The opposite may also happen – the possibilities for coupling may continue to appear, but there are no entrepreneurs. Overall, the problems stream determines the possibility of policy, the politics stream – the feasibility of policy, the alternatives stream – the content and quality of the policy. Policy entrepreneurship conditions the timing and the actual appearance of the policy, whereas policy negotiation processes are assumed away.

Kingdon reserves a passive role for entrepreneurs. Although mentioning in passing such properties and qualities of policy entrepreneurs as willingness to invest time, money or political position in the success of a policy, the principal role of entrepreneurs is to “lie in wait, in and around government with their solutions already in hand, waiting for problems to float by to which they can attach their solutions, waiting for a development in the political stream they can use to their advantage.” (Kingdon, 1984: 165) In other words, in Kingdon’s view, their role is reduced to the provision of policy solutions that would be used by other policy actors.

We propose to extend and refine the models of Kingdon and Baumgartner and Jones as follows.

Firstly, we argue that the concept of actors’ mobilization overshadows the process of shared image/frame construction and the issue of its credibility and consistency. Hence it is necessary to examine framing process in greater detail.

Secondly, it is necessary to allow for a greater role for entrepreneurship. We argue that in most cases of agenda setting it is not a single entrepreneur that couples the streams and enacts change. Rather it is more plausible that at

every point in time several policy entrepreneurs, located in different segments of the policy system (executive branch, expert community, top policymakers etc.), are active. The policy entrepreneurship task may therefore be performed in several ways and by different means.

Thirdly, we argue that while framing and policy entrepreneurship efforts are indispensable in placing policy issue firmly on the agenda, they are not sufficient. The alertness of actors in the policy system to external events (e.g. political and economic crises, longer term developments in the economic or political system) and to the overall context of agenda setting is equally important.

The hypothesis advanced in this paper is that (in addition to usual pro-change coalition building and bargaining) the decision by the GATT participants to embark on trade liberalization and to start negotiations was a result of:

1. Their collective readiness for change, and
2. Collective efforts to devise analytical instruments and tools that enhance policy construction and experimentation.

Readiness or change (Wiener, 2009) incorporates shared commitment to implement change, either because actors value change or because they have little choice but to implement it. In our view, in international trade policy space both situations are possible. Consequently, one needs to examine the chain of events and reactions to events that brought actors to agreement that change cannot be averted, and also to examine the process through which actors obtain policy image/frame that is mutually shared and valued.

The availability of analytical instruments and measurement tools is indispensable, as without them policy construction and experimentation process will turn amorphous and inconclusive. Also, proponents of change will not be able to persuade opposition without figures at hand and measurements of existing policy failures.

Hence, three streams of agenda setting entrepreneurship are examined:

Entrepreneurship in the problem framing stream, including efforts of certain actors to challenge existing policy ideas and interpretations of policy reality, by introducing and advancing alternative interpretations, the process that may potentially culminate in some commonly held interpretation.

Entrepreneurship in the contextualisation stream, composed of activities that relate internal agenda setting controversies with exigencies of external political and economic environment. Thereby it will be determined when exactly change has to be implemented (agenda setting processes cut short and debates moved into the negotiation domain).

Entrepreneurship in the operationalisation stream, including activities to create instruments and analytical apparatuses that will help policymakers to

get a clearer idea of what the problems, solutions and whole discussion are about. These activities have a facilitative nature and are analogous to creating “language”, making policy construction and whole agenda setting swift and determinative.

The idea of three streams of entrepreneurship is rooted in the theory of entrepreneurship formulated by J. A. Schumpeter and I. M. Kirzner in the economic domain.

In his earlier works, J. A. Schumpeter (1912) viewed entrepreneur as a heroic figure, positioned outside the core of the economic system or industry, driven by higher order interests (not always limited to wealth maximization), willing and able to introduce novelties and make non-incremental changes and thereby radically reconfigure economic system or industry. Importantly, the introduction of novelties is distinguished from invention, the former being the recombination of existing production factors and resources. In later works, Schumpeter (1942) acknowledged that recombination and innovation may also be undertaken by entrepreneurs within corporations and may take a form of incremental change. We argue that these views of entrepreneur can be extended to the policy domain.

We hypothesize that problem framing requires initiative and mobilisation on the part of some actors as well as their ability to impose (by using various tactics) their interpretations of “what is happening” and of “what ought to be done” on the rest of the policy system. This is therefore a form of radical Schumpeterian entrepreneurship, that takes place in the problem framing stream and that brings new policy interpretations and views (i.e. policy novelties). We also hypothesize that the construction of new instruments and “language” in the operationalisation stream makes it necessary that policy actors innovate (albeit in incremental and non-radical way); therefore, Schumpeterian incremental entrepreneurship is likely to take place.

The concept of entrepreneurship proposed by I. M. Kirzner (1973; 1997) complemented the views of J. A. Schumpeter. It focused on the abilities of entrepreneur and his/her functions in the market process. Kirzner argued that entrepreneur plays crucial role in bringing in equilibrium in the economic system, by being alert to price differentials and being able to exploit respective profit opportunities. The role of entrepreneur is therefore of facilitator of the processes in the market system who ensures that inefficiencies in the system are eliminated and resources and production factors are directed to their best use.

We argue that similar abilities and functions are required on the part of the actors in the policy system. It is essential that actors are alert to external

political and economic events and developments that may threaten or in contrast foster agenda setting process as well as to differences between the various parties and interests during the agenda setting. The actors are able to make use of these events and developments and to exploit (narrow down) the differences and thereby ensure that agenda setting proceeds in the efficient and non-conflictual way. In other words, these actors facilitate policy process and behave as Kirznerian facilitating entrepreneurs. Clearly there are two aspects to these activities:

1. Advocacy, mediation and coalition building that bridge positions of the conflicting parties;
2. Contextualisation activities that involve recognition of the appropriate pace of agenda setting process (given external conditions) as well as the right timing for the beginning and the conclusion of process and for the start of the actual policy negotiations.

This paper considers only the second aspect.

3. Timing of the Uruguay Round

3.1 Background to the Uruguay Round

The principal economic consequence of agricultural policies that had been instituted in the developed economies in 1930-1960s (specifically in the USA and the EEC) was that the support instruments provided incentives to farmers to expand production well beyond the point when domestic policies are relatively neutral to international trade. In other words, domestic agricultural policies disrupted existing trade patterns, exercised undue influence on international commodity markets, and created budgetary pressures domestically.

The adverse effects that domestic agricultural policies exercised on the rest of the economy started to be felt in 1950s. Until 1980s however agricultural policies did not provoke irresolvable policy tensions, either domestically or internationally. The international food demand (and with it the amount of trade) continued to rise due to the population and economic growth, thus allowing surpluses disposal and cushioning domestic interventionist policies. Agricultural expansion on the part of USA and EC became possible due to demand increase in Japan, China and USSR, which became substantial food importers.

The turning point came in 1982, when demand ceased to rise, but the policies to encourage high levels of production remained. Policymakers faced the

dilemma either to start considering policy reform as a solution or to dispose of the food surplus in the international market, distorting prices and creating trade tensions. The latter solution turned out to be the preferred one, leading to trade conflicts between EEC and US and putting the whole GATT system at risk (Hudec, 1988: 41).

Hathaway (1987: 13) made four conclusions about the problem of the early 1980s:

1. National policies developed prior to the Uruguay Round and entrenched in the 1970s in order to expand output were no longer appropriate, given the present and prospective market situation;

2. National policies were transforming excess capacity into major trade problems;

3. Major changes in trade policy without corresponding changes in domestic policies would not have solved the problem; and

4. It became impossible to wait for long term structural change in agriculture and transformation of agricultural markets to solve the policy problem – instead a major policy reform was required urgently and had to accompany the Uruguay Round.

The realisation of these four facts in the agricultural trade policy domain of the USA, the EC and other countries did not come instantaneously, nor did it immediately translate into concrete policy action and negotiations in domestic and international arenas.

3.2 Framing Stream

In the USA the framing of agricultural policies could be attributed to conscious revision of existing policy ideas on the part of newly elected President R. Reagan, D. Stockman (his Director of the Office of Management and Budget) as well as of several Congress members, not solely to the dramatic deterioration of the economic situation. The essence of policy beliefs of R. Reagan and D. Stockman was a combination of F. A. Hayek's and W. Lippmann's views of an "organic" and self-correcting society and the inevitability of unintended and adverse consequences of state intervention; the contentions of supply-side economists (M. Friedman and A. Laffer), seeing negative effects of over-spending and over-taxing on the macroeconomy and economic incentives; and Buchanan's insights on the failure of democratic policymaking, through falling prey to vested interests (Stockman, 1986; Riccio, 1994).

The core of the emerging frame is best represented as follows:

"The right starts with history and society as they are, and places the burden

of proof on those who would use the policy instruments of the state to bring about artificial change. The left starts with an abstraction – a vision of the good and just society – and places the burden of defence on the bloody process. Implicit in the conservatism of the right is a profound regard for the complexity and fragility of the social and economic order, and a consequent fear that policy interventions may do more harm and injustice than good... We viewed the supply-side doctrine as all-encompassing. It implied not merely a tax cut but a whole catalogue of policy changes, ranging from natural gas deregulation, to elimination of federal certificates of “need” for truckers, hospitals, airlines, and anyone else desiring to commit an act of economic production.” (Stockman, 1986: 32, 40)¹

Agricultural policy reform was in light of the above contention an instrument and one of many steps in attaining a “good” society, based on conservative principles (i.e. served higher-order objectives). In contrast to many reformist frames that are not attended to by those having power, the fate of Stockman’s frame was a lucky one – it resonated well with Reagan’s personal views.² It also seeded doubts about the credibility of existing agricultural policy frames among members of the US Congress.

