Models of Tax Planning Simulation: The Case of Greece

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Abstract

This paper highlights the timeless failure of the tax system in Greece despite its continuous reform, addressing the study of tax evasion phenomenon with a different approach. The study aims to identify socio-psychological characteristics and attitudes that affect the study of tax behavior using the mathematical research of linear models for tax policy and to assess tax behavior with simulation models, where state reform, tax reform and fiscal restructuring—along with social consensus, transparency and fair taxation—are control parameters. The survey involved 320 taxpayers from the entire Greek territory. Mathematical study using linear analysis showed that a linear model integrates fiscal, social and psychological factors are significantly better in representing tax behavior, lowering tax evasion. Specifically, a main futures model is bettering the tax behavior ($R^2 = 0.237$) improving the tax revenues. These results plainly infer the conclusion that tax behavior in Greece might affected by fiscal, social and psychological factors.

Keywords

Tax Evasion, Social Simulation, Tax Behavior, Compliance, Public Policy

1. Introduction

Tax evasion remains of the biggest challenges facing the Greek society. The illegal evasion of taxes is a major economic and social problem [1] because it bereaves the public of social resources that would improve the country's standard of living. Evasion is also acting as a means of redistribution of disposable income from legitimate taxpayers to tax evaders. Moreover, the recent protracted economic austerity policy, combined with additional taxes [2], in association with the financial solidarity of the European Union and the International Monetary

Fund—aimed at serving the financial needs of the public debt—is continuing, while tax evasion remains unaffected. This situation conduces to the frustration of both the Greek and European taxpayers.

The long-range presence of intense evasion, despite several changes in the tax legislation, is not just limited to the failure of the tax-audit authorities, but is possibly extended by the forbearance exhibited by the community [3]. An economy or/and a society that have habitual learned to tolerate the shadow economy and the illegal acquisition of non-taxed income at a high level; it has effectively adopted a corresponding illegal tax behavior [4]. The tolerant attitude held by taxpayers regarding tax evasion is obviously not derived solely from the weaknesses of the tax authorities. It possibly involves socio-psychological characteristics and perceptions of the mix of budgetary and tax public policy [5] and the management of fiscal resources—these influencing the tax behavior, and thus helping to preserve this attitude [6].

The exploration of fiscal and socio-psychological factors that influence tax behavior and the design of a tax system that integrates them is the contribution of this research to existing literature. The exploratory factor analysis of this research indicated 6 factors that may have a positive impact on tax revenues. Experimenting with tax planning simulation models that, besides taxpayers' economic and tax assets, includes fiscal and socio-psychological characteristics, potentially can successfully expand the tax base and the effectiveness of the tax system.

2. Background

2.1. Comparing Tax Systems

Table 1 compares aspects of three National and tax systems and the average for the European Union of 28 countries with the Greek tax system. As seen from the table the Greek economy demonstrates a relatively large non-taxed economy (Shadow Economy). However, the proportion of GDP taken in tax revenue is higher than the European average [7]. The percentage of tax revenues to total GDP expenditure, calculated as the sum of taxes compared to the height of GDP for each year, excluding social health insurance funds, amounts to 11.09% of GDP in Greece (9.7% EU 27) [8].

Table 1. Overview of tax systems.

TAX SYSTEM	GROWTH (% G.D.P.)	TAX REVENUES (% G.D.P.)	SHADOW ECONOMY (% G.D.P.)*
Greece	−0.2	24.50	22.4
Germany	1.7	11.50	12.2
France	1.3	23.20	12.3
U.S.A.	2.6	11.00	5.9
European Union (28)	2.2	19.70	18.3

*Eurostat & Schneider, F. Size and development of the shadow economy of 31 European and 5 other OECD countries from 2003 to 2015: Different developments.

Greece, in the informal sector, occupies 21st position (22.4%) among the 28 European Union countries (average 18.3%) and, without consideration of social benefits, 11.09% instead of 9.7% when compared with the European average. The proportion of tax revenues in GDP of Greece is more than the average European average (19.70%). This difference is higher than the comparable figures for the German and the American tax system, these representing two of the largest global economies showing largely economic activity. The comparison of the Greek tax system with the French shows that the former is extremely inadequate for despite displaying similar tax percentage of GDP, Greece has a shadow economy of more than twice the volume [9].

