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Recent Evidence on the Taxpayers' Reporting Decision in Greece: A Quantile Regression Approach

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Abstract:
This paper examines the responses of individuals to marginal tax rates in their reporting of income, using the 2009 individual tax return data for Greece. The method of regression quantiles is employed to provide evidence on behavioral responses at different points of the income distribution. The results reveal significant differences in the marginal tax rate reporting responses across income classes and for different occupational groups; whereas high income taxpayers have a very elastic response. As particular groups of taxpayers have more flexibility in misreporting tax liability also depends on the government's effectiveness to control tax avoidance. Evaluation of the 2010 tax reform further reveals that misreporting of the occupational groups Rental Income and Wages & Salaries appears to be the highest. Policy recommendations regarding tax reforms should therefore take into account the reported income distribution involved and the selected policy objectives.

Key Words:
Tax price elasticity, behavioral responses, quantile regression

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1. Introduction

The examination of the taxpayers' behavioral response to changes in marginal tax rates is essential in estimating the impact of different tax policies so as to minimize the individual's bias and avoid erroneous policy recommendations. The effectiveness of government intervention is affected by changing behavior, as taxpayers' reporting decisions are subject to the prevailing tax schedule. The lack of government revenues can also be partially explained by the potential responsiveness of taxpayers. Given that Greece is considered a country with a high rate of tax avoidance and evasion, the estimation of the reported income elasticity could prove useful, especially for policy makers and taxpayer advocates, for the evaluation of alternative tax policies and the prediction of tax revenue effects.

Initially, labor supply elasticities were used to design appropriate tax and fiscal policies, though these are likely to underestimate taxpayers' response to tax rate changes, measuring only how taxpayers alter their work schedule. Recent studies have used elasticities of (taxable) income, accounting explicitly for tax avoidance and implicitly for exclusions and deductions (e.g. Lindsey, 1987; Feldstein, 1995; Sammartino and Weiner, 1997; Auten and Carroll, 1999; Gruber and Saez, 2002). The obtained results vary though considerably, depending on the method of estimation used, the particular tax reform examined and the country under consideration. Two reasons may explain the conflicting results. First, it is often problematic to compare reported income before and after a tax reform, as changes in the definition of taxable income are introduced apart from tax rate changes. Second, most studies attribute the widening of income inequality to tax reforms, though evidence has shown that other factors may have increased inequality. Nevertheless, results show that income heterogeneity should be considered when estimating the taxpayers' reporting decision, as the responsiveness of taxable income to taxes may be higher in higher income classes, for which a larger share of income is likely to come in forms that are easier to hide from tax authorities (Thalassinos and Liapis, 2013).

A suitable approach for this line of empirical analysis was recently employed by Alm and Wallace (2007 and 2010); namely quantile regression. Quantile regression was developed by Koenker and Bassett (1978) as a robust alternative estimation technique compared to conditional mean regression against outliers, and a useful approach in cases of heteroskedasticity. The magnitude of differential responses across income classes can be further examined, since regression quantiles allow analyzing the responsiveness of a wide range of reporting behavior to marginal tax rates and the responses of individuals at different points of the income distribution; a task that is not investigated thoroughly. Both empirical studies estimate though taxpayers' reporting decision using arbitrarily 'typical' quantiles such as 0.2, 0.4, 0.6, 0.8, which are very unlikely to always correspond to income classes that are taxed

differently so that the reported estimations may lead to a possible bias of the real magnitude of the differential responses across income classes. In addition, using quintiles, that is a 'truncation on the dependent variable' that segments the sample into subsets based on its unconditional distribution, and doing least squares fitting on these subsets yields to inconsistent estimates (Koenker and Hallock, 2001). Such strategies are condemned to failure for all the reasons so carefully laid out in Heckman's (1979) work on sample selection, implying that the reported OLS quintiles estimations should not be directly compared to the respective quantile regression estimations.

In this framework, this paper contributes to the examination of the responsiveness of a wide range of reporting behavior to marginal tax rates and the responses of individuals at the different points of the income distribution that correspond to specific tax brackets. The elasticity of earned income for the case of Greek taxpayers is estimated using quantile regressions that take into account heterogeneity, and a number of control variables. A rich dataset of individual tax returns for Greece is retrieved for the fiscal year 2009 to investigate whether marginal tax rates matter, as taxes might affect differently the behavior of individuals with different levels of income as well as occupation. Policy implications are also provided based on a scenario of the 2010 tax reform implementation a year earlier, using the new income tax schedule that includes nine brackets instead of four. Overall, this paper aims at providing an additional tool for policy makers' decision concerning taxation reforms, who could consider not only a single elasticity of taxpayer responses, but also the differences in these responses based on taxpayers' income classes and occupational groups.

The rest of the paper is organized as follows. Section 2 presents the theoretical framework underlying the income elasticity concept and analyzes quantile regressions that are used for the empirical analysis. Section 3 provides the details as to the data used, whereas Section 4 presents and discusses the empirical results. Conclusions and policy implications are included in the final section.

2. Theory and Methodology

2.1. Theory

In the literature on behavioral responses, it is assumed that individuals maximize a utility function responding to taxation through different margins such as intensity of work, career choices, form and timing of compensation, portfolio investments and tax avoidance or tax evasion. All such changes in behavior involve deadweight losses to the individual because they alter the way in which potential income is spent (e.g. on leisure, fringe benefits, tax-deductible consumption such as charitable gifts etc.). As a result, labor supply, investment interest, health insurance and charitable

consumption are just some of the factors negatively affected when tax rates increases, since individual taxpayers try to reduce taxable income.

It is therefore assumed that an individual chooses how much of a fixed amount of income M to report as taxable income R and how much to allocate to tax avoidance activities A. Reported income R is subject to a progressive income tax schedule $T(R)$, where $T' > 0$ and $T'' > 0$. The individual may though reduce income subject to taxation by engaging in tax avoidance at some cost, $C(A/M)$, in order to pay, for instance, for tax advice. This cost is assumed to be conditional upon total earned income, with $C' > 0$ and $C'' > 0$. The individual chooses then R and A to maximize income net of taxes and avoidance costs. The impact of an upward shift in marginal tax rates, t, on the individual's reporting decision can be denoted by:

$$\partial R/\partial t = -1/[T''(R) + C''(A/M)] \quad (1)$$

with the income marginal tax rate elasticity η defined as $\eta \equiv [(\partial R/\partial t)(t/R)]$ and the corresponding income tax price elasticity θ equal to:

$$\theta \equiv [(\partial R/\partial(1-t))((1-t)/R)] = -\eta[(1-t)/t] \quad (2)$$

This elasticity aims to capture all potential responses to income taxation in a single measure, without the need to specify the nature of the various different types of response such as labor supply changes, income shifting between sources which are taxed at different rates, and tax evasion through non-declaration of income. It is expected that an increase in marginal tax rates will reduce the amount of income that an individual reports on tax returns. The income elasticity refers then to substitution from taxed to untaxed goods, but also to avoidance and evasion. Tax avoidance and evasion are here considered as a single activity; namely the activity of not declaring incomes that would be taxed. In all cases, taxpayers will undertake behavior that reduces tax liability up to the point that the marginal cost equals the marginal tax saving. In the case of substitution, the cost is an otherwise unattractive bundle of goods; for avoidance, the cost may be expenditures on tax advice; whereas for evasion, the cost may be exposure to the uncertainty of an audit and any attendant penalties for detected evasion (Slemrod and Yitzhaki, 1996).

