Online ISSN 2424-6166. EKONOMIKA 2016 Vol. 95(2)
DOI: http://dx.doi.org/10.15388/Ekon.2016.2.10123

TAX BEHAVIOUR: ASSESSMENT OF TAX COMPLIANCE IN EUROPEAN UNION COUNTRIES

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The aim of this paper is to assess the impact of the selected tax behaviour determinants for the overall tax (non) compliance in European Union countries for a period from 2003 to 2014. Firstly, the literature on tax behaviour is analysed through the viewpoint of behavioural economics and the systemisation of the main determinants is provided. Secondly, selected tax behaviour determinants for the analysis are presented, hypotheses raised and models formed. Research suggests that tax morale, socio-cultural determinants and the relationship between tax authority and taxpayers have an overall significant impact on tax behaviour in European Union countries. Nevertheless, the effect from different determinants varies greatly across regions and countries.

Key words: *tax compliance, tax evasion, tax behaviour, slippery slope framework, tax morale, tax culture*

INTRODUCTION

Taxes are an essential component for the efficient long-term functioning of the government and the creation and redistribution of social welfare. However, implementation of legislative regulations does not suggest in itself that tax duties will be respected. Tax noncompliance is a pressing matter all over the European Union: a failure to report full tax liabilities results in lower revenue for the state and thus impairs the optimal realisation of social welfare policies.

Different measures have been employed in order to explain the subject of tax behaviour. In a general sense, tax behaviour describes an individual's approach towards tax compliance that defines a degree to which taxpayers follow their tax duties (contrary to the degree of tax evasion and avoidance)[1]. The neoclassical approach observes and implies the use of governmental control through audits and penalties and assesses tax

[1] In this paper, concepts of tax evasion and avoidance are summarised under the term "tax noncompliance". Though they differ in nature, here such intricacies are not analysed thoroughly, but rather used in a general way (through the term "noncompliance") as to depict opposition to tax compliance.

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compliance through a combination of these measures, provision of heterogeneous endowments and modification of tax rate. However, it is very intuitive to assume that such approach does not provide a high degree of explanatory power in a practical – or *real world* – noncompliant tax behaviour analysis. Seeking to look beyond the classical assumptions, the theory of tax compliance has turned to the observations of human cognitive capabilities and judgemental errors and biases arising from them.

The aim of this paper is to determine the impact of different tax behaviour factors on tax compliance in selected European Union regions. Using data from studies conducted by Eurostat, the World Bank and individual researches, an empirical analysis of the tax behaviour determinants' effect for the period of 2003–2014 is performed. The results obtained from such analysis can work as indicators of potential public policy shortcomings in terms of optimising the levels of tax compliance.

The paper is structured in the following way. The first part looks at the subject of tax (non)compliance through the point of behavioural economics and provides a summary of the main tax behaviour determinants. In the second part, following the theoretical suggestions, individual tax behaviour determinants are selected and models are formed for the analysis of tax behaviour in the European Union for the period 2003-2014. In the third part, results of the impact of tax behaviour determinants are presented. Finally, we present the conclusions on verifying the hypotheses and the furute implications.

1. Theoretical review of tax behaviour determinants

Tax behaviour is strongly related to psychological foundations: taxes modify the terms of individual choices, thus affecting personal behaviour and actions; they redistribute wealth, impose cost and trade-offs, taxes can create a drag on economic efficiency and impose welfare costs (Congdon, Kling, & Mullainathan, 2011). On the other hand, individuals have limited computational capabilities, are subject to errors and judgemental biases, may not fully comprehend tax design and are subject to making wrong decisions. Tax policy ought to be designed with keeping in mind the individuals who are to bear the burden of taxes and who are to respond to them. In order to do this, all potential tax behaviour determinants need to be assessed carefully.