The US agricultural policy failure of the early 1980s was in their view a result of government’s unnecessary intervention into farm affairs. The deterioration of markets in 1982 (price fall and the build up of surpluses) and distress of the farm sector (soaring bankruptcy rate) were only partly attributable to the fall in international demand, “bumper” crops in the USA, undercutting of US exports by the EC, and strong US dollar. Far more important was a faulty 1981 Farm Bill that, despite changes on commodity markets, continued to set guaranteed prices at a high level (as was the case in the 1970s), thereby stimulating US farmers to continue production and create more surplus. Subversion of agricultural policies to foreign and security policies during the Carter administration (above-mentioned embargo on the USSR) added to the problem.

However, mere reduction of supports, in the absence of alternatives, would have been unpalatable to both farm community and Congress. Hence, framing gave an international dimension to the issue. The reduction of the current account deficit incurred in the early 1980s through importation of expensive foreign oil could have been realised through export promotion. As US manufacturers were losing competitive ground to Japan and Germany and hence were neither willing nor able to act as a “locomotive” of export expansion, agriculture, and services were the only item where an expansionist strategy could work. Also, the potential beneficiaries from the USA opening its market for industrial goods (Germany, Japan) were not always the same countries that

were undercutting US agricultural exports (France). While bilateral deals with Germany and Japan could solve some of the problems for the USA, the inclusion of export subsidisers (e.g. France) was still essential – hence Reagan’s trade strategy necessitated a broader negotiation setting (multiple issues, multiple parties, requiring in turn a more judicious and sophisticated negotiation strategies). Thus, a “grand” frame was adopted by the Reagan administration – the combination of deep reform of domestic farm policy and multilateral agricultural trade liberalization.

Importantly, the pro-liberalization, multilateralism and domestic retrenchment sentiments were however infiltrating the Congress. The shift in congresspersons’ attitudes with regard to new US agricultural trade strategy is most clearly seen in the position of Senator R. J. Dole (Kansas): behaving as a “typical Republican” senator in the 1970s, demanding higher supports for his constituency, in 1980 he reversed his stance, stating that “my whole philosophy is that I want to see farming out in the free market as much as it possibly can be.” (US Congress, 1980, p. 3107) Clearly, the dire situation in his state and hence higher accountability pressures made him somewhat similar to New Dealers (many of whom became reformers from the local level), making changes to help “his” people. In addition, his move in 1978 from the Agriculture Committee to the Finance Committee pushed him to look at the problem from a budgetary angle (US Congress, 1996).

Similarly to the USA, in the EC the economic and political climate of the 1970s (global commodity boom and the entrenchment of protectionist and interventionist interests) substantially decreased the influence of pro-reform frames, whereas the problems of the early 1980s gave impetus to framing activities.

One of the earliest attempts to question the CAP (EC Common Agricultural Policy) paradigm was the independent research of European agricultural economists, embodied in the Vedel Report (Vedel, 1969) and the Wageningen Memorandum (Corbet and Van Riemsdijk, 1973). It pointed to the growing inconsistencies of the CAP, specifically on its potential to generate sizeable surpluses, ignore other aspects of the rural economy (such as structural and income distribution issues), as well as other aspects of European integration (regional policy and monetary union) and to create conflicts between the EC and other members of the international trade community. Consequently it was proposed to reframe the CAP in a way that would allow long-term dimensions of agricultural development and broader external objectives of agricultural policy to be addressed, that is to reformulate the CAP not solely as a welfare state institution, tackling lagging farm incomes and relying on a system

of institutionalised price supports, but as an “integrated policy” embodying instruments of achieving non-price-support objectives and as a positive factor of international trade governance. The above reports spurred more specific proposals to ease the surplus problem by means of adjusting price supports downwards for products in surplus, to reduce production capacity by diverting land to non-agricultural uses, to encourage structural change by means of “digressive” direct income payments, limited in duration and diminishing over time, thereby precluding the replacement of the current generation of farmers with a new one (Koester and Tangermann, 1977). It was also proposed (Tangermann, 1978) to enhance greater international responsibility of the EC in agricultural trade relations – to stabilise international markets, minimise external effects of the CAP and ensure access for low income and/or low-cost agricultural exporters (abandon or limit the use of export subsidies, widen the gap between threshold and intervention prices and make import levies less variable).

It can be argued (Phillips, 1990) that limited effect of new proposals is attributed to the situation on global markets (grain shortages throughout the 1970s), underrepresentation and weakness of non-farm organizations (consumer, environmental and industrial), failed attempts to make CAP subject to evaluation by other Directorates) and the professionalization of the Commission (resulting in its limited interaction with other decision-making bodies).

We argue, however, that the decisive factor, explaining the limited resonance of pro-reform frames, was the attitudes of the frames’ recipients, the EC policymakers. The latter were influenced by the ideas of the limits to growth, popularised by the works of The Club of Rome, and associated gloomy forecasts of global agricultural production. These dismal projections, combined with volatility on financial markets following collapse of the Bretton Woods system, strengthened the contentions of EC policymakers and farm lobbies that the course of the CAP was right, that CAP constructs were justified and no downward adjustment in institutional prices was required. Further, the volatility on commodity markets of the 1970s firstly meant that CAP should continue serving its original function as a “guardian” of the EC’s food security, and secondly led to an erroneous conclusion, based on a short-term view of markets, that surpluses would not constitute a pressing problem in the future.

Framing efforts continued into the 1980s, with diagnostic and reform frameworks and ideas advanced by media, NGOs and economic circles, as well as some of the European policymaking bodies (EC Commission) most distanced from the agricultural policy “iron triangle”.

The old dissatisfaction with the privileged standing of the CAP, when

compared to other policies, resurfaced and was particularly salient in light of the single market initiatives gaining momentum in the 1980s. Both media and consumer groups indicated CAP's "increasing appetite for Community funds" (The Times, 1982) that deprived other policies of necessary financial backing. It is therefore not surprising that this time the proposals were advanced to tackle institutional causes of overspending (Koester, 1984) and to institute conditionality of agricultural expenditure. The latter aspect emerged, in particular, in the Siena Memorandum, urging expenditure increases (still necessary in the medium term to finance surplus disposal and newly instituted income compensation schemes) to be made dependent on more market-oriented policies and to allow them only as a temporary measure (Barbero et al., 1984).

Regarding other diagnoses and solutions, academic community proposals of the 1980s became more sophisticated (European Review of Agricultural Economics, 1984), elaborating on:

1. An agricultural credit system to lower costs of invested capital, as an indirect way of ensuring farm incomes;
2. Direct transfers to enhance farm incomes;
3. More balanced and homogenous trade protection in order to ease budget pressures; and
4. Measures to account for structural policy, European enlargement, and broader policy goals stated in the Treaty of Rome.

More significant, however, in terms of the challenges of EC price supports reform and multilateral trade liberalization were framing efforts by the Community's official organs. For instance, the *Zahorka Report*, originating from the European Parliament, proposed a bold reconsideration of the EC's agricultural trade policy, asking for total elimination of export subsidies in the long term and urging "a set of rules applying to the international trade in agricultural products to be established, and that a tighter international discipline be respected in that field." (European Parliament, 1986) Also, in contrast to the 1970s, calls for solving the surpluses problem were now coming from the Commission. The 1981 Commission *Guidelines for European Agriculture* criticised the fallacious practice of setting prices based on short term considerations without thinking about long term consequences, manifested specifically in mounting surpluses (Commission of the European Communities, 1981). The 1985 Green Paper *Perspectives for the CAP* likewise castigated a policy that distorted market forces and provided perverse incentives to overproduce (Commission of the European Communities, 1985).

The criticism that CAP was compromising needed policy developments in the rural sector was also coming from the Commission. The Commission

seminal work of 1988, entitled *The Future of Rural Society*, castigated CAP for its limited structural policy measures and proposed making rural and structural policy a separate pillar of the CAP on an equal footing with price support measures (Commission of the European Communities, 1988a).

Finally, the 1985 Green Paper seriously tackled the relation between CAP and the environment. Although the origins of agro-environmentalism dated back to 1974, when an umbrella European Environmental Bureau embodying 25 interest groups was created, Commission's documents of the 1980s (including the 1988 *Environment and Agriculture*), as well as extension of the Community's Environment Action Program to the farm sector, marked the growing interest and involvement in agro-environmental matters of top policymaking bodies (Andreosso-O'Callaghan, 2003; Commission of the European Communities, 1988b).

Thus, frames were a driving force of EC policy reform, determined the EC's stance in the GATT and the timing of the Uruguay Round. The dominance of "original" CAP ideas in the 1970s and the timid and "whispering" effect of new ideas led to the non-cooperative stance of the EC in the Tokyo Round. Conversely, the more assertive and aggressive pro-reform framing in the 1980s led to domestic reforms and the Uruguay Round breakthrough.