According to the Court of Auditors' Report for the financial year 2009 (ECA, 2011) at the end of 2009 Tax Entitlements pending were 33.55 billion €. In late 2013 the overdue taxes were more than 65 billion €. Today they exceed 95.00 billion € [10]. Merely the interest due on taxes for the one year 2016, added another 11 billion €. During the years 2010-2013 the overdue taxes virtually doubled, while tax evasion showed no reduction remaining very high compared with the European average—for the year 2012 it amounted to 24% of the Gross National Product or 43.2 billion €. For 2013 it stands at 23.3% or 44.7 billion € [11]. By the end of 2017 the sum of overdue taxes will ascend the 60% of GDP surpassing the 100 billion €.

2.2. Tax Behavior

The economic human behavior often deviates from the neoclassical rational model [12], embodying actions aimed at the welfare and beliefs of others. Human behavior and decision making [13] vary from rational choice by the activation of mental shortcuts (heuristics) and cognitive limits (cognitive bias) [14]. The dominant features for the individual are rationality in behavior and selfishness with sole motive staff satisfaction of interest in material goods [15]. However, social preferences such as altruism, reciprocity, intrinsic motivation, the desire to preserve morality, trust, envy, all have conspicuous impact [16] on economic behavior [17], affecting economic fundamentals such as unemployment, charity and education. Understanding the nature and interaction of social preferences and social norms is particularly beneficial [18] for improving the understanding of economic behavior [19], and in managing and improving economic policy and tax policy [20].

Tax evasion appeared alongside taxes [21] and is one of the enduring puzzles of applied economics. Tax evasion is influenced by the perceived fairness of the tax system [22]. Tax compliance is a priority of public finances, affecting equity, effectiveness and the impact of uniform taxation. When a part of the population can systematically avoid paying the corresponding taxes, the tax system is evidently unfair. Tax evasion distorts the efficiency of the tax system [23], it calls for more taxation in order to achieve fiscal balance so worsening the welfare of those who pay their taxes [24]. The deception of the public authorities by certain

categories of taxpayer results in an inequitable distribution of the tax burden, disadvantaging the honest taxpayer in the harvest of tax revenue.

The formation of tax systems with increased tax rates is too simplistic to be successful in a modern complex socio-economic system [25]. An increment in tax rates achieves only an interim increase in tax revenue while implementing tax models with low social efficiency [26], maintain the "marginal" behavior of the population using mixed strategies over time adopting a temporary option to pay taxes and then adapting in any way to eschew paying taxes [27]. This kind of behavior is a political exploitation object while raising taxes for balancing the budget exacerbates inequality, social conflict and the distortion of competition.

The over-taxation in addition to creating economic lassitude in the population leads to social reactions to an ineffective government. This is caused by the ratio of taxable income and tax [28]. The increase in tax rates through tax policy differentiation [29] is ineffective for increasing tax revenues and managing the economy. Finding the optimal tax rate is a prerequisite for a sustainable tax policy [30].

2.3. Social Simulation

Simulation is the process of experimentation [31] models. The simulation of social phenomena involves creating a model to aid our understanding and confirmation everyday experiences [32]. Social simulations are based on systems consisting of human beings [33]. The complex dynamics [34] of social systems [35] makes it difficult to accurately predict behavior. The interaction of human factors [36] provides explanations for the emergence of social phenomena [37]. Therefore, it is more efficient to model at different levels. The process of micro-simulation in which different levels of the system simulation are selected achieves this. These levels in a social simulation of an economic system, specifically in a tax system [38], which include socio-psychological characteristics [39], may provide an optimistic model, a pessimistic one, and at least an intermediate model.

A tax algorithm calculates taxes on disposable income. A simulation of a tax planning for a population with economic and socio-psychological characteristics, can better explore various strategies that combine different disciplines. This achieves an investigation of macroeconomic effects in relation to those individual characteristics of the population that determine the tax behavior, with the ultimate goal of modeling tax compliance [40].

2.4. Social Consensus

Social consensus is an agreement on a common social purpose [41] [42] from all involved and interested parties. The social consensus—also known as functionality—is based [43] on societies of self-preservation and social responsibility [44], equilibrating on a social acceptance with a view to maintaining the existing social order [45]. Rewards on tax compliance can enhance social consensus [46].