Classical determinants. An economic research on the subject of tax compliance and tax evasion began with the seminal study by Allingham & Sandmo (1972), followed by Srinivasan (1973) and Yitzhaki (1974). This classical approach, labelled by some researchers as "economics of crime", puts the taxpayer in a gambler's position, having to choose between compliance and evasion – in other words, between legal and criminal activities (Alm, Cherry, Jones, & McKee, 2010; Christian & Alm, 2014; Casagrande, Cagno, Pandimiglio, & Spallone, 2015; Castro & Scartascini, 2015). The traditional approach suggests two compliance enforcement measures: randomised audits (with pre-

committed probabilities) and penalties (fines, levied on the undeclared income) with an additional effect from income levels. The principal literature on tax compliance underlines four main findings: the evasion rate increases with an increase in tax rate; the evasion rate decreases with an increase in fine rate; the evasion rate decreases with an increase in audit rate; the effect of income on evasion is ambiguous.

However, the research on tax behaviour has since advanced greatly: relatively static neoclassical models were enhanced with insights from other disciplines and with broader use of dynamics; theoretical models were interconnected with empirical research. Subsequent research has found that classical enforcement measures do have a weakening impact on tax evasion, but it can be either considerably small (Andreoni, Erard, & Feinstein, 1998) or have a reverse effect on the willingness to pay taxes (Feld & Frey, 2002; Kirchler, Hoelzl, & Wahl, 2008). The impact of audits has been analysed under different settings: performing audits only if declared income falls below a certain threshold (known as *triggered audits* or *audit cut-off* policy) or using the *bounded rule*, where taxpayers are provided with knowledge on the maximum number of audits to be carried out (Alm, Cronshaw, & McKee, 1993; Tan & Yim, 2014). Moreover, the classical viewpoint, which states that fines dominate over control through monitoring (therefore setting them at the maximum levels should result in higher compliance) is, however, a wrong approach, one which fails to consider the existence of imperfections in the market, asymmetric information and intrinsic implications under which an optimal fine level exists below the maximum level (Lisi, 2015). Tax rate has also been a subject of numerous discussions. Bernasconi, Corazzini, & Seri (2014) have looked into the effects of hedonic adaptation[2] on the taxpayer's understanding of fiscal variables and evasion decision and have suggested that, while tax rate has a negative effect on the compliance level (this confirms the insights from classical models), once individuals adapt to new tax conditions, the overall level of evasion does not depend on a specific tax burden, which is an important observation for policy design. Therefore, it is essential to consider other influential factors of tax compliance and refrain from considering the variation of tax rate as a primary method for fighting evasion.

Dynamic models. Tax evasion is not a one-shot decision; therefore, the study of dynamics (such as *learning*) in the model is essential for understanding the emergence or failure of different tax compliance aspects. A degree of dynamic interaction between audit and penalty rates can have an impact on tax behaviour, meaning that it is not *any* combination of these measurements that results in a divergence of an individual compliance level towards the one predicted by the neoclassical theory, as described through an adaptive learning model based on optimisation, in which successful decisions have

[2] The hedonic adaptation (hedonic treadmill) is a tendency of humans to adapt to positive or negative circumstances and return to a relative (stable) neutrality in terms of happiness.

a higher probability of being adopted (Soliman, Jones & Cullis, 2014). The concept of learning includes acknowledgement and expectation of the frequency of audits (so called the *bomb-crater effect*): an agent, being audited in a single period, believes he will not be audited in the next one (see e.g. Kastlunger, Kirchler, Mittone, & Pitters, 2009; Fochmann & Kroll, 2016). The traditional model works on the assumption that an agent has full knowledge of his tax liability, which, in reality, is not always a case, due to the high complexity of tax system. One way for a taxpayer to respond to such complexity is to under-report his taxable income and wait for audit to point out the correct application of tax liabilities (Kirchler, Hoelzl, & Wahl, 2008); the other option is to over-report the taxes in order to avoid potential audits (Alm, Cherry, Jones, & McKee, 2010)[3]. There is also a significant difference between underreporting taxable income and not declaring any at all, which is subject to a much lower chance of audit, but, potentially, to higher penalties if caught (Alm, Cherry, Jones, & McKee, 2010). Both reporting and filling decisions can be influenced by a diverse tax authority approach to compliance: use of regular enforcement measures can be complemented by an introduction of services which help to deal with the complexity of the tax system (the so called *service paradigm*): if tax authorities provide a helpful service for taxpayers, one which helps to deal with the complexity of the tax system, individuals can form a positive image of authorities being fair and transparent (Kirchler, Hoelzl, & Wahl, 2008; Alm, Cherry, Jones, & McKee, 2010).