As Goolsbee (1998) stresses though, tax avoidance and evasion depend on the enforcement system in place, so that the standard assumption of a constant elasticity across individuals becomes even more untenable than usual. Higher income individuals are apt to have more flexibility in their reporting decisions due to their larger financial resources and their greater access to sophisticated tax advice. Moreover, the taxpayers' occupation may reflect the flexibility to alter their work schedule or compensation arrangements in response to tax rate changes. To deal

with these problems, separate elasticities will be estimated for different occupational groups and based on different income classes. In addition, a robust estimation technique will be employed allowing examining whether the reporting responses differ at different points of the income distribution, taking into account outliers whom are often observed in individual income tax returns datasets.

It should also be mentioned that the marginal tax rate is likely to be endogenous, even if rates' endogeneity in a progressive income tax schedule is a general problem that plagues just about all empirical work on the behavioral response to taxation (Slemrod, 1998). Exogenous variation in behavior that affects reported income may push an individual into a higher marginal tax rate bracket, thus producing a correlation between the behavior and the measured marginal tax rate that is not indicative in any way of a behavioral elasticity. A number of different approaches have been adapted to this problem and various instruments have been used, such as education and occupation. In this paper, various taxpayer characteristics are introduced as non-tax factors to examine the impact of marginal tax rates on taxpayers' decisions to report income (e.g. marital status, family size and occupation).

2.2. Methodology

Starting with the dependent variable, the total *Adjusted Gross Income (AGI)* is used before any deductions, exclusions or exemptions are taken. This definition of total income captures the sum of an individual's income from all sources minus certain expenses and other 'adjustments'. Subtracting 'itemized deductions' from AGI results in 'taxable income'. In Greece though, the large bulk of items that are deductible from taxable income (mortgage interest deduction, charitable giving etc.) may generate (fiscal) externalities, so that the elasticity of a broader pre-deduction concept of income is of more importance rather than taxable income. The analysis focuses then on the extent to which individuals' income as a whole responds to changes in marginal tax rates[3].

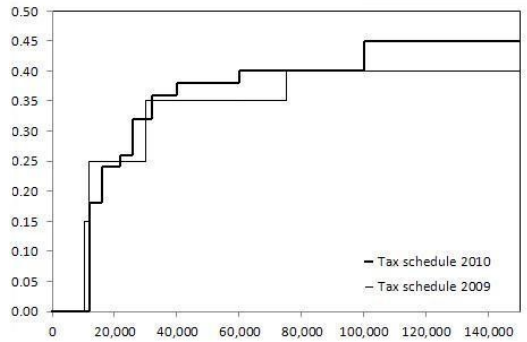
The sample used is also divided into six main subgroups based on the occupational group in which each individual is categorized, in order to analyze whether the determinants of reporting behavior affect subgroups of the population differentially. The reporting behavior of individuals having different occupation is therefore examined separating the sample based on the main income source of each taxpayer and into the subgroups of *Rental Income, Business Income, Farm Income, Wages & Salaries, Self-employment Income,* and *Pension*. *Business Income* is defined as income coming from all business activities (incorporated and unincorporated) apart from the one from self-employed activities; whereas *Self-employment Income* refers to profits from small businesses that are fully owned by the taxpayer.

[3] Capital gains are excluded because their tax treatment is special and non-comparable.

In terms of the explanatory variables, the *Marginal Tax Rate* used is based on the four-bracket national tax system ranging from 0% to 40%, for the fiscal year 2009. In addition, the fact that the timing of the 2010 Greek tax reform coincided with an economic crisis renders the estimation of the behavioral responses to this reform rather complicated. As a result, data for 2009 are also expected to be more 'informative' concerning tax liability in Greece for the year 2011, and thus are extensively analyzed using a scenario for the implementation of the 2010 tax reform a year earlier. Figure 1 presents the tax brackets in Greece for both tax systems. The *Marginal Tax Rate* is measured as a percentage and is based on total income, being adjusted for the child exemptions[4].

Other variables include the *Squared Marginal Tax Rate*, which is a common approximation used for the estimation of welfare costs of taxes, assuming that the excess burden of a tax change increases approximately in proportion to the square of the tax rate. This proxy serves then to highlight the fact that as tax rates are increased in general, the distortionary impacts will worsen more than proportionately. Dummies for the number of dependent *Children* reported by the sample individuals are also used; as well as a dummy variable for the *Marital Status* equal to one if the taxpayer is married and zero otherwise. A dummy variable for the reporters' Sex is denoted by one if he is male and zero for females; and six dummies for the different income sources referring to the abovementioned individuals' main occupational group are further introduced. Finally, dummies for residence in each of Greece's twelve regions are included, together with dummies for residence in two metropolitan areas (Attica and Thessaloniki).

Figure 1: Tax brackets in Greece



Note: Income coming from *Wages & Salaries* and *Pension* are excluded from the 15% tax rate.

[4] Child exemptions in 2009 were €1,000 for each of the first two children; €10,000 for the third child; and €1,000 for every child above the third. The 2010 tax reform increased the exemption for the first two children to €1,500 each; to €11,500 for the third child; and to €2,000 for every child above the third.

Concerning the empirical approach used, a robust estimator that takes heterogeneity of the dependent variable into account is employed, namely quantile regression (Koenker and Basset, 1978). This approach involves the estimation of conditional quantiles, rather than estimation of coefficients at a single measure of the mean. In the quantile regression, the median is defined as the solution to the problem of minimizing a sum of absolute residuals, similarly to the sample mean used as the solution to the problem of minimizing a sum of squared residuals. The use of least squares regression leads though to biased estimates of the parameters included in the analysis when the data are heteroskedastic due to variable variations in the sample. Using quantile regression, the sets of slope parameters of the conditional quantile functions differ from each other, as well as from the least squares slope parameters. Estimating conditional quantiles at various points of the distribution of the dependent variable allows then for tracing out different marginal responses of the dependent variable to changes in the covariates at these points (Jayachandran *et al.*, 2002). In this framework, the taxpayer reporting decisions of a marginal change in tax rates is estimated, taking into account the taxpayers' characteristics (e.g. source of income, marital status etc.) at different points of the conditional income distribution. OLS estimates showing the mean effects of these covariates are also presented for reasons of comparison.

The quantile regression model is defined as:

$$R_i = z_i\beta_\tau + \varepsilon_{\tau i} \text{ with } Q_\tau(R_i/z_i) = z_i\beta_\tau \qquad (3)$$

where

R_i is the reported income of the ith sample taxpayer,
i = 1,..,N,

z_i is a vector of individual characteristics.

$Q_\tau(R_i|z_i)$ denotes the τth conditional quantile of R_i given z_i and β_τ is the unknown vector of parameters to be estimated. The τth regression quantile ($0 < \tau < 1$) solves the individual taxpayer's minimizing problem:

$$\underset{\beta_\tau}{Min}\frac{1}{N}\left\{\sum_{i:R_i \geq z_i'\beta_\tau}\tau|R_i - z_i'\beta_\tau| + \sum_{i:R_i < z_i'\beta_\tau}(1-\tau)|R_i - z_i'\beta_\tau|\right\} \qquad (4)$$

Any quantile of the distribution of R_i, conditional on z_i can be obtained by changing τ from zero to one. This continuous change of τ relaxes the assumption of iid errors (ε) upon which the least square regression depends. Consequently, the parameter estimates are not assumed to be the same at all points on the conditional distribution. Moreover, analysis can be focused on the upper tail of the positively skewed income distribution since only the above median quantiles correspond to income classes that are taxed.