The social consensus contrasts [47] with the practice of conflict [48] that requires modification of the existing status quo in order to accomplish a change. The social consensus aims to balance the society through an altogether acceptable agreement [49] on the rules, values and operational regulations of the society on a particular frame.

2.5. Tax Reform

The tax reform and the state reform is the method [50] an elected government chooses to improve the tax system and the state administration with the aim of collectability of taxes and the quality of government services. Tax reform could include simplifying the tax system, increase or reduction of taxes, the change of progressiveness of tax income, imposing new taxes, eliminating inefficient taxes for economy, by updating of demographic characteristics or even the procedure of collection of established taxes [51]. The state reform may include simplifying citizen transactions with the state, improving the provision of government services, the functionality of public services [52] for the benefit of citizens [53] and the public works efficacy in relation to the financial requirements and conditions.

The tax system and state operation effectiveness is linked to economic development and the efficient management of the available financial resources. It is a key factor for economic prosperity and social cohesion and is also the cornerstone of an independent democratic state [54].

The efficiency of a tax system depends on the economic environment in relation to the social characteristics of taxpayers [55]. The importance of a fair tax system is fair distribution of the tax burden in relation to real incomes [56]. The primacy of justice or of selfishness compared to taxation is the key efficiency factor of a tax model [57]. The fair distribution of tax burden is affecting the degree of tolerance evasion both to the consistent taxpayers and to the fraudsters, stressing the importance of a fair tax system [58].

2.6. Tax Compliance

Tax behavior depends on the tax compliance of taxpayers in relation to legislation [59]. Changes in tax law can cause changes of the behavior of taxpayers, these being adaptive to the new legal environment that has been created.

Change in tax legislation influences the consumption behavior of the taxpayer [60]. Appropriate tax advice from an accountant can adjusts the recording of tax status, the changing tax returns, the reviewing of the timing of transactions and so performing a series of actions that do not alter the consumer behavior but the tax mapping of this behavior. Especially in high income taxpayers [61] the tightening of tax legislation can lead to alteration of their taxable income rather than the actual level of prosperity and consumer behavior.

Fear arises from the tightening of penalties for tax evasion causing a change in tax treatment [62], but not a corresponding change in behavior. An increase in

tax rates affects low income brackets more than the high who can adjust their consumption behavior to the new situation, without appreciably affecting their living standards and tax morality [63] [64].

According to tax legislation in Greece, evasion leads to the activation of sentences [65] comprising the capture of movable and immovable property, seizing bank accounts, temporary or permanent closure of businesses and, in exceptionally cases, high evasion can lead to imprisonment [66]. As a consequence, fear of selecting legal or illegal (tax evasion) tax behavior is caused by the imposition of such penalties.

2.7. Transparency

Transparency is the degree of perception of managed information of a sender [67] by an administrator [68]. Administrators should enhance the visibility, understanding and accuracy of information to stakeholders in order to achieve [69] adequate transparency [70]. The removal of all obstacles in the information management and the public decision-making constitutes the radical transparency [71].

In politics [72], transparency is inherent with the integrity of government officials, the accountability of civil servants and limit corruption [73]. The more a government publishes regulations, tenders, budgets and accounts [74], the further enhances transparency [75]. Transparency is also enhanced when laws and decisions of a government put into public consultation before finally legislated [76].

3. Method

3.1 Participants

This research investigated the identification of characteristics and perceptions which play an important role in the tax behavior and endurance of evasion. The total sample from respondents consists of 320 anonymous questionnaires. An audit for outliers to the data reported a successful outcome (100%). The sample consisted of 159 men (49.7%) and 161 (50.3%) women—this achieving a harmonious symmetry in relation to the total population. Data was collected between June and December 2016.

3.2. Procedure

For the fulfilment of the research it was chosen the method of online survey. The key features that helped in choosing the online survey method is the wide dispersion achieved in the research sample of the population with relatively low cost, the increasingly large number of users of social networks, personal character that is achieved when completing the questionnaire a susceptible personal issue as tax behavior, safe environment offered by the completion of the questionnaire in the privacy of the participant and comfortable communication to solve problems of understanding when completing the questionnaire.

The anonymity of the questionnaires helped to overcome the authentication failure that exists in the online survey through the use of social networks. Limitations of the research process probably include that the sample may contain a small number of older or retired taxpayers, low or limited educational level or/and busy which tend to more easily reject their participation on a survey.