The concept of *slippery slope framework* summarises the *perceived* fairness of tax authorities and trust in them (Kirchler, Hoelzl, & Wahl, 2008). The observed levels of tax compliance tend to be not as low as proposed by the classical model (Andreoni, Erard, & Feinstein, 1998; Castro & Scartascini, 2015) and *slippery slope framework* (SSF) addresses these differences. Under SSF, compliance can be induced either through enforcing (*coercive*) measures, which depend on authority power (namely, audits and fines) or through voluntary (*persuasive*) measures, which depend on trust in authorities (emerging from the provision of services and support for taxpayers). An attempt of formalisation of this framework by Kirchler, Hoelzl, & Wahl (2008) works on the assumption that there are two types of taxpayers – *honest* and *dishonest*. Persuasive measures are essential for supporting and maintaining cooperation with honest taxpayers; however, dishonest taxpayers need to be constrained by coercive measures. A substantial importance is put on the relationship between tax authorities and taxpayers (*tax climate*): too much power can destroy trust and affect willingness to cooperate and may require heavy use of enforcing measures, while a high level of trust can result in higher levels of compliance and a sufficiency of persuasive measures to keep those levels in check. In a nutshell, coercive measures can enforce compliance, but threaten to destroy voluntary compliance com-

[3] The choice of under- or over-reporting can be viewed as a manifestation of a degree of risk aversion an agent has. Following such reasoning, a risk neutral person might choose in his reporting is simply on the mean value.

pletely. As suggested by Lisi (2014), overall tax compliance and macroeconomic climate are enhanced more by trust-inducing actions than by coercive measures, as the former lead to the creation of a cooperative society and a provision of legitimacy to power structures; nevertheless, the power of coercive measures can't be disregarded, as they lead to establishment of trust as well, particularly through control of dishonest taxpayers and the perception of fairness within a society by honest taxpayers. Kirchler, Hoelzl, & Wahl (2008) also underline the importance of disclosure and justification of the use of respective measures as principal for the establishment of trust. Numerous studies indicate that aversion to give taxes may come from the fact that individuals lack control over the use of tax revenues, while tax compliance is perceived to be higher when, in example, taxes are spent on research or charity, rather than given to state purposes (Doerrenberg, 2015) In general, fairness, transparency and consistency in procedural processes by tax authorities can help to increase (perceived) quality of institutional work, thus implying positive effect on compliance levels (Feld & Frey, 2002).

Social norms, attitudes, beliefs and morale. Prinz, Muehlbacher, & Kirchler (2014) indicate that compliance is influenced not only by the particular measures applied by tax authority, but also by the existing social norms and the behaviour of other taxpayers (actual or perceived). In classical setting, the behaviour of other taxpayers does not have any effect on the interaction between taxpayers and tax authority; however, it is fairly obvious that ethical dimensions and social interactions are crucial for the understanding of tax evasion and compliance behaviour (Alm & Torgler, 2011). The interest in the analysis of psychic costs of tax evasion has been growing significantly: a great body of research has been dedicated to study the effect of social norms which are not limited to an individual and can rather be incurred through social interactions, such as loss of reputation, guilt and shame (see, e.g. Casagrande, Cagno, Pandimiglio, & Spallone, 2015). Though tax morale – a set of personal rules that may lead to a feeling of happiness if the individual acts according to these standards of conduct and to a feeling of guilt or embarrassment if the individual acts differently – is placed as a potential explanation for divergence between predicted and observed levels of compliance, it should be noted that a high level of tax morale does not automatically equate to a high level of tax compliance; it only reflects individual preferences which might differ from the actual behaviour (Lisi, 2015; Christian & Alm, 2014). Social interactions and social norms also play a key role in compliance decisions: taxpayers may be willing to evade as a mean to fight against unfair government or if they believe that other individuals are evading too. Both attitudes and beliefs arise endogenously from the horizontal and vertical interactions within a society (Hashimzade, Myles, Page, & Rablen, 2014). Taxpayers tend to exhibit (evasive) compliant behaviour as a response to (dis)advantageous inequity (Bazart & Bonein, 2014). However, they may also overestimate the other individuals' propensity towards evasion and therefore seek to adjust (lower) their compliance level as to fit the