3. Data and Descriptive Statistics

The analysis is based upon the 2009 dataset of individual tax returns provided by the Greek General Secretariat for Information Systems, Ministry of Finance. A micro-level dataset is essentially used that contains detailed information on individual observations from a stratified random sample of taxpayers in Greece. The representative sample includes 566,652 individual records (about 10% of the total number of taxpayers), and each record contains information from actual individual income tax returns, excluding the taxpayers' name, tax identification numbers, and other identifying information (e.g. address of residence).

Based on this sample, a brief analysis of the Greek taxpayers' income and their characteristics follows. As shown in Table 1, more than 50% of the individuals earn their income either from wages and salaries or pensions. A considerable 10% of taxpayers report as rents their main income source, whereas the smallest share appears to be the one for self-employees. In particular, individuals categorized in the *Pension* subgroup account for almost 30%, while those of *Farm* and *Self-Employment* subgroups amount less than 7%, respectively. Moreover, 50.35% of the sample consists of married taxpayers and the remaining are single; whereas about one third of individuals are women. The majority of taxpayers are childless, and only a fraction has more than four children. Finally, most of the individuals included in the sample live in the region of Attica that refers mainly to the city of Athens.

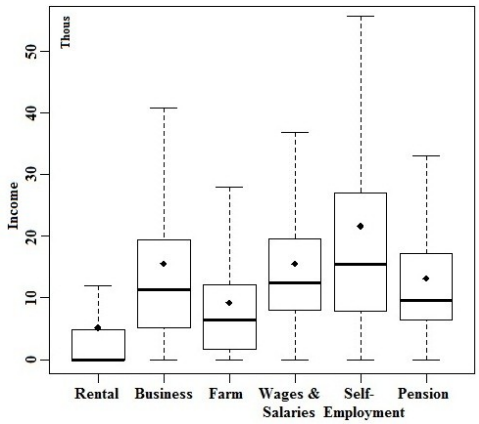
Table 1: Taxpayers' characteristics

Income Source, %		***Regions, %***		***Regions, %***	
Rental	10.50	*Attica*	38.42	*Thessaly*	6.41
Business	12.30	*East Macedonia & Thrace*	5.20	*West Greece*	5.76
Farm	6.89	*Central Macedonia*	7.03	*Peloponnese*	5.32
Wages & Salaries	35.77	*Thessaloniki*	9.89	*Central Greece*	4.77
Self-employment	6.56	*West Macedonia*	2.54	*North Aegean*	1.79
Pension	27.96	*Epirus*	2.88	*South Aegean*	2.84
Child, %		*Ionian Islands*	1.98	*Crete*	5.18
0	75.71	***Sex, %***		***Marital status, %***	
1	10.44				
2	10.92	*Male*	73.47	*Yes*	50.35
3	2.36	*Female*	26.53	*No*	49.65
≥4	0.57				

The distribution of taxpayers' income per occupational group is presented in Figure 2. From the boxplot, 50% of the individuals in each group receive at least the median income; while the lower edge of each box corresponds to the 25th percentile and the upper edge to the 75th percentile. Half of the individuals included in the different occupational groups report income between these values. Those reporting income from rents appear to have the lowest median, though 25% receive more than

€4,750. Relatively significant income scatter is observed for the subgroup of self-employees, since 50% of those report €15,445, but 25% have income lower than €7,800, and 25% at least €27,000. The average income per taxpayer declaring wages and salaries as the main source of income amounts to €15,506 per year, while the average declared income for taxpayers whose income is obtained mainly from sources other than wages and pensions (excluding agriculture) is €13,210. For the subgroup of *Wages & Salaries* in particular, only 8.66% report income above €30,000 and 59% are under some sort of tax exemption (including child exemptions). Overall, the mean and median total income in 2009 is €13,733 and €10,386, respectively. The top income class contains individuals who earn more than €75,000 and represent 0.68% of the sample.

Figure 2: Distribution of taxpayers' income by different occupational groups, fiscal year 2009



It should be here noted that although the two top marginal tax rates in 2009 (35% and 40%) were applied at a relatively low level of income threshold (of €30,000 and €75,000, respectively), the effective tax rate applied to the income class where the bulk of taxpayers is concentrated (i.e. €13,000 - 27,000) is 25%. It is also important to note that Greece has a rather large 'zero' tax bracket (up to €12,000 that increases with the child exemptions); whereas 3.3 million taxpayers (or about 58% of the total number of tax forms submitted to tax authorities) report average income below the tax-free level. Finally, the effective taxation of non-wage income is very low in Greece, mostly due to under-reporting of income by self-employed individuals (Statistical Bulletin, 2010).

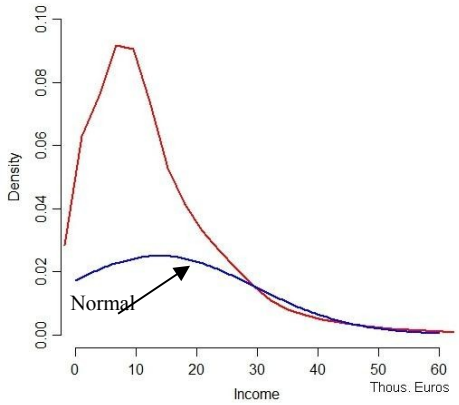
4. Empirical Results

4.1. Estimation of income-tax price elasticities

The distribution of the individuals' income, presented in Figure 3, provides evidence of a highly skewed distribution with a long right tail, implying considerable heterogeneity and thus justifying the use of quantile regression. In addition, formal

testing leads to a rejection of normality, since the D'Agostino *et al.* (1990) skewness test indicates that the depended variable is positively skewed at the 1% level of significance (skewness=857.72).

Figure 3: Income distribution, fiscal year 2009



As a result, the empirical analysis examines the effects of the various covariates mentioned previously on different points of the reported income distribution using regression quantiles. The analysis focuses on the upper tail of the *AGI* distribution since only the above median quantiles correspond to the specified income classes. The results obtained for *AGI* are shown in Table 2, where the corresponding *AGI* of eleven different quantiles is reported based on the relevant tax brackets. The income classes have been adapted to capture the brackets of both the tax system for the fiscal year 2009 and of the 2010 tax reform; whereas the OLS estimation results are reported in the first column of the table. In the Annex, Table A1 summarizes the estimation results when using as dependent variable the *AGI* for the six different occupational groups. In all cases, the numbers in parentheses signify the standard errors. Furthermore, formal testing has been performed to check if the estimated quantile regression relationships conform to the location shift hypothesis that assumes all of the conditional quantile functions to have the same slope parameters. Using the ANOVA test proposed by Koenker and Basset (1982), the results show that in all cases the relevant hypothesis has been decisively rejected indicating that even quantiles close to each other exhibit statistically significant different slope parameters.