3.3. Measures

All methods and implementation of linear models were performed in SPSS 20.0. The quantitative survey was conducted by the completion of anonymous questionnaires which were distributed, completed and collected online. The anonymous questionnaire contained five parts. The Part A recorded the personal and demographic data of the participants, Part B investigated the assessment of the tax system through thirty questions, Part C focused on investigating the attitude to tax policy with forty questions, and Part D the fiscal policy mix with fourteen questions which participants answered using a 5 point-scale. Part E listed twenty-two possible causes that might incite a taxpayer to evade taxes.

4. Results

Part A lists personal, demographic and economic characteristics of respondents. From the results of the Part B there is apparent agreement that the tax system in Greece is ineffective. The main reasons noted for the inefficiency is that the tax system is unfair, it treats all taxpayers equally, while not delivering equitable management of public resources. The tax system itself is basically responsible for the tendency towards tax evasion. The amount of tax is excessive and the supposed transparent management of public resources a failure.

The results of the Part C show there is no sense of satisfaction with either the tax system or for the distribution and fiscal management of public funds. It is evident from the data that these do not meet the requirements of taxpayers. Apart from the non-acceptance of the existing tax system there is a general distaste for the way in which public funds are spent. Redistribution of income is not achieved by the existing tax system and the implemented tax policy mix.

Part D shows that taxpayers expect a new tax system and a new fiscal policy mix by the restructuring of government spending. There are certain areas of public spending proposed in order to directly save resources for budget consolidation. There are other areas proposed to improve management and also specific areas that should be included in a new fiscal policy. The preference is of government revenues to run on a Government rather than on a European level, however, with regard to the management of state income, taxpayers seem to have more confidence in broader European management rather than Government and/or Local Authorities management. However, the joint management of Tax revenues at Government, European and Local level is also seen as acceptable.

In the Part E of the questionnaire, some open questions were asked which record reasons that might be seen to stimulate evasion. There is an agreement in

almost two out of three taxpayers that the main causes of tax evasion in Greece are political corruption and unfair taxation. Other important causes of tax evasion recorded are: mismanagement at government level, the lack of transparency in government spending policy, high taxes and poor public services.

This research indicates the reasons which might motivate a taxpayer to evade tax. There is agreement in around two out of three taxpayers that the main reasons underlying tax evasion in Greece are corruption and unfair taxation. Other important causes of tax evasion indicated are mismanagement at government level, the lack of transparency in government policy, high taxes and poor public services.

5. Exploratory Factor Analysis

An exploratory factor analysis was conducted (Principal Axis Factoring) with direct rotation (Direct Oblimin) using the software SPSS version 20.0. This was done after a data suitability estimate for factor analysis [77]. The analysis indicated 6 factors which were obtained with the SPSS 20.0 program.

Table 2 presents a summary of the factor analysis. The six factors identified in this analysis and assessment of the tax system were; State Reform, Tax Reform, Social Consensus, Financial Restructuring, Transparency and Fair Taxation.

The Confirmatory Factor Analysis was performed using the method of maximum likelihood to estimate the model. This rejected the possibility of variables having have zero correlation. However, the influence of a latent factor the observed variables was not confirmed in the factor analysis. The factor analysis system showed that a latent factor model is not a good fit.

6. Simulation Model Tax Planning

The exploration of a linear tax planning model that incorporates socio-psychological characteristics may give rise to improved procedures concerning tax revenue. In the Model of Essential Characteristics, Taxes might be calculated in relation to the basic tax behavioral factors as measured by Factor Analysis, adding the factor of a tightening of sanctions on fraudsters. On the Model of Personal Property Taxes [78] are calculated in relation to the property of taxpayers (movable, immovable, property statements etc.).

Table 2. Summary of factor analysis.

FACTOR	EIGENVALUE	PCT VAR	NO. ITEMS	Alpha
State Reform	7.621	9.998	21	6.131
Tax Reform	4.903	6.021	16	3.231
Social Consensus	3.053	3.373	7	2.866
Fiscal Restructuring	2.658	2.756	4	2.969
Transparency	2.560	2.607	2	2.969
Fair Taxation	2.099	2.036	2	2.026

In a period of shrinking economy, with a smaller increase in tax revenues resulting from a model incorporating the personal property of taxpayers, a greater increase in Tax Revenue might be achieved by a model that incorporates the key features of taxpayers and the severe punishment of tax evaders, which is more effective in times of economic growth. State Reform and Fair Taxation are the Key Factors in reforming the tax system, however the low R^2 reveals a complexity in the phenomenon. A summary of the Models is presented in Table 3 below.