The pre-Uruguay Round policy episodes witnessed both successes and failures in framing. During International Trade Organization (ITO) negotiation in 1945-1948, no shared interpretation of policy problem was obtained. The frame by the US (attributing post-war economic problems to disruptions of international economic relations and protectionism, rather than to the difficulties of reconstruction and reconversion) was not accepted favourably. The US emphasis on trade regulation devoid of colonial trade preference arrangements, state monopoly over foreign trade, or import substitution policies was not welcomed by both colonial empires, centrally planned and developing economies. Likewise, there was a clash of frames by the global farm community (seeing necessary to have measures against overproduction in the farm sector, social guarantees and welfare state in light of agricultural depression of the 1930s) and by US trade negotiators (urging removal of agricultural protectionism). The latter frame was considered out of touch and utopian. Inability to find common ground in framing was one of the reasons of the ITO negotiation failure. With no shared pro-liberalization frame the task of agricultural protectionism removal and establishment of comprehensive liberal trade order was delayed for forty years.

We note, however, that even if shared frame is present, there is no guarantee that liberal policy will eventuate. This was the case of framing during

agricultural policy formulation in the EC in the 1950s. Preoccupation with lagging incomes in agricultural sector (and price policy as the remedy to this problem), and the lack of social guarantees in the sector (and hence the need to moderate market forces), the view of small-peasant agriculture as foundation of the social order (and hence limited focus on structural policy measures that would lead to the disappearance of small farms) and the consideration of agricultural policy as an instrument of economic and political integration in Europe (hence elimination of agricultural trade barriers between EC member states and imposition of common external barriers) were widespread and shared by the majority of actors and this conditioned rather smooth agenda setting. The outcome was a highly protectionist policy that distorted international markets for several decades and made agricultural trade liberalization impossible in the 1960-1970s.

3.3 Operationalisation Stream

On the eve of the Uruguay Round several activities in the operationalisation stream took place.

The work of independent academics was salient, particularly where distortions created by domestic policies were concerned (especially the effects of the Common Agricultural Policies in the EC). This can be partly explained by the fact that inconsistencies in CAP operation had been experienced long before the start of the Uruguay Round and hence help on the part of academics was required. Phillips (1990) mentions several studies conducted in 1981-1985 from both partial and general equilibrium perspectives, as well as from the point of view of inter-sectoral transfers caused by CAP and trade-related component of distortions. Their role was more “humble” – to raise awareness of the problem and “give figures” (of CAP distortions) to policymakers, and in that they were quite successful. The fact that policy experimentation in the EC started and new frames were introduced was clearly inspired by these studies. At international level, the first attempts to operationalise agricultural trade distortions date back to the 1980 OECD Ministerial that appointed an expert group to analyse domestic-international policy nexus and to offer practical recommendations. At the same time, International Agricultural Trade Research Consortium (IATRC) was formed with a mission to initiate in-depth studies of international commodity markets as well as policy effects, and, importantly, to foster penetration of ideas and proposals born within IATRC into government and policymaking circles. The entrepreneurship by policy economists within intergovernmental bodies and at non-governmental level

continued into 1982-1983. On 10 May 1982, the first expert reports of the OECD was made public and was accepted with reserved optimism and the OECD mandate to pursue further analysis was extended for another three years (OECD, 1982).

It was rather coincidental that the OECD research group was headed by G. E. Rossmiller, who at the same time was a member of IATRC and also a government official in the USA (member of FAS in USDA). In these capacities he was able to provide a link between two independent research projects and to facilitate the exchange of ideas and their penetration into governmental circles. Gradually the research methodology crystallised – it was decided to examine the qualitative institutional aspect of agricultural protectionism, as well as quantitative analysis of specific protectionist instruments. The latter posed a serious problem – of how to compare them in principle (e.g. tariffs with quantitative restrictions and with other non-tariff barriers) and how to select a “common denominator”, allowing numerical estimation. The innovative work of T. Josling (1975), one of world’s leading agricultural economists and a member of IATRC was helpful in this respect. His earlier study, conducted for FAO in the 1970s, introduced two principal concepts - Producer Subsidy Equivalents (PSE) and Consumer Subsidy Equivalents (CSE) standing roughly for the aggregate measures of producer and consumer surplus in standard partial equilibrium analysis. It was argued that these numerical figures would allow construction of a multi-commodity trade model suitable for assessing liberalization scenarios and reform effects on individual countries. Josling’s approach resonated well within the OECD research division and by 1983 the extended analysis of actual policies followed, based on PSE and CSE concepts, including the effects of import tariffs, quotas and subsidies (Legg, 2003). In addition to measuring aggregate, it was also investigated how non-tariff and quantitative measures may be expressed as a tariff equivalent (Marcia and Hanrahan, 1984). The results obtained were of immense importance, allowing concrete negotiations over opaque instruments. During actual negotiations few years later, the OECD study became a cornerstone of the Uruguay Round tariffication proposal.

The joint OECD-IATRC effort spurred analytical activities in other bodies as well as studies in the academic community (based on, but not limited to PSE and CSE concepts), both helping to identify precisely who was responsible for most of the distortions, which instruments were most distorting, what were the distributional implications of policies and what might have been the effect of full-scale removal of existing policies. A World Bank (1986) study, introducing “the nominal protection coefficient” (measured as the ratio of domestic

producer prices to international prices) in seven economies during 1980-1982 period, is indicative in this sense. The study confirmed accusations and suspicions by the USA, Australia and New Zealand (nominal protection coefficients equal to 1.17, 1.09 and 1.00) of a high degree of protectionism in the EC and Japan (respective nominal protection coefficients equal to 2.08 and 1.56).

For comparison it is instructive to look at creation of analytical instruments and “language” for policy discussion during earlier GATT rounds. The Haberler Report presented to the GATT in 1958 (Haberler, 1958) was the first systematic attempt to examine the welfare effects of existing agricultural policies and protection instruments and to propose possible solutions to the agricultural trade problem. It was innovative in dissecting the protectionism effects (the problems of market access to developed economies, the effects of export subsidization and deteriorating agricultural terms of trade, costs of domestic policies). It also pioneered alternative policy approach: “there should be some gradual moderation of the degree of agricultural protection in exporting and importing countries; that whenever practicable there should be some shift of the means of protection away from price support and toward deficiency payment systems.” (p. 89) However, while providing measurement of the terms of trade decline, it did not devise any means to compare countries’ agricultural policies and various instruments and hence had little influence on policy discussion of the 1960s.

3.4 Contextualization Stream

The first reactions to adverse developments in international agricultural markets in 1980-1982, despite careful organisational activity at international level (the formation of the GATT Consultative Group of Eighteen and the Trade Ministers Quadrilateral with a task of exploring current trade issues, chartering the course of future trade relations and improving coordination at top decision making level), were hardly marked by any willingness of the USA and the EC trade, agricultural and top policymakers to sit together and negotiate agricultural trade policy issues. Indeed, the idea of joint multilateral action would come few years later. This state of affairs is explained, apart from inherent difficulties in measuring the extent of subsidisation and lagging operationalisation efforts, by the fact that both parties crucial for the launch of the Round could initially minimize (avoid) the costs of economic and governance crisis through unilateral action.

In 1981, in contrast, the atmosphere of “passing the buck” set in. US Secretary of Agriculture J. R. Block accused the EC of undercutting US exports,

but “wisely” avoided any criticisms of the underlying problem of the EC’s high internal prices, inevitably causing export expansion, knowing that such move would lead in return to condemnation of the USA 1981 Farm Bill that perpetuated New Deal practices. Indeed, EC Commissioner C. Villain did not fail to reiterate this point. 1982 discussions of Transatlantic trade relations thus rapidly turned into a squabble of who subsidises most and who is “sinning” more.

1982 marked a certain decrease in the unwillingness of the USA and the EC to cooperate due to greater involvement of the OECD. Being an organ with a substantial consultative function, it was helpful in examining all aspects of the crisis and all possible solutions (including the multilateral one). It also allowed participants to be less obliged to make difficult political decisions. This explains why agricultural ministers rather quickly made a joint declaration that “the present situation called for immediate action, as the problems arising from market imbalances could have potentially dangerous consequences. Pragmatic and multilateral action was required, inspired by a sense of urgency and collective self-restraint.” (OECD, 1982, p. 114)

GATT Ministerial in November 1982 gave momentum to contextualization entrepreneurship. While the Ministerial yielded no practical outcome with any agreement reached on a reformed system of surplus disposal and export subsidies, the realisation of joint vulnerability and of multilateralism as a solution was growing stronger. Ministers now considered imperative “to bring agriculture more fully into the multilateral trading system by improving the effectiveness of GATT rules.” (GATT, 1982, p. 7v)

In 1983, however, the reversal in multilateral action was witnessed, this time among US policymakers. Dissatisfied with EC’s reaction in the GATT Ministerial, unilateral mechanisms of assisting the US farmers in the crisis were devised – the allocation of additional funds to the US Export-Import Bank in order to extend concessional credit to foreign buyers of US agricultural exports, and wheat sales to Egypt, a traditional French export market. Voices were also raised in Congress as to whether GATT was necessary at all for US trade relations and whether Section 301 economic sanctions should be added to the US trade strategy toolbox.