Table 2: OLS and quantile regression estimates for total income*

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	OLS	*Quantile regression estimates*										
	estimates	*100,001*	*75,001*	*60,001*	*40,001*	*32,001*	*30,001*	*26,001*	*22,001*	*16,001*	*12,001*	*10,501*
Marginal Tax	-1.315	-6.335	-4.248	-2.852	-1.596	-1.378	-1.328	-1.240	-1.151	-0.847	-0.704	-0.653
Rate	(0.004)***	(1.143)***	(0.913)***	(0.265)***	(0.015)***	(0.008)***	(0.007)***	(0.007)***	(0.007)***	(0.007)***	(0.005)***	(0.004)***
Squared Marginal	0.071	0.282	0.199	0.143	0.092	0.082	0.079	0.074	0.069	0.054	0.047	0.045
Tax Rate	(0.0001)***	(0.045)***	(0.035)***	(0.011)***	(0.001)***	(0.0003)***	(0.0003)***	(0.0003)***	(0.0003)***	(0.0003)***	(0.0002)***	(0.0002)***
Children	0.667	2.970	2.601	2.223	1.218	1.061	1.019	0.957	0.957	0.944	0.979	0.991
	(0.019)***	(3.056)	(1.772)	(0.130)***	(0.018)***	(0.015)***	(0.012)***	(0.009)***	(0.011)***	(0.013)***	(0.011)***	(0.014)***
Marital Status	0.576	:	-0.005	-0.004	0.006	-0.186	0.245	0.444	0.601	0.852	0.940	0.793
	(0.035)***		(4.330)	(0.151)	(0.019)	(0.018)***	(0.017)***	(0.019)***	(0.019)***	(0.022)***	(0.016)***	(0.017)***
Sex	0.158	0.018	0.035	0.049	0.174	0.219	0.248	0.317	0.352	0.319	0.117	0.056
	(0.034)***	(5.818)	(4.092)	(0.121)	(0.018)***	(0.019)***	(0.019)***	(0.020)***	(0.019)***	(0.021)***	(0.013)***	(0.011)***
Business	3.566	0.174	0.305	0.489	4.314	2.981	2.905	3.697	4.605	5.527	5.274	4.677
	(0.056)***	(15.080)	(6.816)	(0.201)**	(0.088)***	(0.110)***	(0.073)***	(0.059)***	(0.049)***	(0.044)***	(0.029)***	(0.028)***
Farm	2.271	0.100	0.151	0.271	4.023	2.037	2.490	3.391	4.183	4.702	4.121	3.367
	(0.066)***	(12.122)	(7.353)	(0.099)***	(0.112)***	(0.061)***	(0.063)***	(0.060)***	(0.055)***	(0.051)***	(0.037)***	(0.038)***
Wages & Salaries	4.223	-31.297	-18.584	-9.930	1.657	2.849	3.366	4.511	5.687	7.009	6.958	6.398
	(0.047)***	(8.904)***	(5.576)***	(4.869)**	(0.044)***	(0.056)***	(0.058)***	(0.053)***	(0.043)***	(0.038)***	(0.017)***	(0.017)***
Self-employed	5.145	0.234	0.423	0.672	4.722	4.615	4.811	5.085	5.930	7.141	6.953	6.339
	(0.066)***	(9.850)	(9.272)	(0.252)***	(0.111)***	(0.081)***	(0.083)***	(0.086)***	(0.052)***	(0.053)***	(0.041)***	(0.043)***
Pension	4.090	-31.355	-18.664	-10.041	1.456	2.553	3.042	4.102	5.183	6.543	6.799	6.458
	(0.048)***	(9.306)***	(5.815)***	(5.468)*	(0.044)***	(0.057)***	(0.058)***	(0.053)***	(0.044)***	(0.038)***	(0.013)***	(0.012)***
Intercept	2.567	43.279	30.533	21.825	9.904	8.378	7.712	6.156	4.464	2.066	0.795	0.589
	(0.047)***	(8.716)***	(5.792)***	(0.074)***	(0.045)***	(0.057)***	(0.059)***	(0.054)***	(0.043)***	(0.038)***	(0.015)***	(0.017)***

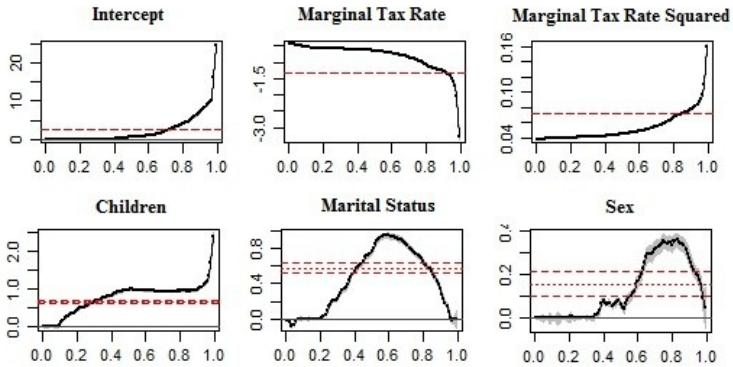
__Notes:__ Values in the parentheses are Standard Errors. Significance levels: 0.01***, 0.05**, 0.1*.

* The appropriate τ's are presented by the corresponding reporting income; whereas income is measured in thousands of euros.

The quantile regression estimates are also summarized using a plot for each of the five main covariates (and the intercept) included in the model (Figure 4). The dummies for the different income sources referring to individuals' main occupational group, as well as for residence in Greece's regions are not included for sake of brevity. In particular, ninety-nine distinct quantile regression estimates are presented for a (horizontal) quantile scale ranging from 0.01 to 0.99 as the solid curve with filled dots. The shaded grey area depicts a 90 per cent pointwise confidence band for the quantile regression estimates. The dotted line in each figure shows the OLS estimate of the conditional mean effect, whereas the two dashed lines represent conventional 90 per cent confidence intervals for the least squares estimate.

In the first panel of the Figure, the intercept of the model can be interpreted as the estimated conditional quantile function of the *AGI* distribution of a taxpayer who is a single female, without children, located in Attica and is categorized in the *Rental Income* occupational group. Each of the other plots gives information about the relevant covariate. At any chosen quantile, the question that can be answered is how different is the response of *AGI* from the corresponding variable, given a specification of all other conditioning factors. At the upper quantile, the covariate of main interest, the *Marginal Tax Rate*, tends to be especially steep implying a significant increase of income misreporting. It is also clear that the disparity observed for the quantile estimates cannot be captured by the OLS estimates, and the same holds for all covariates.

Figure 4: OLS and Quantile regression estimates



In addition, Table 3 includes the marginal tax rate elasticities for the total reported income using both empirical approaches (i.e. quantile regression and OLS), while a similar Table is provided in the Annex for the income elasticities of the different occupational groups (Table A2). All elasticities are calculated using the mean values of the tax rates and of the taxpayers' income at the appropriate quantile. Moreover,

the change in reported income for each income class is also reported, using the average, high and low income values of the specific quantile.

Table 3: Income- tax price elasticities and estimated misreporting of tax increases for total income

		Quantile			Mean Estimation		
	Elasticities	Misreporting from 1% increase in tax rates					
		lower	average	upper	lower	average	upper
>100,001	-0.0059	-587.49	-974.06	-8,488.37	-138.30	-305.74	-2,664.39
75,001-100,000	-0.0082	-615.90	-698.22	-821.19	-138.30	-225.81	-184.40
60,001-75,000	-0.0070	-418.34	-463.56	-522.91	-110.64	-122.60	-138.30
40,001-60,000	-0.0066	-263.61	-312.86	-395.40	-73.76	-87.54	-110.64
32,001-40,000	-0.0079	-254.35	-282.22	-317.92	-59.01	-65.48	-73.76
30,001-32,000	-0.0089	-265.95	-274.45	-283.67	-55.32	-57.09	-59.01
26,001-30,000	-0.0067	-173.77	-186.13	-200.50	-47.95	-51.36	-55.32
22,001-26,000	-0.0072	-159.41	-173.07	-188.38	-40.57	-44.05	-47.94
16,001-22,000	-0.0075	-120.11	-140.86	-165.14	-29.51	-34.61	-40.57
12,001-16,000	-0.0090	-107.45	-123.97	-143.26	-22.13	-25.53	-29.50
10,501-12,000	-0.0052	-54.27	-58.15	-62.02	-19.36	-20.75	-22.13
OLS	-0.0018	:	:	:	-19.36	-25.32	-2,664.39