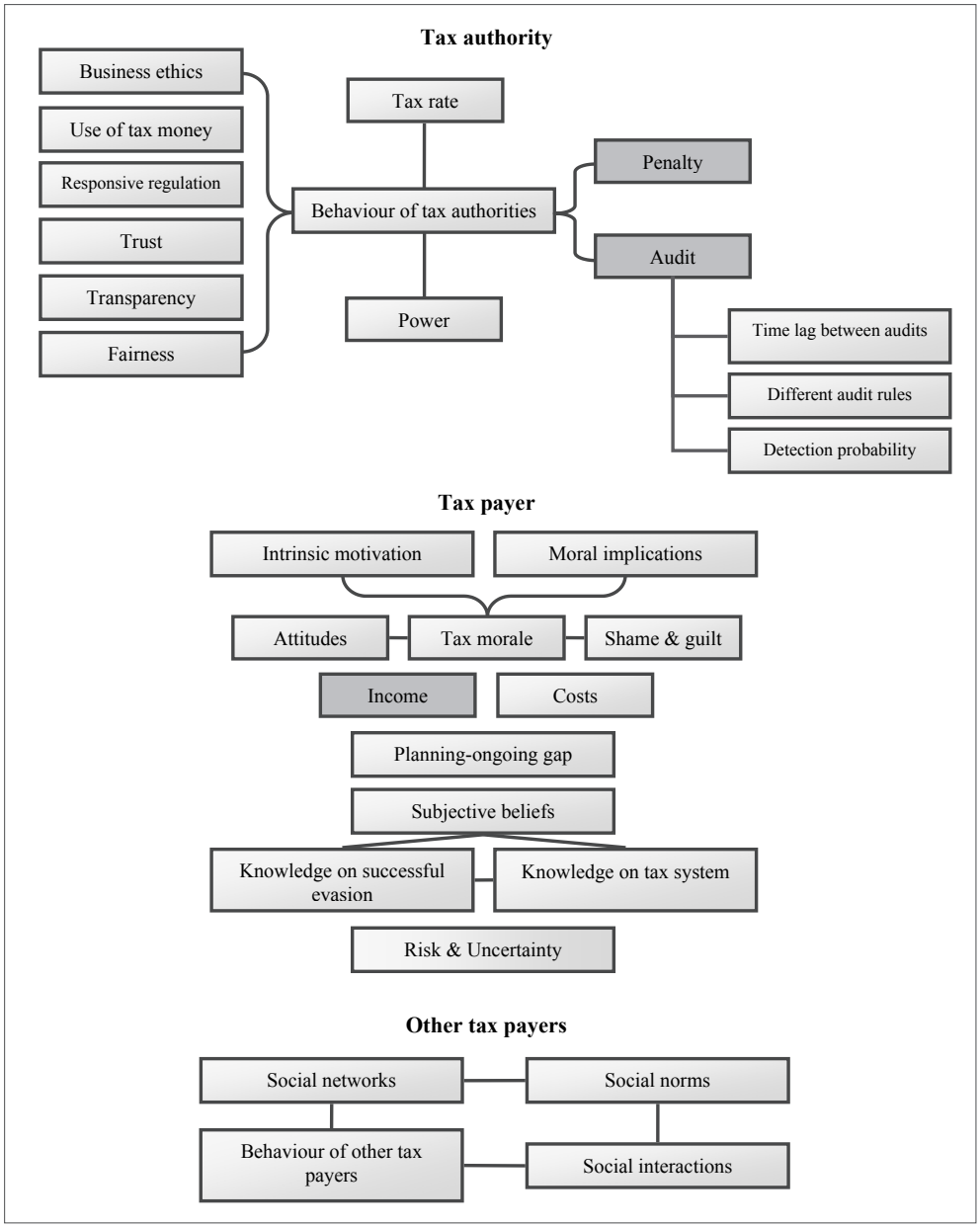

FIGURE 1. **Main determinants of tax behaviour**

Note: Dark grey boxes indicate classical tax behaviour determinants (penalty, audit and income); remaining indicators are grouped in three categories, their relation is demonstrated by the connecting lines and groups of colours.