This resurgence of unilateralism was short-lived however in the USA. The failure of the Payment in Kind measure that was introduced in 1983 to deal with excessive surpluses and the ongoing bankruptcies of the private banks that financed the program pushed US policymakers to firmly embark on a multilateral solution to the US domestic farm problem. There was also realization that agricultural trade frictions could potentially cripple the GATT dispute settlement system and, importantly, could destroy the cohesiveness of US trade

strategy and Uruguay Round agenda – such agricultural exporters, as Brazil, were refusing to place services on the Round agenda without a guarantee that some multilateral solution to the agricultural trade problem (and, as a result of it, increased market access for exporters) would be found.

The institution of the EEP (Export Enhancement Program) as well as devaluation of the US dollar following the Plaza and Louvre agreements were thus the manifestations of this new perception of external context by the USA. Both of these measures had a single purpose – to increase the costs of EC export subsidisation, to drain the Community budget and thereby to convey to the EC that the USA awaited the start of talks shortly. Indeed, as argued by Wiener (1995: 120), the EEP was established in response to the EC's indecisiveness as to whether to start the Uruguay Round.

Regarding the EC's perceptions of a multilateral solution to the agricultural trade crisis, all countries, except France, relatively easily agreed that agricultural issues should be discussed (due to their smaller stake in subsidised exports). France, however, avoided calls for the new Round agricultural talks throughout the early 1980s - both at time of positive (the EC's palliative reform of 1984 that eased budget pressures) and negative developments (looming trade war with the USA over export markets and the loss of markets following EEP operation). The Bonn Summit of G-7 states (2-4 May, 1985) exposed this intransigence of France, leading to the Summit collapse.

However, French position changed gradually. Firstly, its demands to discuss trade issues in parallel to monetary ones (specifically monetary system instability) were satisfied in 1985 in the above mentioned agreements. Secondly, preliminary agreement that had been sought by France to discuss the services issue in the Uruguay Round was reached, thus guaranteeing the package approach to talks (with neither agricultural issues nor export subsidisation ones singled out for special treatment). Hence, no excuses were left to ignore the forthcoming Round and inclusion of agricultural agenda. Thirdly, the effectiveness of EEP led to deterioration of the French trade balance. Finally, French cartelization initiative failed (Preeg, 1995: 54). France suggested creating a cartel of agricultural exporters to lift prices. Other EC members, however, had no intention of distorting trade relations through such radical means. All these factors added a sense of urgency to French policymakers, making it clear to French policymakers that agricultural agenda cannot be avoided. Deprived of avenues for retreat, fearing isolation in the Community, enlarging to the maximum the field of forthcoming negotiations and allowing themselves the maximum leeway, France finally agreed to start the Round in 1986.

4. Conclusion

The paper demonstrated that the readiness for change when the latter cannot be avoided does not usually come instantaneously, with actors preferring to tackle adverse exogenous developments through unilateral action, rather than cooperation and maximize their gains at the expense of other parties. The idea that minimization of adverse effects requires joint action come to fore only when realization of mutual vulnerability and possible joint losses is strong enough. It was also shown that policy system is not ready for change, when adverse developments are not perceived as acute or requiring immediate attention, but more like a “wake-up” calls. Finally, the readiness for change is increased substantially, if adverse exogenous factors start to affect an increasing number of actors, both within given policy space, and also other spaces. The agricultural and trade policy history attests that realization along these three dimensions was not present in earlier GATT rounds, during ITO episode, and in the early 1980s. It was only in 1985 when major players got ready for all-encompassing change: the ongoing fall in commodity prices and intensifying export competition created a situation when they stood at the brink of a trade war with unpredictable consequences (including the destruction of the whole trade governance regime).

The process of obtaining mutually valuable and shared frame and hence readiness for change did not depend much on the internal quality and consistency of the frame (i.e. on whether it offered economically sound and clear interpretations of what was wrong and why problems had to be tackled in a particular way). Instead, frame appropriateness (its acceptability in the eyes of established opponents) and credibility (frame not contradicting world events and reality) mattered most. The history of international agricultural and trade policy witnessed both unsuccessful instances of framing (during the ITO formation in the 1940s or in the European policy system in the 1970s), when new frames were not considered appropriate in light of existing frames and also contradicted objective economic conditions, and successful framing cases (the US and the EC on the eve of the Uruguay Round, and agricultural policy formation in the 1950s in the EC), when objective conditions were conducive to acceptance of new frames, and when existing consensus about the “sanctity” of existing frames started to crumble.

We also showed that the role of the community of economists and experts is not limited to mere diagnosing the problems, raising awareness, or providing theoretical frameworks (no matter how elaborate they are) but more importantly “providing figures” to policymakers. The limited progress in agricultural

trade liberalization in the 1960-1970s is attributed to lagging quantification of agricultural trade distortions.

Notes

1. Despite the widely held opinion that R. Reagan was initiator of the “conservative revolution” in US economic policy targeting the withdrawal of the state from the economy, the real impetus for change came from D. A. Stockman. His zealous conservative orientation combined with his sound knowledge of various economic and social doctrines and well thought-out and broad reform program made him a classical example of a resolute and effective framer of policy issues. At the same time his in-depth experience of Washington politics made him somewhat different from the classical outsider entrepreneur, as originally formulated by Schumpeter.

2. Firstly, Reagan’s life experience as “self-made person” was a clear confirmation of Stockman’s theories that prescribed the unleashing of private initiative and productive potential of people. Secondly, Reagan’s pragmatic pre-occupation with re-election, for which curing the economic woes of the USA through tax cuts, sequestration of budget items and, importantly, limitation of the balance of payments deficit were a number one priority, complemented well Stockman’s broader visions. This also suggests that Reagan was not a passive recipient of policy ideas, but was instead willing and able to do his own framing (Bergsten, 1996: 105-106).

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ACADEMIC COURSES' AND TEACHERS' EVALUATION BY STUDENTS USING THE ANALYTIC HIERARCHY PROCESS MODEL

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Abstract

The continuous evaluation of instructors' effectiveness and courses' relevance constitute an important part of the educational Process. In this paper, a multicriteria decision making method, called the Analytic Hierarchy Process (AHP), which has been developed by Saaty is used for the Ranking of the following University Courses: "Introduction to Computing", "Business Statistics" and "Financial Mathematics". The data for using the AHP Model are Greek University students' answers to a Questionnaire for the evaluation of the above three courses, with respect to the following three criteria: "Teaching Effect of Professor", "Effect of a good course book" and "easiness for obtaining a pass grade at exams".

The subcriteria for the criterion "Effect of a good course book" are: "Clear exposition of content", "Inclusion of many examples" and "easy access of Course book". The subcriteria for the "teaching effect of Professor" are: "Academic qualifications", "previous professional Experience", "Communication ability", "Friendly conduct" and "Research activity". The subcriteria for "Easiness for obtaining a pass grade at exams" are: "Avoidance of stress by good preparation", "obtaining a partial pass grade by Continuous Assessments during the course" and "existence of knowledge about the subject from previous courses".

The random sample of the evaluators were 482 students at the University of Athens, Greece and at the Technological Institute of Athens. A questionnaire was distributed to them containing questions on Demographics, Pairwise Comparison of the three Courses with respect to the three Criteria and

Pairwise Comparisons of the subcategories of every Criterion. After applying the Analytic Hierarchy Process, we found the weights corresponding to the "importance" of the courses. The final ranking was the following in descending order: First course: "Introduction to Computing", Second course: "Business Statistics" and Third course: "Financial Mathematics". The

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Consistency Ratios were calculated for all 7 pairwise comparison matrices (PCM) and were all less than (0,1), which is an important requirement for the consistency of the pairwise comparisons according to Saaty. An important finding is that, for students, the “Communication ability” and “friendly conduct” of a Professor carries more weight than his “research activity” and that the “homework given to students during the course” carries more weight than “knowledge accumulated from similar previous courses”. Finally, students rate higher a “book containing many examples” presented with clarity than the “effort which they make in obtaining the course book”.

JEL Classification: C6, C8, I20, I21, M1.

Keywords: Analytic Hierarchy Process, Consistency Ratios, Operational Research, Student Preferences, Teaching Effectiveness

1. Introduction

1.1. Importance of Curriculum Evaluation

An important part of teaching assessment is Curriculum evaluation. Every academic management department cannot ignore the findings of empirical research concerning student preferences relative to course evaluation and teacher effectiveness.

1.2. Evaluation of Courses and Teaching Effectiveness

The evaluation of courses and teaching effectiveness has been a research topic of continuous interest. A great deal of research has been devoted in determining if the teacher’s effectiveness of teaching (SET) is a function of the instructor who teaches a course rather than the course that is taught according to (Centra, 2003), (Marsh, 2007) and (Marsh and Roche, 1997). Of particular interest are the review papers of (Feldman (1989a, 1989b, 1992, 1993)), (Zahedi, 1986), (Aleamoni, 1987), (Braskamp et al, 1984), (Marsh, 1987) and (Marsh and Dunkin (1992, 1997)), (Blanas, 2008).

1.3. The Analytic Hierarchy Process

A multi-criteria method for decision making that uses qualitative and quantitative data is the Analytic Hierarchy Process introduced by (Thomas L. Saaty, (1977, 1980, 1987)). This important decision making technique has been applied to decision problems in many disciplines, such as economic analysis, regional planning and forecasting according to (Vargas, 1990), (Alessio

and Ashraf,2011). Important reviews on Analytic Hierarchy Process are: (Ho, 2008), (Vaidya and Kumar,2006), (Subramanian and Ramanathan,2012) and (Efron and Tibshirani, 1994).