Considering first the impact of marginal tax rates on the average reporting behavior for the entire sample, the OLS results indicate that the marginal tax rate has a negative and statistically significant impact on reported income, suggesting that as the marginal tax rate increases the level of reporting income decreases. The associated elasticity is calculated at the mean value of the marginal tax rate and total reporting income and is found to be negative (-0.002). The marginal tax rate coefficient and elasticity result are consistent with the theoretical model, though the obtained estimates are not comparable to those generated with the regression quantiles. These results illustrate several different behavioral aspects and large disparities along the different quantiles. For instance, the elasticities are all negative ranging from -0.005 to -0.009. It also appears that there is a slight tendency for the elasticities to decline in absolute size at the higher quantiles, as the level of reported income for individuals at the relevant quantile increases in size more rapidly than the relevant marginal tax rate.

Moreover, the OLS estimation results are very similar to the quantile results for those reporting total income between €26,000 and €30,000. For individuals reporting more that €100,000, the coefficient of the *Marginal Tax Rate* is -6.335, while the coefficient of the *Squared Marginal Tax Rate* is 0.282. Given the marginal tax rate of the individual with the mean value of total income, these estimates imply that a one percentage point increase in the marginal tax rate reduces the reporting

income by €974 at this income class. A similar one percentage point increase in the marginal tax rate lowers the reporting income by €274 for an individual earning between €30,000-32,000.

The variables concerning the individual characteristics have a small to infinitesimal effect in the higher income classes, when they are statistically significant. For instance, for income classes less than €40,000, single females tend to misreport income more than their married counterparts, while having more children is positively correlated with taxpayers' reported income. The estimated coefficients for the dummy variables of the different occupational groups indicate that those earning income mainly from rents have a different behavior from the individuals earning their income from the alternative sources. It appears that up to €40,000, *Rental Income* has a significant negative effect on reported income, while above that amount *Wages & Salaries* and *Pension* exhibit the same impact on *AGI*, and becomes larger as they move to the highest income classes. Moreover, the impact of the dummy variables concerning the taxpayers' residence on *AGI* is insignificant for income above €60,000, implying that for the high income individuals residence is not a factor that affects their behavior. For income classes below this threshold, it appears that being located at the city of Athens has a positive impact contrary to all other regions.

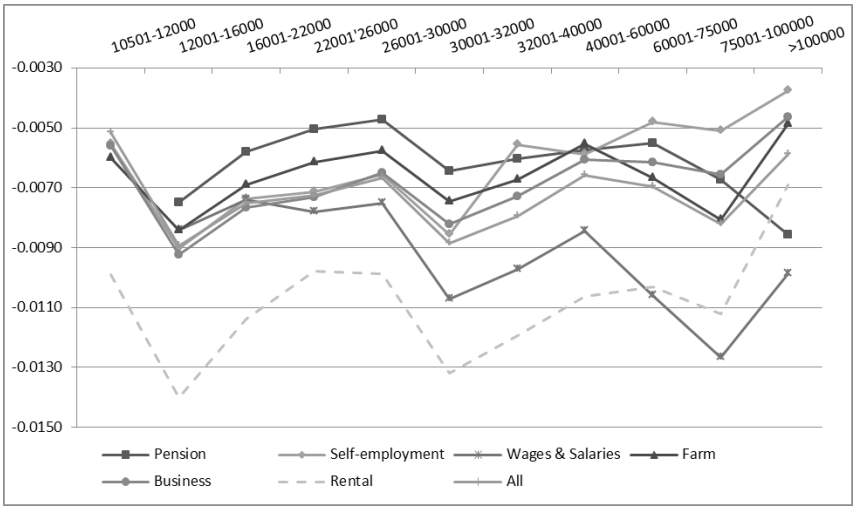
When examining the different occupational groups, the marginal tax rate effects are considerably differentiated both across occupational groups and income classes. The coefficient of the *Marginal Tax Rate* for the highest income class ranges from -2.311 for *Self-Employment Income* to -11.200 for *Wages & Salaries*, while in the lowest income class the disparity is from -0.162 for Farm Income to -0.689 for *Wages & Salaries*. The effect of the *Squared Marginal Tax Rate* exhibits a similar pattern.

Consequently, the tax price elasticities vary considerably across occupational groups. The calculated elasticities for all occupational groups as well as for all taxpayers are presented in Figure 5. The OLS elasticity is not shown but it has to be noted that it is smaller than any elasticities provided by the quantile estimates. The mean estimation may therefore lead to miscalculation of a possible income misreporting. In terms of the occupational groups up to €30,000, all groups with the exception of *Rental Income* exhibit similar price tax elasticities with small variations suggesting that lower income taxpayers have fewer opportunities to misreport. It is interesting thought that this is not the case for *Rental Income*, as the price tax elasticity is relatively high, deviating significantly from all other groups for income up to €60,000. This may be attributed to the fact that *Rental Income* is reported in such a way that makes tax avoidance easier.

On the other hand, the elasticity for *Wages & Salaries* tends to deviate from this trend for income more than €30,000 and the highest elasticities are observed above

€60,000. The results suggest that middle income earners react to marginal rates by reducing the reported labor supply, either by working less or shifting to the underground economy. It is also possible that these individuals report income from more than one source which results in avoidance of reporting income. Moreover, the lowest elasticity for income up to €60,000 is observed for the subgroup *Pension*, though it increases considerably at the higher income classes, so that it overcomes even the elasticity of *Rental Income*. This result indicates that pensioners having high income that probably comes also from sources other than their main pension are likely to avoid reporting their total income.

Figure 5: Income-tax price elasticities by occupational group



Finally, in the upper income classes, the case of *Self-Employment Income* exhibits the lowest elasticity. It should be though noted that in Greece self-employees are those who have more flexibility in their reporting decisions as they can easily alter their work schedule or compensation arrangements, shifting even to the underground economy. Taking this into account, the starting level of the reported income is effectively underestimated affecting the empirical results reported here. This is in accordance to the fact that taxpayers of the subgroup *Wages & Salaries* with high income appear to respond more to tax increases than those of the other occupational groups. These individuals are very likely to have income sources other than their wages and as they are the least audited group by tax authorities, they tend to reduce their tax liability. Overall, it can be argued that misreporting increases for high income individuals despite their occupation.

4.2. Analysis of the "2010 tax reform" scenario

Based on the analysis so far, the choice of the elasticity used in policy simulations is essential and has a significant impact on the results obtained, that is tax revenues. Given the 2010 tax reform and the new tax structure shown in Figure 1, a scenario concerning the taxpayers' reporting decision is here examined. The analysis focuses in the upper quantiles excluding the 'zero' tax bracket. The reported results concern both empirical methods used for the average, lower and upper estimation of the misreported income in each income class. A similar table is further provided in the Annex (Table A3) for the corresponding scenario of the different occupational groups.