Research on a Simulation Model was carried out with the Bootstrapping method incorporating the key features of tax behavior and property taxpayers. This model considered the effect from a tax planning model with key features and personal property using the Bootstrapping method. The method Bootstrapping (IBM SPSS Bootstrapping 20) was applied through the SPSS version 20.0 software.

The simulation method is achieved with a statistical resampling Bootstrapping [79], the distribution of actual research results. During the execution of the proposed method chosen by the software a number of one thousand hypothetical samples with 95% confidence interval.

The factors of the model are those resulting from the factor analysis and translated into 01 = State Reform, 02 = Tax Reform, 03 = Social Consensus, 04 = Fiscal Restructuring, 05 = Fair Taxation and 06 = Transparency. For a systems dynamics simulation model assessment, it was carried out with four different scenarios Economic Development. The informal economy (Shadow Economy) calculated with a factor 0.23 (SE = 0.23 GDP) for the coming years 2014-2020, as a percentage to GDP (GDP) per year (Y). The Savings Tax (TS) on the Simulation Model Method of Bootstrapping is Tax Save = Tax Loss and total taxes after application of the outcome model [80] is mapping to: Tax = Budget Tax + Tax Saving. The model of personal characteristics is expressed from:

$$\text{Tax}(\text{PS}) = \text{Tax}(\text{A}) \cdot \left(SR_{(01)} + TR_{(02)} + SC_{(03)} + FR_{(04)} + FT_{(05)} + Tr_{(06)} \right)$$

where $\text{Tax}(\text{PS})$ represents the taxes arises from the model of personal characteristics, $\text{Tax}(\text{A})$ are the annual total budgeted tax revenues under the medium-term program, $SR_{(01)}$ is the factor of State Reform, $TR_{(02)}$ is the factor of Tax Reform, $SC_{(03)}$ is the factor of Social Consensus, $FR_{(04)}$ is the factor of Fiscal Restructuring, $FT_{(05)}$ is the factor of Fair Taxation and $Tr_{(06)}$ is the factor of Transparency. In Table 4 is representing the correlations variables in the model of personal characteristics that is based the reference sample for the bootstrapping method.

Table 3. Summary model key features and personal property.

Summary Model	MAIN FEATURES MODEL	PERSONAL PROPERTY MODEL
Taxes	0.351	0.090
Sample Measurement	320	320
R^2	0.237	0.269

Table 4. Correlations variables simulation model sample = 1000, R^2 = 0.269.

	Taxes	01	02	03	04	05	06
Taxes	1.000	0.121	−0.093	0.033	0.221	0.309	−0.208
01	0.121	1	0.083	0.002	−0.083	−0.0238	−0.103
02	−0.093	0.083	1	0.168	−0.192	0.035	−0.055
03	0.033	0.002	0.168	1	−0.123	0.088	0.176
04	0.221	−0.083	1	0.168	−0.192	0.035	−0.055
05	0.309	−0.238	0.035	0.088	−0.007	1	−0.054
06	−0.208	−0.103	−0.055	−176	0.038	−0.054	1

In **Table 5** we fix the results for the years 2013 to 2016 on the basis of the Medium Term Program [81] and **Tables 6-9** is a provision with four average economic growth scenarios, first (Optimistic) by +3.5%, the second (Realistic) with 0.5%, the third (Pessimistic) to −1.5% and the fourth (Very Pessimistic) to −4.5%. Subsequently we investigate the extent to which tax savings are related to factors in the model of personal characteristics. The estimation of tax saving resulting from:

$$\text{Tax}(S) = (\text{GDP} \cdot \text{SE}) \cdot \left(SR_{(01)} + TR_{(02)} + SC_{(03)} + FR_{(04)} + FT_{(05)} + Tr_{(06)} \right)$$

where $\text{Tax}(S)$ represents the tax savings from the Shadow Economy of GDP. The total new computed taxes $\text{Tax}(\text{New})$ resulting from:

$$\text{Tax}(\text{New}) = \text{Tax}(A) + \text{Tax}(S)$$

where $\text{Tax}(A)$ are the annual total budgeted tax revenues under the medium-term program [80].