1.4. Applications of the Analytic Hierarchy Process in different fields

We shall review some important papers on AHP which have been published recently. (R.W.Saaty,1987) investigates the considerable qualities of AHP as a method of measurement which uses ratio scales and gives the axioms and some of the crucial theoretical underpinnings of the theory.(R.W.Saaty,1987) pays special attention to departure from consistency of the pairwise comparison matrix (PCM), because the consistency is necessary for the validity of the AHP. The AHP method uses pairwise comparison matrices (PCM) for making decisions. Considerable research has been devoted for testing the consistency of the (PCM). The interested reader is referred to the paper of (Ergu et al,2011).

In an interesting research paper, (Tsinidou et al.,2010) the authors attempt to obtain a clearer picture of evaluations of quality determinants in Greek Higher Education as they are perceived by the students. The authors use the AHP for finding the relative importance weights of quality determinants that influence the educational process in Greek Higher Education. These quality determinants are the following: “Academic Staff”, “Administration Services”, “Library Services”, “Curriculum Structure”, “Location”, “Infrastructure”and “Career Prospects”. For the criterion of quality: “Academic Staff”, the authors suggest the following subcriteria: “Academic Qualifications”, “Professional Experience”, “Communication Skills”, “Friendliness”, “Business Links” and “Research Activity”.

The subcriteria for “Curriculum Structure” are the following: “Course content/Book”, “Educational Material”, “Structure of Courses”, “Course Structure info”, “Elective Courses”, “Laboratories” and “Weekly Timetable”. A point which needs further investigation is that the students who have answered the questionnaire in the above paper, believe that the subcriterion “Content of the Course” is not very attractive compared to the other subcriteria of “curriculum structure”, according to (Tsinidou et al.,2010).

In Education the AHP has been applied in selecting University Faculty, according to (Grandzol,2005), (Saaty et al.,1991).

In Marketing, the AHP, has been used for evaluating and comparing web-site usability according to (Presley and Fellows,2013). In a paper by (Altuntas et al., 2012), the AHP is used for measuring hospital service quality.

In an important review paper, (Sipahi and Timor,2010), the authors

categorize the applications of the Analytic Hierarchy Process(AHP) and Analytic Network Process (ANP) in various fields such as environmental Management and Agriculture, Energy Studies, Transportation and Construction Industries, Education, Logistics, Research and Development, Telecommunication Industry, Banking and Finance, Urban Development, Defence Industry and Military, Government, Marketing, Tourism, Archaeology, Mining and Auditing. During the period 2005-2009, 600 papers related to AHP and ANP have been published, according to (Sipahi and Timor,2010), (Halim et al.,2007),

1.5. Decision Problems in which the Analytic Hierarchy Process can be applied

According to (Frangos et al., 2014), the decision circumstances in which the AHP can be applied include: **a.** Choice. The selection of one alternative from a given group of alternatives, usually where there are multiple decision criteria involved. **b.** Ranking. Ordering a set of alternatives from most to least desirable. **c.** Prioritization. Determining the relative advantages of members of a set of alternatives, as opposed to selecting a single one or merely ranking them. **d.** Resource allocation. Distributing resources among a set of alternatives, (Bhushan and Kanwal,2004). **e.** Benchmarking. Comparing the operations and processes in one's own organization with those of other best- of -breed organizations. **f.** Quality Management. Dealing with the different points of view of quality and quality improvement. **g.** Conflict Resolution. Settling Disputes between Companies or groups of workers with apparently incompatible goals or positions,(Saaty and Peniwati,2008), (Saaty,2008).

1.6. Aim of this paper

In this paper, we apply the Analytic Hierarchy Process (AHP) in order to rank three courses “Introduction to Computing (INTRODUC_TO_COMPUTING)”, “Business Statistics (BUSINESS_STATISTICS)” and “Financial Mathematics (FINANCIAL_MATHS)”, with respect to the three criteria: “Teaching Effect of Professor (EFPROF)”, “Effect of a good Course Book (CBOOK)” and “Easiness for Getting a Pass Grade at Exams (GPEXAM)”.

2. Analytic Hierarchy Process Methodology

2.1. Setting of the Overall Goal, the Pairwise Comparison Matrix(PCM), called A for the three Criteria and the Evaluation Scale

In general, a hierarchical model of some social problem might be one that descends from an overall goal (focus), down to criteria, down further to sub-criteria which are subdivisions of the criteria and, finally, to the alternatives from which one must make the choice, according to (Winston et al., 2001). In our case, we have:

a. OVERALL GOAL: the choice by the students of one University Course with respect to three criteria. (CHCOURSE)

b. CRITERIA: “Teaching Effect of Professor (EFPROF)”,
“Effect of a good Course Book (CBOOK)” and
“Easiness for obtaining a Pass Grade at Exams (GPEXAM)”.

c. ALTERNATIVES “Introduction to Computing (INTRODUC._TO_COMPUTING)”,

“Business Statistics (BUSINESS_STATISTICS)” and
“Financial Mathematics (FINANCIAL_MATHS)”.

d. The subcategories of criterion: “Teaching Effect of Professor (EFPROF)”, are:

“Academic Qualifications (ACQUAL)”
“Previous Professional Experience (PEXPER)”
“Communication Ability (COMMNCA)”
“Friendly Conduct (FRIENDC)”
“Research Activity (RACTIV)”

e. The subcategories of criterion: “Effect of a good Course Book (CBOOK)” are:

“Clear presentation of contents of Course (CLEARC)”
“Inclusion of many Examples (EXAMPLE)”
“Easy Access of Course book (ABOOK)”

f. The subcategories of criterion: “Easiness of Obtaining a Pass Grade at Exams (GPEXAM)” are:

“Avoidance of Stress by good preparation for exams (ASTRESS)”
“Obtaining a partial Pass mark by Continuous Assignments during the Course (CASSIGN)”
“Existence of knowledge about the subject from Previous Courses (PCOURSE)”

To obtain the weights for the three criteria or objectives, we follow the exposition of The Analytic Hierarchy Process contained in the books of (Winston et al., 2001) and (Ragsdale, 2001). The first step is to set up pairwise comparison Matrices (PCM) for the 3 courses compared with respect to each of the three criteria, in the same manner, as we formed the (PCM) matrix A. We call them:

- B (Comparison with respect to criterion (EFPROF),
- C (Comparison with respect to criterion (CBOOK)
- D (Comparison with respect to criterion (GPEXAM))

2.2. Obtaining Students' Evaluations Through a Questionnaire

The entries in the pairwise comparison Matrices A, B, C, and D are the mean values of the answers to questions contained in a structured Questionnaire which has been distributed to (480) students at the University of Athens and at the Technological Educational Institute of Athens who have been taught the three courses.

2.3. The Four Pairwise Comparison Matrices

From the answers to the Questionnaires, we obtain the following Pairwise Comparison Matrices:

$$A = \begin{bmatrix} 1 & 0.500 & 0.700 \\ 2.000 & 1 & 0.600 \\ 1.428 & 1.666 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 4.048 & 4.142 \\ 0.247 & 1 & 0.500 \\ 0.241 & 2.000 & 1 \end{bmatrix},$$

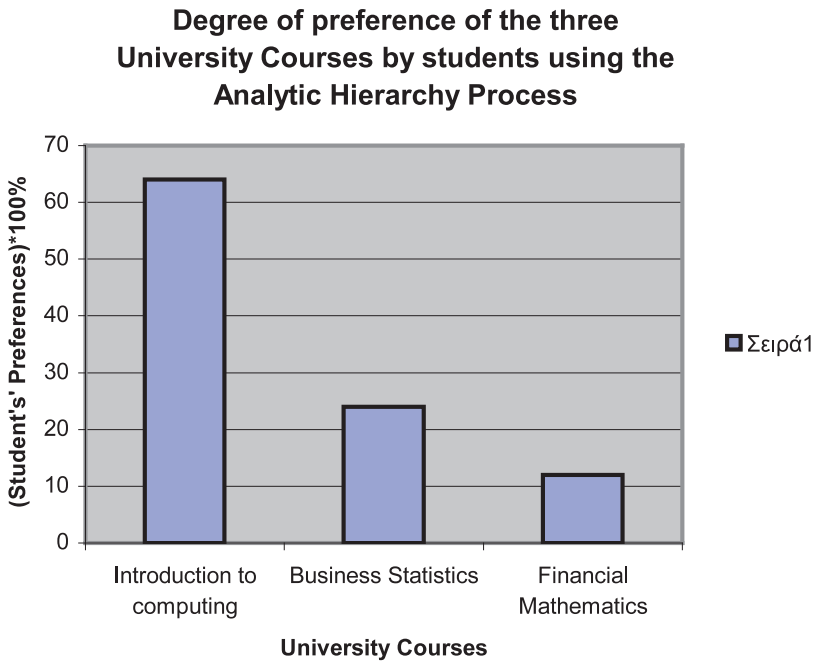
$$C = \begin{bmatrix} 1 & 3.633 & 3.629 \\ 0.275 & 1 & 3.383 \\ 0.275 & 0.295 & 1 \end{bmatrix}, \quad D = \begin{bmatrix} 1 & 4.235 & 4.358 \\ 0.236 & 1 & 0.450 \\ 0.229 & 2.222 & 1 \end{bmatrix}$$

2.4. Obtaining the Weights

For the final ranking of the three Courses, we obtain the following weights according to detailed spreadsheet instructions in [25] and [39]:

$$W_{11}=0.651 \quad W_{21}=0.120 \quad W_{31}=0.240$$

Figure 1: Ranking of the three Courses, according to students' preferences, by AHP



2.5. Calculation of the Consistency Ratios for Each Pairwise Comparison Matrix

A matrix is said to be consistent if it holds: $\alpha_{ij} * \alpha_{jk} = \alpha_{ik}$, for every i, j and k.