As expected, the individuals facing the highest increase in tax rates are those who may have the greatest response. Taxpayers earning more than €100,000 experience a 5% increase in their marginal tax rate and are likely to avoid reporting income that ranges from almost €3,000 up to €42,500. In addition, individuals belonging in the income class of €60,001-75,000 and those having income between €26,001-30,000 are likely to misreport up to €2,600. On the opposite side, those who are taxed at lower tax rates will probably show a positive response raising their reporting income. For instance, taxpayers of the lowest income class are not taxed under the 2010 tax reform and as a result they may increase their reported income at a rather high rate. Moreover, those who remain at the same tax bracket will probably not change their behavior (e.g. those earning from €75,001-100,000). It is therefore apparent that the new tax brackets could lead to differential taxpayers' responses at different points of the reported income distribution.

Table 4: Scenario for the 2010 Greek tax reform on total income

	Quantile			Mean estimation		
	lower	**average**	**upper**	**lower**	**average**	**upper**
>100,001	-2,937.43	-4,870.29	-42,441.86	-922.02	-1,528.72	-13,321.94
75,001-100,000	0.00	0.00	0.00	0.00	0.00	0.00
60,001-75,000	-2,091.68	-2,317.79	-2,614.56	-553.22	-613.02	-691.51
40,001-60,000	-790.82	-938.57	-1,186.20	-221.29	-262.63	-331.92
32,001-40,000	-254.35	-282.22	-317.92	-59.01	-65.48	-73.76
30,001-32,000	797.86	823.35	851.02	165.97	171.27	177.03
26,001-30,000	-1,216.39	-1,302.89	-1,403.47	-335.63	-359.49	-387.25
22,001-26,000	-159.41	-173.07	-188.38	-40.57	-44.05	-47.94
16,001-22,000	120.11	140.86	165.14	29.51	34.61	40.57
12,001-16,000	752.17	867.80	1,002.81	154.91	178.73	206.53
10,501-12,000	814.12	872.24	930.33	290.46	311.20	331.92

In comparison to the results obtained from the quantile regression, the corresponding OLS estimates clearly underestimate the taxpayers' responses, as their magnitude in most cases is more than fourfold, which supports the choice of quantile regression. The results also deviate significantly among occupational subgroups and especially

at the highest income class. Misreporting for the subgroup *Wages & Salaries* ranges from almost €5,000 to €71,000, followed by *Rental Income* (€3,500-39,900). On the other hand, the results concerning the subgroup Pension appear to have the smallest differentiation, which is from €4,300 to €9,600. Finally, similar results are obtained for the other income classes.

5. Conclusions

Changes in marginal tax rates induce taxpayers to alter their behavior in ways that affect their reported income. The magnitude of this response is of critical importance in the formulation of tax and fiscal policies. The marginal impact of taxation can be accurately summarized using the response of reported income to the income tax rate. This paper reports then new estimates of the responsiveness of taxpayers to changes in marginal tax rates using quantile regressions as a robust estimation technique.

The income elasticity, as matter of government policy, was empirically examined for the case of Greece and it was used to evaluate the 2010 tax reform, having a stratified representative sample of 566,652 taxpayers. Regression quantiles were further employed, rather than rely on mean estimations, so that the marginal tax rate responses at different points of the income distribution indicate the differential responses of individuals at different income classes. Spanning the tax changes of the 2010 tax reform, the analysis considers to what extent taxpayers may change their reported incomes in response to changes in tax rates, controlling for non-tax factors as well, such as the taxpayer's marital status, family size, occupation, region of residence etc.

The obtained results show that the price tax elasticity of total reported income ranges from -0.005 to -0.009, whereas the change in tax rates according to the 2010 tax reform may result in a significant reduction of income reported by the individuals at the highest income class. In addition, tax price elasticities appear to vary considerably across occupational groups. Using different subsamples for this criterion, results revealed again that misreporting increases for high income individuals. A tax-induced change is, therefore, a fundamental factor with an impact on the incentives of high-income individuals for reporting income. Taking into account that particular groups of taxpayers have more flexibility and incentives in (mis)reporting and are in general considered less tax liable, the results provide evidence of the fact that wage earners tend to avoid taxation more than self-employees and businessmen, as they are the least audited by tax authorities. On the other hand, lower income taxpayers have fewer opportunities and/or intensives to misreport with the exception of those individuals who earn rental income.

In terms of the scenario examined regarding the implementation of the 2010 tax reform a year earlier, it can be concluded that individuals facing the highest increase

in tax rates are those who will probably have the greatest response, as expected. On the other hand, those who will be taxed at lower tax rates are likely to show a positive response raising their reported income, while those who will remain at the same tax bracket are not expected to change their behavior. The employed estimation technique, regression quantiles, allowed also the examination of the marginal impact of taxation at different points of the reported income distribution revealing that the mean estimates of the differential responses of individuals are clearly underestimated. In a similar manner, the results are differentiated when examining the behavior of taxpayers for different occupational groups.

Consequently, policy recommendations should take into account the income distribution involved and the selected policy objectives. That is, policy makers should not only consider a single elasticity for the taxpayer response, but the differences in these responses by income classes and occupational groups. Quantile regression proves to be a suitable approach by estimating a wide range of elasticities taking into account taxpayers' heterogeneity. Particular attention should be given, finally, to the instruments used to control tax avoidance and/or evasion of high income individuals, as well as of occupational groups who have the flexibility not to report taxable income.