social norms (Wenzel, 2005). In a study on endogenous formation of attitudes and beliefs (specific to a certain group), Hashimzade, Myles, Page, & Rablen (2014) conclude that formation is mutually reinforced through attitude towards evasion, risk aversion, choice of occupation and compliance; simulations demonstrate that social interactions lead to formation of subjective beliefs on audit probability (which tends to exceed the objective probability); individuals exhibit a self-selective behaviour concerning a social division by occupational activities (based on their attitude towards risk and compliance). Moreover, evasion can be tackled through competition or strategic uncertainty (due to different audit policies), public shaming (with potential reintegration in the society afterwards, thus preserving the *emotional social control*), increase of sympathy and empathy levels (Casagrande, Cagno, Pandimiglio, & Spallone, 2015; Christian & Alm, 2014).

Agent based models. Agent based models constitute another area of research on tax behaviour, which allows to test for effects through simulations. Despite a high degree of complexity due to numerous variables simultaneously affecting behaviour of agents, these models have gained interest due to the higher flexibility and degree of control for analysing large populations composed of heterogeneous agents directly interacting with each other; an application of this method is mainly used for observations on evolutionary processes, replications of tax behaviour within a society or the effect of social networks on compliance decisions (see e.g. Andrei, Comer, & Koehler, 2014; Hashimzade, Myles, Page, & Rablen, 2014).

Overall, the discussed determinants can be grouped in three categories: relationship with tax authority, interaction with other tax payers and individual characteristics. Each of these groups is subdivided into the individual determinants, which may be subject to further analysis and elaboration; therefore, the list is not finite; rather it is an indication of main areas of potential tax behaviour determinants. The main groups and their elements are presented in figure 1.

2. The methodology for tax behaviour determinant analysis in European Union countries

Despite changes in tax policy landscape, the increase in practical use of research insights or the expanding frontiers of academic inquiry into the subject matter, the fight with tax evasion and avoidance stays among the top European Union strategic priorities (as stated in the Annual Growth Survey for European Union in 2016). However, there is yet no heterogeneous methodology for constructing national tax compliance policy recommendations based on the proposed influence determinants. Different timelines of the research or recentness of the proposed models, numerous determinants with the noteworthy differences in testing requirements make choosing a set of independent variables for the empirical assessment of tax behaviour highly complicated. Moreover, imperceptibility of such activities as tax evasion, avoidance and fraud makes reliable and accurate measurement

of their scope to be eminently problematic. Certain estimates, such as calculations of a *tax gap* – a difference between the amount of tax liabilities faced by taxpayers and the taxes collected – are available for certain taxes and selected countries (only the calculations of VAT gap are available for all European Union members since 2009). Another widely used *indirect* measure of noncompliant tax behaviour is an estimation of shadow economy (see e.g. Schneider, Raczkowski and Mróz (2015)). However, activities recognised to conform to a definition of shadow economy include not only tax evasion and avoidance, but also illegal production and trade, theft; moreover, estimations on the size of shadow economy by national statistical bureaus are not publicly available for every member state or the results are incomparable due to different methodologies used. A *direct* measurement of tax noncompliance is possible as done by Christie & Holzner (2006), who have constructed two separate models for measuring discrepancies in tax compliance in income (social security contributions and personal income tax) and in consumption (VAT and excise tax).