We must calculate the Consistency Ratios for every pairwise comparison matrix and these Ratios, according to Saaty [26], must not exceed appreciably (0,10), otherwise we must revise some of our judgements.

The Consistency Ratio is given by: $CR = \frac{(\lambda_{\max} - n)}{(n-1) * r_n}$,

where, (λ_{\max}) is the maximum eigenvalue given by the average Consistency Measure for all alternatives, according to [25] and [39], (n) is the number of

alternatives for this problem ($n=3$) and (r_n) is a random number given by Saaty [26], for $n=3$, the number of alternatives ($r_n=0,58$). The Consistency Ratios calculated in the same manner for the matrices A, B, C, and D, using Microsoft Excel, according to Winston et al [39], Ragsdale [25], Expert Choice [10], are given below:

Table 1. Consistency Ratios for the Pairwise Comparison Matrices

Pairwise Comparison Matrix	Consistency Ratio	Pairwise Comparison Matrix	Consistency Ratio
A	0.070	C	0.082
B	0.050	D	0.066

Note, that every Consistency Ratio is less than (0,10), according to the guidelines of Saaty [26]. Hence, the judgements of the evaluators are fairly consistent.

2.6. The Pairwise Comparison Matrices for the Subcriteria of Each Criterion

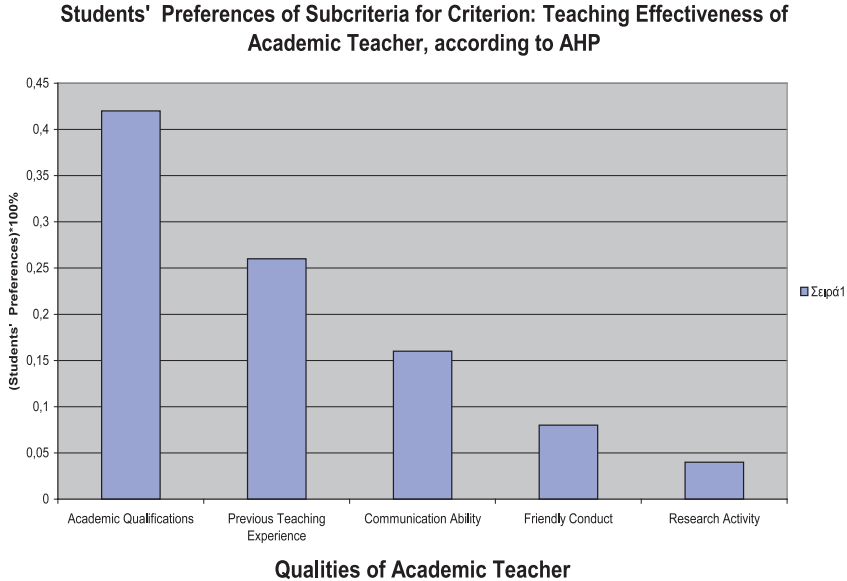
Now, we turn our attention to the pairwise comparisons of the subcriteria corresponding to each criterion. We form the following pairwise matrix, E, for the subcriteria of the first criterion: “Effectiveness of teaching Professor” described in paragraph (d) of Section (2).

a. Subcriteria of 1st Criterion

Matrix (E)=

	<i>ACQUAL</i>	<i>PEXPER</i>	<i>COMMNCA</i>	<i>FRIENDC</i>	<i>RACTIV</i>
<i>ACQUAL</i>	1	3,626	3	3.662	3.400
<i>PEXPER</i>	0.275	1	3.455	3.586	3.347
<i>COMMNCA</i>	0.333	0.289	1	3.111	2.333
<i>FRIENDC</i>	0.273	0.278	0.321	1	0.900
<i>RACTIV</i>	0.294	0.298	0.428	1.111	1

b. Finding the weights and the Consistency Ratio for Pairwise Matrix (E). We find the following weights, summarized graphically in the following graph and the Consistency Ratio for matrix E:

Figure 2: Ranking of qualities for Academic Teacher

c. Consistency Ratio= 0.081

We can see that the highest weight of “importance” is assigned to “Academic Qualifications” whereas the lowest weight of “importance” is assigned to “Research Activity.” We note that “Friendly Conduct” and “Communication Ability” have higher degree of “importance” than “Research Activity”, in the opinion of students.

d. Finding the Ranking for the subcriteria for criterion: Course Book (CBOOK) and Exam(GPEXAM).

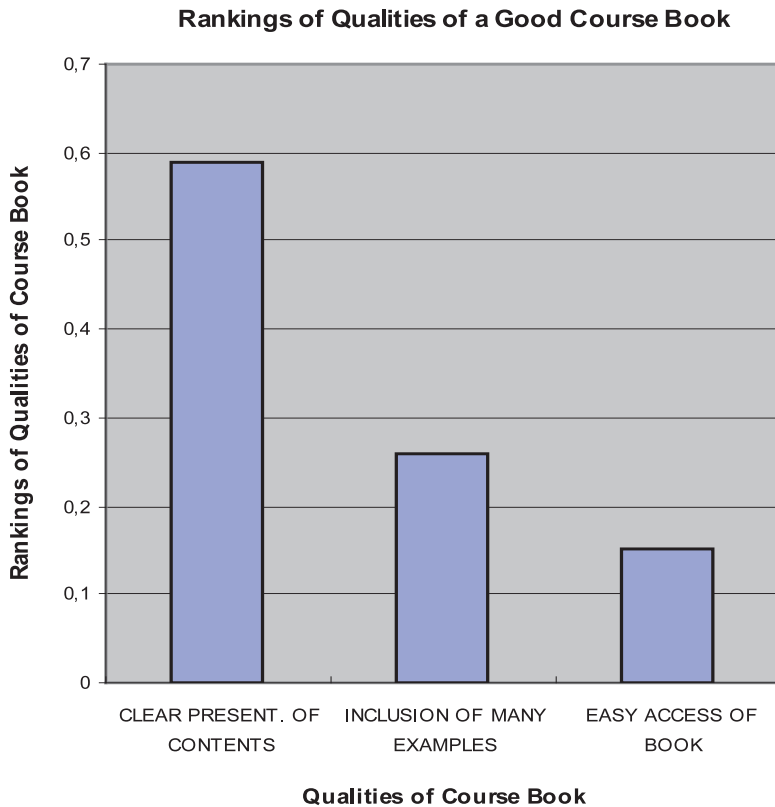
Similarly to criterion “Effectiveness of Professor (EFPROF)”, we construct the following Table with the Rankings of the subcriteria for criteria:CBOOK and GPEXAM.

Table 2: I Students' preferences for the two criteria: CBOOK and GPEXAM

	CLEARC	EXAMPLE	ABOOK
CBOOK	0.590	0.260	0.150

	ASTRESS	CASSIGN	PCOURSE
GPEXAM	0.650	0.250	0.090

Figure 3: Ranking of qualities of a good course Book, according to students' preferences



e. Results from Calculations We note that the students rate: “Obtaining a partial Pass mark by Continuous Assignments during the Course” higher than “Existence of knowledge about the subject from Previous Courses” and “Inclusion of many Examples” higher than “Easy access of Course book”.

3. Discussion

The findings of this paper are the following:

a. The AHP is a powerful method which can be used for the evaluation and choice of Courses and Selection of University Faculty. Apparently, the AHP can be applied, also, to many diverse fields, such as Engineering, Planning, Military, Marketing, Economics, Conflict Resolution, Environmental Management, Research and Development and many more.

b. According to the opinions of the group of students who have completed a Questionnaire, “Teaching Effectiveness of the Professor” is a criterion with subcriteria of highest rating the “Academic Qualifications” and of lowest rating the “Research Activity”. The subcriterion “Ability of Communication” is of higher rating than the subcriterion “Research Activity”. The following questions are to be investigated: (b1) If there was a different random sample of students, the degree of the “importance” of Teaching Effectiveness could be different? (b2) If the Courses in consideration were offered online would the preferences of the students be different? (b3) Which are the preferences of the students towards Courses which are taught at laboratory Sessions, using Computer packages ?

c. An important task is to develop Psychological instruments such that people’s feelings can be adequately represented by numerical scales.

d. The results of AHP can be compared with similar results from other Decision approaches, such as Expected Monetary Reward decisions and Optimization algorithms.