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Annex

Table A1: OLS and quantile regression estimates* for different types of income

	Marginal Tax Rate	Squared Marginal Tax Rate	Children	Marital Status	Sex	Marginal Tax Rate	Squared Marginal Tax Rate	Children	Marital Status	Sex	Marginal Tax Rate	Squared Marginal Tax Rate	Children	Marital Status	Sex
	Rental					Farm					Self-employment				
100,001	-4.472 (0.450)***	0.305 (0.030)***	2.266 (0.220)***		0.003 (0.036)	-3.051 (0.967)***	0.210 (0.064)***	3.242 (0.037)***		0.016 (0.002)***	-2.311 (0.425)***	0.160 (0.017)***	2.686 (1.107)**		-0.015 (2.550)
75,001	-3.537 (0.333)***	0.244 (0.020)***	1.580 (0.612)***	0.011 (0.665)	0.002 (0.532)	-2.501 (0.278)***	0.173 (0.019)***	3.222 (0.022)***	-0.003 (0.003)	0.014 (0.003)***	-1.581 (0.070)***	0.110 (0.004)***	2.049 (0.299)***	-0.230 (0.336)	0.048 (0.219)
60,001	-2.725 (0.191)***	0.190 (0.012)***	0.199 (0.120)***	0.095 (0.064)	-0.061 (0.058)	-1.739 (0.240)***	0.123 (0.016)***	0.119 (0.084)***	-0.006 (0.006)	0.028 (0.022)	-1.290 (0.033)***	0.089 (0.002)***	1.369 (0.170)***	-0.393 (0.194)**	0.125 (0.010)***
40,001	-1.935 (0.101)***	0.140 (0.007)***	0.881 (0.147)***	0.318 (0.078)***	-0.249 (0.071)***	-0.965 (0.031)***	0.071 (0.002)***	2.370 (0.057)***	-0.011 (0.015)	0.335 (0.053)***	-1.286 (0.018)***	0.081 (0.001)***	0.652 (0.047)***	0.082 (0.064)	0.225 (0.078)***
32,001	-1.543 (0.075)***	0.116 (0.005)***	0.642 (0.138)***	0.436 (0.115)***	-0.354 (0.092)***	-0.857 (0.011)***	0.065 (0.001)***	1.578 (0.074)***	-0.009 (0.036)	0.613 (0.080)***	-1.250 (0.017)***	0.077 (0.001)***	0.628 (0.036)***	0.492 (0.094)***	0.373 (0.097)***
30,001	-1.452 (0.051)***	0.111 (0.003)***	0.569 (0.146)***	0.427 (0.123)***	-0.355 (0.103)***	-0.821 (0.015)***	0.062 (0.001)***	1.349 (0.055)***	0.035 (0.041)	0.692 (0.104)***	-1.243 (0.017)***	0.076 (0.001)***	0.652 (0.047)***	0.569 (0.107)***	0.434 (0.102)***
26,001	-1.238 (0.081)***	0.098 (0.005)***	0.324 (0.157)**	0.613 (0.124)***	-0.413 (0.111)***	-0.731 (0.012)***	0.058 (0.001)***	1.198 (0.028)***	0.218 (0.058)***	0.920 (0.144)***	-1.203 (0.016)***	0.073 (0.001)***	0.660 (0.055)***	0.879 (0.115)***	0.572 (0.110)***
22,001	-0.954 (0.034)***	0.082 (0.002)***	0.136 (0.170)	0.655 (0.120)***	-0.473 (0.104)***	-0.603 (0.011)***	0.051 (0.001)***	1.767 (0.034)***	0.493 (0.070)***	1.431 (0.195)***	-1.101 (0.013)***	0.068 (0.001)***	0.739 (0.055)***	0.970 (0.093)***	0.749 (0.089)***
16,001	-0.722 (0.024)***	0.071 (0.001)***	-0.438 (0.130)***	0.930 (0.109)***	-0.607 (0.101)***	-0.424 (0.013)***	0.043 (0.001)***	0.973 (0.036)***	0.808 (0.079)***	2.434 (0.182)***	-0.757 (0.010)***	0.052 (0.001)***	0.748 (0.054)***	1.052 (0.079)***	0.835 (0.068)***
12,001	-0.552 (0.033)***	0.063 (0.001)***	-0.791 (0.104)***	0.952 (0.110)***	-0.624 (0.087)***	-0.257 (0.014)***	0.036 (0.001)***	0.820 (0.041)***	1.269 (0.093)***	2.509 (0.127)***	-0.607 (0.013)***	0.046 (0.001)***	0.704 (0.064)***	0.968 (0.109)***	0.848 (0.083)***
10,501	-0.488 (0.026)***	0.060 (0.001)***	-0.855 (0.075)***	0.912 (0.105)***	-0.621 (0.081)***	-0.162 (0.013)***	0.032 (0.001)***	0.731 (0.041)***	1.533 (0.097)***	2.355 (0.121)***	-0.535 (0.012)***	0.042 (0.0004)***	0.654 (0.067)***	0.928 (0.111)***	0.770 (0.087)***
	Business					Wages & Salaries					Pension				
100,001	-2.823 (0.492)***	0.195 (0.019)***	2.866 (1.116)**		-0.035 (4.108)	-11.200 (0.947)***	0.048 (0.038)***	3.139 (0.062)***		0.011 (0.066)	-6.933 (0.001)***	0.306 (0.000)***	3.319 (0.002)***		0.001 (0.001)
75,001	-2.036 (0.080)***	0.142 (0.004)***	2.554 (0.171)***	-0.111 (0.334)	-0.008 (0.171)	-7.141 (0.482)***	0.313 (0.019)***	2.902 (0.037)***	-0.015 (0.014)	0.039 (0.009)***	-3.232 (0.616)***	0.158 (0.025)***	3.137 (0.219)***	0.004 (0.002)*	0.004 (0.002)**
60,001	-1.603 (0.151)***	0.113 (0.005)***	2.219 (0.546)***	-0.156 (0.270)	-0.008 (0.160)	-4.995 (0.223)***	0.226 (0.009)***	2.591 (0.041)***	-0.059 (0.029)	0.071 (0.016)	-1.961 (0.054)***	0.107 (0.002)***	3.003 (0.040)***	0.009 (0.005)*	0.022 (0.006)***
40,001	-1.134 (0.021)***	0.080 (0.001)***	1.242 (0.025)***	-0.329 (0.030)***	0.006 (0.031)	-2.497 (0.072)***	0.124 (0.003)***	1.728 (0.033)***	-0.117 (0.019)***	0.195 (0.017)***	-1.202 (0.037)***	0.076 (0.001)***	1.084 (0.149)***	0.163 (0.064)**	0.036 (0.066)
32,001	-1.020 (0.015)***	0.072 (0.001)***	1.034 (0.034)***	-0.322 (0.033)***	0.047 (0.033)	-2.078 (0.021)***	0.106 (0.001)***	1.446 (0.016)***	-0.037 (0.023)	0.294 (0.022)***	-0.785 (0.025)***	0.058 (0.001)***	0.903 (0.045)***	0.406 (0.026)***	0.087 (0.029)***
30,001	-1.005 (0.017)***	0.070 (0.001)***	0.966 (0.030)***	-0.347 (0.047)***	0.045 (0.058)	-1.984 (0.022)***	0.101 (0.001)***	1.420 (0.014)***	-0.002 (0.023)	0.295 (0.020)***	-0.681 (0.025)***	0.054 (0.001)***	0.905 (0.013)***	0.460 (0.028)***	0.144 (0.031)***
26,001	-1.016 (0.018)***	0.068 (0.001)***	0.903 (0.029)**	-0.299 (0.071)***	0.083 (0.103)	-1.759 (0.020)***	0.091 (0.001)***	1.393 (0.012)***	0.107 (0.023)***	0.329 (0.023)***	-0.488 (0.017)***	0.045 (0.001)***	1.047 (0.024)***	0.670 (0.033)***	0.246 (0.034)***
22,001	-1.032 (0.017)***	0.067 (0.001)***	0.885 (0.032)	-0.084 (0.073)	0.031 (0.099)	-1.540 (0.016)***	0.080 (0.001)***	1.350 (0.015)***	0.258 (0.027)***	0.386 (0.025)***	-0.405 (0.016)***	0.040 (0.001)***	1.297 (0.019)***	0.824 (0.031)***	0.335 (0.031)***
16,001	-0.772 (0.014)***	0.053 (0.001)***	0.877 (0.034)***	0.054 (0.076)	0.190 (0.090)	-1.041 (0.013)***	0.058 (0.001)***	1.391 (0.019)***	0.429 (0.035)***	0.293 (0.031)***	-0.375 (0.011)***	0.037 (0.0004)***	1.496 (0.040)***	0.907 (0.032)***	0.437 (0.033)***
12,001	-0.663 (0.013)***	0.048 (0.001)***	0.832 (0.036)***	0.122 (0.077)	0.207 (0.096)**	-0.775 (0.009)***	0.047 (0.0004)***	1.426 (0.024)***	0.376 (0.042)***	0.364 (0.034)***	-0.416 (0.010)***	0.036 (0.0004)***	1.532 (0.064)***	1.028 (0.030)***	0.315 (0.029)***
10,501	-0.629 (0.011)***	0.046 (0.0004)***	0.772 (0.037)***	0.130 (0.073)*	0.228 (0.092)**	-0.689 (0.007)***	0.043 (0.0003)***	1.297 (0.026)***	0.251 (0.040)***	0.365 (0.030)***	-0.448 (0.009)***	0.036 (0.0003)***	1.499 (0.050)***	1.003 (0.033)***	0.301 (0.030)***

Values in the parentheses are Standard Errors. Significance levels: 0.01***, 0.05**, 0.1*.
* The appropriate r's is replaced by the corresponding reporting income.