As seen from the above **Tables 5-9**, based on a Simulation Model for Tax Planning, a significant amount of lost taxes might be recovered. Recovery of additional taxes may approach 18 billion € for the four years from 2017 to 2020, while exceeding 17 billion € for the four years from 2013 to 2016 based on the growth figures of the economy and tax payments as provided for in the Medium Term Plan. Note that the calculation of taxes on growth scenarios and/or recession of GDP for the years 2017 - 2020 was calculated as a proportion of the taxes under the Medium Term Plan for the year 2016.

From the results of the simulation model it is obvious that both tax savings during periods of high growth economy (17.947 billion €) and during periods of intense depression (14.775 billion €) are possible. Moreover, it may be that the model focus on State & Financial Restructuring (factors 1 & 4) and the Fair Tax Reform (Factor 5) could bring about the return of two thirds of the total lost taxes. Budget for the four years 2013 - 2016 can restore € 29.818 billion in total taxes than 45.804 billion € taxes are eliminated through tax evasion. With the optimistic scenario average growth +3.5% for the four years from 2017 to 2020 the corresponding tax recovery amount is 30.514 billion €. This being the recovery of additional taxes achieved without assurance of new taxes but after a

Table 5. Tax savings calculation for the years 2013 to 2016 after the reformation based on a simulation model with the Bootstrapping method.

	BUDGETS TAX REVENUES 2013-2016 BASED ON THE MEDIUM TERM (Amounts in millions of €)								
Y	GDP	TAX	01	02	03	04	05	06	TS	TAX NEW
2013	189.708	52.255	1.492	−1.146	407	2.725	3.810	−2.565	4.723	56.978
2014	188.750	50.406	1.402	−1.078	382	2.562	3.582	−2.411	4.439	54.845
2015	187.797	48.412	1.347	−1.035	367	2.460	3.440	−2.315	4.264	52.676
2016	186.849	46.718	1.300	−999	354	2.374	3.320	−2.234	4.115	50.833
								Tax Saving:		**17.541**

Table 6. Tax savings calculation for the years 2017 to 2020 after reformation based on a simulation model with the Bootstrapping method (average growth +3.5%).

	SCENARIO A: AVERAGE GROWTH 3.5% of tax revenue from 2017 to 2020 (Amounts in millions of €)								
Y	GDP	TAX	01	02	03	04	05	06	TS	TAX NEW
2017	193.388	48.353	1.345	−1.034	367	2.457	3.436	−2.313	4.258	52.611
2018	200.157	50.045	1.392	−1.070	379	2.543	3.556	−2.394	4.406	54.451
2019	207.162	51.797	1.441	−1.108	393	2.632	3.681	−2.478	4.561	56.358
2020	214.413	53.609	1.491	−1.146	406	2.425	3.810	−2.564	4.722	58.331
								Tax Saving:		**17.947**

Table 7. Tax savings calculation for the years 2017-2020 after reformation based on a simulation model with the Bootstrapping method (average growth +0.5%)

	SCENARIO B: 0.5% average growth in tax revenues from 2017 to 2020 (Amounts in millions of €)								
Y	GDP	TAX	01	02	03	04	05	06	TS	TAX NEW
2017	187.783	46.951	1.306	−1.004	356	2.386	3.336	−2.245	4.135	51.086
2018	188.722	47.186	1.313	−1.009	358	2.398	3.353	−2.257	4.156	51.342
2019	189.665	47.422	1.319	−1.014	360	2.410	3.370	−2.268	4.177	51.599
2020	190.614	47.659	1.323	−1.017	361	2.417	3.380	−2.275	4.189	51.848
								Tax Saving:		**16.657**

Table 8. Calculation of tax saving for the years 2017 to 2020 after reformation based on a simulation model with the Bootstrapping method (average growth −1.5%).