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THE ADOPTION OF INTERNATIONAL FINANCIAL REPORTING STANDARDS (IFRS) AND INTERNATIONAL STANDARDS OF AUDITING (ISA) IS REQUIRED TO FIGHT SHADOW ECONOMY REPERCUSSIONS

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Abstract

Shadow economy and lack of transparency reduce the overall country's tax revenues. Hence, the legal (honest) households and corporations usually *bear* the tax burden. Besides, high taxation is an obstacle for economic growth. In the present article an effort will be made to point out with panel data that shadow economy causes a higher effective tax rate. This distortion takes place at a greater extent in southern EU. Our sample covers annually Austria (2001-2013), Belgium (2001-2013), Cyprus (2005-2013), Denmark (2001-2013), Finland (2001-2013), France (2004-2013), Germany (2001-2013), Greece (2001-2013), Ireland (2001-2013), Italy (2001-2013), Netherlands (2001-2013), Portugal (2001-2013), Spain (2001-2013), Sweden (2001-2013) and UK (2001-2013). To fight this distortion and to increase transparency, countries should adopt the IFRS and ISA, which will cause eventually economic growth.

JEL Classifications: E26; O17; C33

Keywords: shadow economy; tax evasion; economic growth; panel data analysis

1. Literature Review

1.1. Transparency

An effective tax policy can be applied in many ways (as: budget, income distribution, even as an incentive for health protection (against smoking)). Further, a tax policy is effective only when there is transparency in income statements.

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Following (Allingham and Sandmo, 1972); (Srinivasan, 1973) researches concluded that auditing is one important determinant factor to reduce tax evasion. Hence, auditing is required to guarantee that income statements are trustworthy.

1.2. Globalisation

Globalization has increased competition. Hence, firms try to find ways to be or to look competitive. Some companies resort to tax avoidance and use reduced transparency in order to be competitive. According to (Scherer et al., 2009) there is a “*declining capacity of nation state institutions to regulate socially desirable corporate behavior*”. (Dyckhoorn and Sinning, 2010) investigated the degree of adoption of International Financial Reporting Standards (IFRS) around the globe. They have studied large geographical regions such as Europe, Australia as well as North America. A special attention was given to China as well as emerging economies, for these regions became recently important players in the global economy (Palley, 2011).

1.3. Many Countries Refuse To Adopt IAS And ISA

Adopting internationally IFRS and ISA is very difficult and this is shown for various reasons in a great number of studies such as: Walker (2010); (McEnroe and Sullivan, 2013); (Prather-Kinsey, 2006); (Hegarty et al., 2004); (Dyckhoorn and Sinning, 2010); (Ottaway, 2001); (Stoddart, 2000); (Navarro-García and Bastida, 2010).

1.4. Advantages Of Transparency

According to (Hermalin and Weisbach, 2007) at a company level the extent of transparency depends on the governance relation between the CEO and the Board of Directors. The directors set the level of transparency, and increased transparency provides benefits to the firm (since the inter-firm collaboration is better, and the within-firm collaboration is improved (Rao et al., 2007))¹, but entails costs as well. Indeed, restricting shadow economy is hard to get (Georgiou, 2013). Thus, according to (Hermalin and Weisbach, 2007) that there can be an optimal level of transparency. Further, Kerr (2015) asserts that countries in which firms have greater levels of transparency have lower levels of tax avoidance. Further, an increased transparency gives better, trustworthy and reliable information to the would be investors. Hence, international investments will be increased ending up with economic growth (Georgiou, 2013a).

1.5. Reasons and Consequences of Shadow Economy

1.5.1. Reasons

According to the work of (Guenther, 1994) companies of the United States resort to earnings management before a change in the profit tax rate. In this way firms aim to show lower levels of profits in order to pay less taxes. This is mainly done by large companies. A lot of studies are made on earnings management: DeAngelo (1986), Jones (1991), Cahan (1992). Earnings management showed a remarkable increase during the period 1997-2002 (Cohen *et al.*, 2004). The rapid technological progress as well as the fast change in capital markets made accounting systems very complicated. Firms in a globalized environment resorted to earnings management in order to attract would-be investors (Vanasco, 1998). Hence, in order to have transparency an international accounting system is required to be adopted. World history has shown that countries with robust governance and reliable accounting systems enjoy economic growth and political stability (Georgiou *et al.*, 2015); (Rogdaki, E. Koutoupis, A. G. and Rodosthenous, M., 2011); (Bekiaris *et al.*, 2011).

Doing earnings management entails certain risk. But taking this risk means that there is a reason for it. There are five reasons (Verbruggen *et al.*, 2008). The first reason is various motives about the stock market. The second reason is hiding (or revealing) some information. The third reason is political cost. The fourth reason is to show that the retiring CEO is a nice character and finally the fifth reason are various motives internal to the firm. More specifically:

Regarding the stock market motives, the earnings management is related to the share prices of these firms. In the United States the stock market is efficient (Cormier *et al.*, 2000). But there are countries where there are firms not listed in the stock market, in which tax evasion takes place. In these countries the method of earnings management happens in a considerable extent. Further, earnings management takes place in order to show that the firm has realized its targets so as to raise its share price (Bartov *et al.*, 2002). It should be also noted that firms aim to remain competitive and to meet their obligations to third parties (Cormier and Magnan, 1996) in order to avoid bankruptcy. Hence, they sometimes hide various costs, in order to avoid an increase in the interest rates of their loans.

As far as hiding (or revealing) information is concerned, according to Rosner (2003), hiding information helps earnings management. Besides, information hiding aims to the optimum future tax burden allocation of the company

(Shane and Stock, 2006). Apart from that, earnings management made by the company directors aims towards their remuneration improvement (Tucker and Zarowin, 2006).

Political cost is also a motive for the companies to avoid government control that causes future tax increase. Thus, they resort to earnings management (Monem, 2003). Further, D'Souza, Jacob and Ramesh (2001) claim that there are companies which, through the method of earnings management, show lower levels of profits when they are in the process of negotiating labour contracts.

The fourth reason (motive) to use earnings management is the attempt of CEO to persuade the others that he (she) is a person of good fame. This can happen when CEO is leaving (Godfrey *et al.*, 2003), or when he (she) retires (Reitenga and Tearnay, 2003). In these cases, earnings management tend to show higher profits so as the leaving CEO to be able in the future to become a member of the board of directors.

Finally, there are various motives (reasons) of internal to the firm nature, that cause earnings management, either to increase company's share prices (Graham *et al.*, 2005), or to improve the company's CEO remuneration (Graham *et al.*, 2005).

There are lots of studies pointing out that earnings management is done mainly for tax evasion: DeAngelo (1986), Jones (1991), Cahan (1992), (Burgstahler & Eames, 2006), (Burgstahler *et al.*, 2002), (Dhaliwal & Wang, 1992), (Ettredge *et al.*, 2006), (Glancy & Yadav, 2011), (Healy & Wahlen, 1999), (Phillips *et al.*, 2003).

However, when there is an organized control through auditing then companies avoid resorting to earnings management. At this point it must be stressed that a stricter state governance is off-putting for the tax avoidance, restricts shadow economy (Georgiou, 2013b) and consequently yields economic growth and political stability (Georgiou *et al.*, 2015). In fact, Wang, X. (2014) asserts that in international level earnings management is stronger in countries where investors are not protected, laws are not respected as well as when there is a highly concentrated ownership status.

According to Brondolo (2009) tax evasion is higher during economic crisis. In fact in 2008 in many countries tax revenue losses started to go up and on the average it is estimated to reach 0,8% of GDP. It should be noted that this phenomenon continued in 2009. This situation is more severe in emerging economies. On the contrary, according to (Filip and Raffournier, 2015) earnings management in the enlisted companies of EU is reduced considerably during the period 2008-2009.

Greece, which is a southern member of EU, has compared to other countries a higher level of tax evasion through the method of earnings management (Leuz et al., 2003). Besides, according to (Leontidou and Gialis, 2014) southern EU members have the problem of tax evasion due to “hidden employment”.

1.5.2. Consequences of shadow economy

Shadow economy is a consequence of tax avoidance. Tax avoidance can be due either to households and/or to companies. The main consequence of shadow economy is that country’s overall tax revenues are lower than expected, and consequently the legal (honest) people bear the tax burden. Imposing taxation on property in order to finance the tax revenue gap attributed to tax avoidance causes depression (Georgiou, 2013c).

A second consequence is that shadow economy is an obstacle to entrepreneurship, hence it is an obstacle to economic growth. In fact, lack of transparency is off-putting for the would be investors when they do not trust company’s income statements.

These two consequences, caused by shadow economy, are two important *distortions* and are an obstacle for the correct GDP estimation, as well as for the correct policy implementation (Putniņš & Sauka, 2015). Needles to mention that shadow economy distorts market competition (Bitzenis et al., 2016). Finally, high profit tax rates hinder entrepreneurship and are an obstacle to economic growth Georgellis and Wall (2002).

1.6. Our Research Question

From the above mentioned theories and observations our research question is: “*how shadow economy, southern geographical regions of EU and official economic growth affect the effective tax rate*”.

2. The Econometric Model

2.1. Our Research Hypothesis

Based on the afore-mentioned our research our research hypothesis is:

Ho: “*Shadow economy has no impact on effective tax rate and southern regions of EU have no impact on the effective tax rate and official economic growth has no impact on the effective tax rate*”.