Table A2: Income-tax price elasticities and estimated misreporting for different occupational groups

	Elasticities	Misreporting from 1% increase in tax rates			Elasticities	Misreporting from 1% increase in tax rates		
		lower	average	upper		lower	average	upper
		Rental				**Business**		
>100,001	-0.0069	-690.55	-1,197.55	-7,980.14	-0.0046	-462.34	-764.85	-5,342.87
75,001-100,000	-0.0112	-840.93	-957.21	-1,121.22	-0.0065	-490.94	-558.16	-654.58
60,001-75,000	-0.0103	-618.19	-688.76	-772.73	-0.0061	-368.09	-407.67	-460.10
40,001-60,000	-0.0106	-425.14	-510.02	-637.70	-0.0061	-242.02	-288.65	-363.02
32,001-40,000	-0.0119	-381.60	-426.10	-476.99	-0.0073	-233.13	-259.56	-291.41
30,001-32,000	-0.0132	-395.77	-408.78	-422.15	-0.0082	-246.23	-254.08	-262.63
26,001-30,000	-0.0099	-256.35	-274.92	-295.77	-0.0065	-169.26	-181.43	-195.29
22,001-26,000	-0.0098	-215.52	-234.55	-254.70	-0.0073	-160.59	-174.42	-189.78
16,001-22,000	-0.0114	-182.17	-212.26	-250.47	-0.0077	-122.61	-143.54	-168.58
12,001-16,000	-0.0140	-168.14	-194.17	-224.17	-0.0092	-110.78	-128.71	-147.69
10,501-12,000	-0.0099	-103.94	-111.30	-118.78	-0.0056	-58.89	-63.17	-67.29
		Farm				**Wages & Salaries**		
>100,001	-0.0049	-486.82	-825.27	-3,894.93	-0.0099	-988.74	-1,613.78	-14,285.90
75,001-100,000	-0.0081	-604.43	-682.30	-805.90	-0.0127	-950.16	-1,075.07	-1,266.86
60,001-75,000	-0.0067	-399.49	-444.99	-499.35	-0.0106	-636.26	-705.54	-795.31
40,001-60,000	-0.0055	-221.44	-259.82	-332.16	-0.0084	-337.58	-401.24	-506.36
32,001-40,000	-0.0067	-215.14	-237.87	-268.92	-0.0097	-311.66	-345.70	-389.56
30,001-32,000	-0.0075	-223.72	-230.62	-238.63	-0.0107	-321.94	-332.25	-343.40
26,001-30,000	-0.0058	-150.37	-161.42	-173.50	-0.0075	-195.63	-209.25	-225.71
22,001-26,000	-0.0062	-135.42	-147.19	-160.03	-0.0078	-171.73	-186.15	-202.95
16,001-22,000	-0.0069	-110.54	-129.77	-151.99	-0.0074	-118.50	-138.68	-162.93
12,001-16,000	-0.0084	-101.09	-115.22	-134.77	-0.0084	-101.03	-116.59	-134.69
10,501-12,000	-0.0060	-63.14	-67.29	-72.15	-0.0046	-48.18	-51.72	-55.06
		Self-employment				**Pension**		
>100,001	-0.0038	-375.14	-627.91	-4,458.56	-0.0086	-855.47	-1053.38	-1920.15
75,001-100,000	-0.0051	-382.07	-433.19	-509.41	-0.0067	-504.06	-564.68	-672.07
60,001-75,000	-0.0048	-289.40	-321.43	-361.75	-0.0055	-329.99	-359.94	-412.48
40,001-60,000	-0.0059	-235.07	-283.94	-352.60	-0.0058	-230.13	-267.14	-345.19
32,001-40,000	-0.0056	-178.20	-269.06	-222.74	-0.0060	-193.30	-213.74	-241.62
30,001-32,000	-0.0086	-256.62	-264.90	-273.72	-0.0065	-193.52	-199.69	-206.42
26,001-30,000	-0.0066	-170.57	-183.18	-196.81	-0.0047	-122.93	-131.69	-141.84
22,001-26,000	-0.0071	-156.91	-170.80	-185.43	-0.0050	-110.67	-120.28	-130.78
16,001-22,000	-0.0074	-117.88	-139.91	-162.07	-0.0058	-92.96	-109.25	-127.81
12,001-16,000	-0.0090	-108.19	-125.11	-144.24	-0.0075	-89.98	-103.49	-119.96
10,501-12,000	-0.0056	-58.29	-62.53	-66.61	-0.0048	-50.32	-53.76	-57.50

Table A3. Scenario for the 2010 Greek tax reform in tax rates by occupational group

	lower	average	upper	lower	average	upper	lower	average	upper
	Rent			Business			Self-employed		
>100,001	-3,452.74	-5,987.77	-39,900.71	-2,311.68	-3,824.26	-26,714.35	-1,875.69	-3,139.53	-22,292.78
75,001-100,000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60,001-75,000	-3,090.97	-3,443.78	-3,863.65	-1,840.44	-2,038.34	-2,300.51	-1,447.02	-1,607.16	-1,808.75
40,001-60,000	-1,275.43	-1,530.06	-1,913.10	-726.06	-865.96	-1,089.06	-705.21	-851.82	-1,057.79
32,001-40,000	-381.60	-426.10	-476.99	-233.13	-259.56	-291.41	-178.20	-269.06	-222.74
30,001-32,000	1,187.32	1,226.33	1,266.44	738.68	762.24	787.90	769.87	794.71	821.17
26,001-30,000	-1,794.42	-1,924.46	-2,070.41	-1,184.83	-1,269.99	-1,367.06	-1,194.01	-1,282.24	-1,377.65
22,001-26,000	-215.52	-234.55	-254.70	-160.59	-174.42	-189.78	-156.91	-170.80	-185.43
16,001-22,000	182.17	212.26	250.47	122.61	143.54	168.58	117.88	139.91	162.07
12,001-16,000	1,177.00	1,359.17	1,569.20	775.44	900.96	1,033.83	757.34	875.75	1,009.70
10,501-12,000	1,559.15	1,669.50	1,781.72	883.30	947.48	1,009.40	874.33	937.89	999.14
	Farm			Wages & Salaries			Pension		
>100,001	-2,434.08	-4,126.34	-19,474.67	-4,943.69	-8,068.91	-71,429.48	-4,277.33	-5,266.92	-9,600.76
75,001-100,000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60,001-75,000	-1,997.43	-2,224.97	-2,496.74	-3,181.29	-3,527.70	-3,976.55	-1,649.96	-1,799.68	-2,062.41
40,001-60,000	-664.33	-779.46	-996.47	-1,012.75	-1,203.72	-1,519.09	-690.40	-801.43	-1,035.57
32,001-40,000	-215.14	-237.87	-268.92	-311.66	-345.70	-389.56	-193.30	-213.74	-241.62
30,001-32,000	671.17	691.87	715.89	965.83	996.75	1,030.19	580.57	599.07	619.25
26,001-30,000	-1,052.61	-1,129.94	-1,214.50	-1,369.39	-1,464.75	-1,580.00	-860.52	-921.82	-992.86
22,001-26,000	-135.42	-147.19	-160.03	-171.73	-186.15	-202.95	-110.67	-120.28	-130.78
16,001-22,000	110.54	129.77	151.99	118.50	138.68	162.93	92.96	109.25	127.81
12,001-16,000	707.62	806.54	943.41	707.19	816.13	942.85	629.86	724.40	839.74
10,501-12,000	947.06	1,009.33	1,082.26	0.00	0.00	0.00	0.00	0.00	0.00