	Scenario C: average growth −1.5% of tax revenue from 2017 to 2020 (Amounts in millions of €)								
Y	GDP	TAX	01	02	03	04	05	06	TS	TAX NEW
2017	187.046	46.017	1.280	−984	349	2.338	3.270	−2.201	4.052	50.069
2018	181.285	45.326	1.263	−969	344	2.304	3.221	−2.168	3.993	49.319
2019	178.566	44.647	1.242	−954	338	2.269	3.172	−2.135	3.932	48.579
2020	175.887	43.977	1.223	−940	333	2.235	3.125	−2.103	3.873	47.850
								Tax Saving:		**15.850**

Table 9. Calculation of tax saving for the years 2013 to 2016 after reformation based on a simulation model with the Bootstrapping method (average growth −4.5%).

Scenario D: average growth −4.5% of tax revenue from 2017 to 2020 (Amounts in millions of €)										
Y	GDP	TAX	01	02	03	04	05	06	TS	TAX NEW
2017	178.440	44.615	1.241	−954	338	2.267	3.170	−2.134	3.928	48.543
2018	170.410	42.607	1.185	−911	323	2.165	3.027	−2.038	3.751	46.358
2019	162.742	40.690	1.132	−870	308	2.068	2.981	−1.946	3.673	44.363
2020	155.419	38.859	1.081	−831	295	1.975	2.761	−1.858	3.423	42.282
								Tax Saving:		__14.775__

Y = Year, GDP = Gross Domestic Product, Tax = Total Taxes, 01 = State Reform, 02 = Tax Reform, 03 = Social Consensus, 04 = Financial Restructuring, 05 = Fair Taxation, 06 = Transparency, TS = Tax Saving, Tax New = Total Restated Tax.

reform of the tax system based on independent socio-psychological variables of the model, which affect the tax treatment of the population.

7. Discussion

This research revealed significant evidence on the linear relationship of socio-psychological factors [82] into the person's tax behavior. The social consensus, transparency, fair taxation in conjunction with state restructuring and tax reform alter the tax behavior, enhancing government revenue. The socio-psychological approach to the tax fraud problem focuses on finding the characteristics that affect the tax behavior, while eliminating the corruption. The assimilation of the specific characteristics from a revised tax policy restricts the extent of tax evasion.

The size of the shadow economy is shrinking and the tax revenue are increasing from the implementation of tax planning simulation models incorporating socio-psychological characteristics of the taxpayer. A tax planning simulation model [83] that has as its basis the individual socio-psychological characteristics achieves an increase in tax revenue [84]. The development of a model simulation with bootstrapping method confirmed this conclusion.

Legislative initiatives and the tax imputed income when applied in an isolated policy is less effective than a tax policy that involves socio-psychological factors. The opaque functioning of the state, the unfair tax system, and lack of social consensus increases [85] the propensity for fraud. Linear models enriched with socio-psychological factors explain tax behavior most satisfactorily.

The study of tax behavior in Greece revealed a multifaceted phenomenon associated with many factors. A linear tax behavior model can be enriched by several independent factors. Testing with more simulation models of tax behavior may provide perspective for further increase in tax revenues.

8. Conclusions

The development of tax planning simulation models achieves the redesign of the

tax system in Greece with fiscal and socio-psychological characteristics, improving the overall tax collection [86]. The effectiveness of the proposed tax model is based on the fiscal and socio-psychological characteristics emerged from the exploratory factor analysis in the survey results.

State reform has a positive effect while, on the contrary, the tax reform applied has a negative impact on the collection of taxes. The tightening of penalties does not maximize the profitability of a tax planning simulation model, without the processing of penalties. Transparency does not appear to contribute to the effectiveness of tax collection, while fiscal restructuring and the punishment of tax evaders contributing to fair taxation are necessary factors for the effectiveness of a tax planning simulation model in tax collection.

From the study of the existing literature and the results of the current research, it appears that the legislative function (e.g. penalties) or the economic characteristics (e.g. living costs) when applied individually are ineffective in relation to a tax policy involving fiscal and socio-psychological features. Restructuring the tax base through net tax-adding practices does not achieve a significant reduction in tax evasion [87], since taxpayers subsequently adopting an adjusted dynamic tax behavior under any new mixture of tax policies [88].

The exploration of socio-psychological factors that affect tax behavior and designing a tax system that incorporates them constitutes a novelty of this research. Experimenting with models of tax planning simulation that besides taxpayers' economic attributes and assets include socio-psychological features, can achieve widening the tax base and efficiency of the tax system. The further widening of the factors shaping tax behavior in Greece is necessary especially when tax evasion is a timeless problem that despite the legislation change remains high over time.

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