2.2. Data Sources

Effective tax rate (**eft**) is the average rate at which an individual or corporation is taxed and is taken from Eurostat and it is a percentage of GDP for all economy but the financial sector. Official Economic Growth (**rGDPgr**) is taken from World Bank and is the annual growth rate of official GDP at constant prices. Shadow Economy data (**sh_ec**) as a percentage of official GDP are taken from (Schneider et al., 2010); (Schneider, 2013). Finally, the variable (**south**) is a dummy variable to indicate the southern regions of the EU. As southern EU regions the following countries are selected: Cyprus, Greece, Italy, Portugal and Spain. The period covered is 2001-2013 annually, and our data refer to Austria (2001-2013), Belgium (2001-2013), Cyprus (2005-2013), Denmark (2001-2013), Finland (2001-2013), France (2004-2013), Germany (2001-2013), Greece (2001-2013), Ireland (2001-2013), Italy (2001-2013), Netherlands (2001-2013), Portugal (2001-2013), Spain (2001-2013), Sweden (2001-2013) and UK (2001-2013).

2.3. Econometric Model Used

The econometric model is shown by equation (1).

$$eft_{it} = c_0 + c_1 d_sh_ec_{it} + c_2 south_{it} + c_3 rGDPgr_{it} + error_{it} \quad (1)$$

The variable **d_sh_ec** is the first differences² (annual differences) in variable **sh_ec**. This model is estimated by Panel EGLS (Period weights)³ through the Eviews software package, at a significance level $\alpha = 0,05$.

2.4. Econometric Results

Table 1: Unit Root Test for variable [etr]

Panel unit root test: Summary
Series: ETR
Sample: 1 188
Exogenous variables: Individual effects, individual linear trends
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin&Chu t	-6,38376	0,0000	13	162
Breitung t-stat	-8,05882	0,0000	13	149
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2,61631	0,0044	13	162
ADF - FisherChi-square	45,1831	0,0112	13	162
PP - FisherChi-square	111,130	0,0000	13	175

Variable **etr** is stationary⁴ since all *p-values*< α .

Table 2: Unit Root Test for variable [d_sh_ec]

Panel unit root test: Summary				
Series: D_SH_EC				
Sample: 1 188				
Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel				
Method	Statistic	Prob.	Crossections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin&Chu t	-6,23692	0,0000	13	162
Breitung t-stat	-3,51309	0,0002	13	149
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3,68547	0,0001	13	162
ADF - FisherChi-square	60,0685	0,0002	13	162
PP - FisherChi-square	150,256	0,0000	13	175

Variable **d_sh_ec** is stationary since all *p-values*< α .

Table 3: Unit Root Test for variable [rGDPgr]

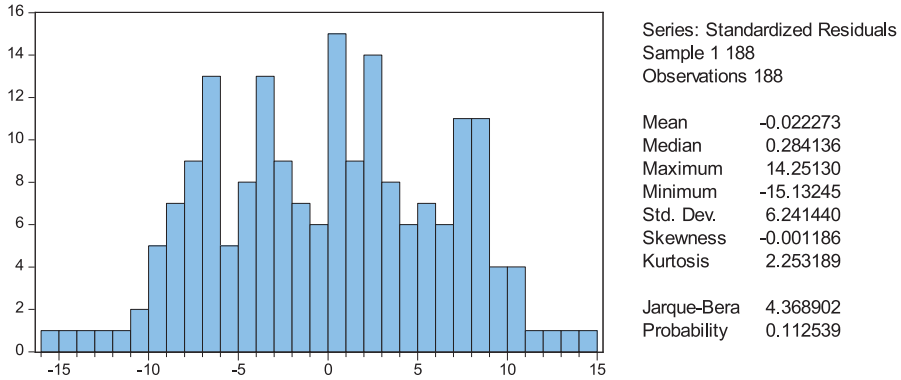
Panel unit root test: Summary				
Series: RGDPGR				
Sample: 1 188				
Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel				
Method	Statistic	Prob.	Cross sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin&Chu t	-5,06491	0,0000	13	162
Breitung t-stat	-3,88392	0,0001	13	149
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2,25179	0,0122	13	162
ADF - FisherChi-square	42,8257	0,0201	13	162
PP - FisherChi-square	105,805	0,0000	13	175

Variable **rGDPgr** is stationary since all p -values $< \alpha$. Since all variables are stationary, then one can estimate the regression (see table 4.).

Table 4: Econometric Results

Dependent Variable: ETR				
Method: Panel EGLS (Period weights)				
Sample: 1 188				
Periods included: 15				
Cross-sectionsincluded: 13				
Totalpanel (unbalanced) observations: 188				
Linear estimation after one-step weighting matrix				
White cross-section standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25,70369	0,646922	39,73231	0,0000
D_SH_EC	2,619629	0,784564	3,338961	0,0010
SOUTH	2,867920	1,174451	2,441923	0,0156
RGDPGR	0,593388	0,141795	4,184834	0,0000
WeightedStatistics				
R-squared	0,137877	Meandependentvar		37,54469
Adjusted R-squared	0,123821	S.D. dependentvar		18,60533
S.E. ofregression	6,292156	Sumsquaredresid		7.284,78
F-statistic	9,808893	Durbin-Watsonstat		1,948311
Prob(F-statistic)	0,000005			
UnweightedStatistics				
R-squared	-0,027357	Meandependentvar		25,97234
Sumsquaredresid	8.103,79	Durbin-Watsonstat		2,014758

With a sample size equal to 188, (at 5%) $d_U = 1,79379 < DW = 1,948311$. Hence there is no serial correlation in this model. All coefficients (including the constant term) are statistically significant, and positive, for all p -values $< \alpha$. P -value of (F statistic) $< \alpha$.

Figure 1: The Distribution of the Residuals of the Regression**Table 5: Robustness Tests⁵**

Tests	Model	Critical values ($\alpha = 0,05$)
Heteroskedasticity*	1,614	7,815
RESET**	1,069	3,841
Normality***	4,369	5,991

Notes:

* Regression of the *log* of squared residuals on X (*a Harvey test*)

** Regression of residuals on \hat{Y}^2

*** Normality test (*Jarque Bera*)

The robustness tests (see table 5) are made in order to check whether the basic assumptions for the construction of the above model are met. To begin with, the assumption of homoskedasticity is fulfilled since, according to the above *Harvey test*, the statistic is less than the critical value 7,815. Besides, the specification of this model is correct, since the RESET statistic is less than the critical value 3,841. Further, the distribution of the regression residuals in all this model is normal, since Jarque Bera statistic is less than the critical value 5,991. Finally, there is no serial correlation, since at $\alpha = 5\%$, $d_U = 1,79379 < DW = 1,948311$. Needless to mention that all variables [etr], [d_sh_ec]

and [rGDPgr] are all stationary, since Levin, Lin & Chu t statistic, Breitung t-stat statistic, Im, Pesaran and Shin W-stat, ADF - Fisher *Chi-square*, and PP - Fisher *Chi-square* have all $p\text{-value} < \alpha$. Consequently, the afore-mentioned model is robust and can be briefly presented in table 6.

Table 6: The Regression Results Briefly

	constant	d_sh_ec	south	rGDPgr
coefficient	25,704	2,620	2,868	0,593
<i>p-value</i>	0,000	0,001	0,016	0,000

Source: Table 4.

3. Concluding

3.1. Findings And Discussion

According to this model at a level of significance 5% the above mentioned *research hypothesis* is not accepted. More specifically, shadow economy has a positive impact on effective tax rate, southern regions of EU have a positive impact on effective tax rate and finally economic growth has a positive impact on effective tax rate. In other words, shadow economy makes the official state to “punish” legal and honest tax-payers by imposing on them a higher effective tax rate to cover the *tax revenue gap* created by the tax evaders. One can also notice that the coefficients of shadow economy and geographical region are about four times higher than the coefficient of economic growth. From this observation it is evident that the high level of effective tax rate is mainly due to the existence of shadow economy and southern EU regions.

This impact is not fair, and in the long run it might be unfortunately a “ *motive*” for the today’s “*legal and honest taxpayers*” to resort to tax evasion in the future. If this takes place, then the size of shadow economy will increase even further, and the created lack of transparency will hinder entrepreneurs to invest and create economic growth. It should not be forgotten the above finding that the effective tax rate tends to be higher in the southern regions of EU, which are mostly hit by the international economic crisis (EIOPA, 2015), where economic growth is mostly required.

Consequently, international financial reporting standards and international standards of auditing should be adopted by EU members in order to eliminate tax avoidance, which is a great segment of shadow economy.

3.2. Further Research

This model refers on the impact of total shadow economy on effective tax rate. It should be of interest to have available data on the various parts of shadow economy (earnings management, hidden employment, etc.) so as to be able to separate the impact of each part on effective tax rate. Besides, one should attempt to find ways in order to persuade people to turn to be “legal” and avoid tax evasion.

The increased tax burden through the higher effective tax rate would cause a distortion in the distribution of income. Therefore, present paper triggers further research on the impact of shadow economy upon the income distribution.

Besides, it would be of interest to investigate how the different *culture* of each member state of EU affects the delay of the adoption of the international accounting standards and international standards of auditing.

Notes

1. It should be also noted that transparency gives better information to the would be investors, so as to invest and cause economic growth. In fact shadow economy hinders entrepreneurship (Georgiou, 2013a).

2. First differences are required to make the variable **d_sh_ec** stationary. From the economics point of view this expresses the annual increase (or decrease) of the shadow economy in each country.

3. For a detailed econometric analysis see (Halkos and Georgiou, 2005).

4. All variables must be stationary in order to be able to estimate the regression.

5. These robustness tests are based on Halkos (2003)

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