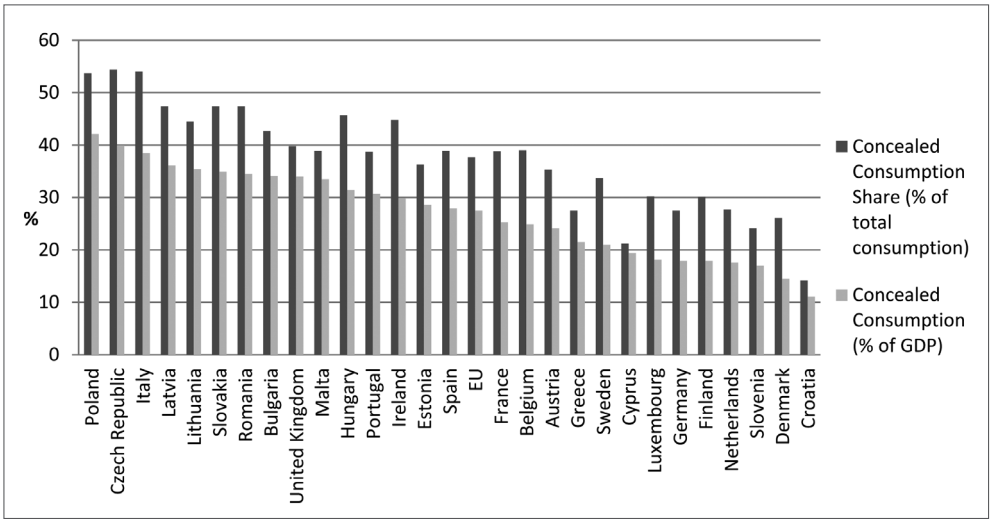

FIGURE 2. **Estimated tax evasion in consumption in EU countries, 2000–2003 average**

Source: composed by the authors, based on Christie & Holzner (2006).

As shown in figure 2, the concealed consumption (as % of total consumption) indicator placed such countries as Croatia, Greece, Cyprus and Slovenia (which are typically associated with a high level of shadow economy) among countries with the lowest *shadow consumption.* On the other end of the spectrum, Poland, Czech Republic, Italy and Latvia were ranked as countries with the highest concealed consumption. Authors also come to a conclusion that regulation on excised goods is mainly undertaken with a goal to increase revenue; for this reason, if excise tax evasion and avoidance is to be targeted, tax rate reduction in combination with other non-fiscal measures are recommended. In general,

however, such calculations of tax noncompliance are highly time consuming and labour intensive therefore the scope and continuity of such research is limited at this moment.

The majority of studies on tax behaviour in European Union countries focus either on one or few determinants, one or a few countries, or on both (see e.g. Lisi, 2012; Richardson, 2008). In this paper, the impact of selected tax behaviour determinants has been empirically assessed for 28 European Union countries for the period 2003–2014. A generalised model has been constructed considering the previously presented systemisation of main tax behaviour determinant groups. This model reviews all three groups through the *slippery slope framework* determinants, corresponding to interactions between a taxpayer and tax authorities, *socio-cultural* determinants depicting social relations and *tax morale* for individual characteristics.

In a basic model of tax compliance in a country,

$$Compl_{it}=\beta_{it}+\varepsilon_{it}; \quad (1)$$

A rate of compliance in a country i for period t depends on a mean of compliance β_{it} and an error term ε_{it}, which shows how much compliance deviates from the mean in country i. **Compliant behaviour** ($Compl_{it}$) is represented by the overall amount of tax revenue (measured as % of GDP)[4]. This model has been expanded with an introduction of vector x_{it} (which contains variables of *slippery slope framework* and individual taxpayer characteristics) and y_{it} (containing data on six Hofstede's cultural dimensions (Hofstede, Hofstede, & Minkov, 2010)). Determinants used in the analysis are presented in table 1.

Three hypotheses have been defined for this analysis:

H1. The *Slippery Slope Framework Hypothesis*: trust (in) and power (of) tax authority explain tax compliance.

Following the main assumptions of the *slippery slope framework* (as presented in the second part of this paper) and suggestions by Lisi (2012, 2014), the effect of trust, power and their interrelation on tax compliance is tested in this paper.

H2. The *Tax Morale Hypothesis:* tax morale has a positive impact on tax compliance.

Tax behaviour in European countries has been researched largely through the question of tax morale with the use of the European Value Survey, the World Value Survey or European Social Survey data (see e.g. Lago-Peñas & Lago-Peñas, 2010): this strand of research mainly tests the effect of demographical variables (such as gender, age, income, education, etc.) on tax morale. In this paper, tax morale is used as an independent variable for determining its impact on tax behaviour.

H3. The *Socio–Cultural Hypothesis*: Socio-cultural determinants have a significant impact on tax compliance.

[4] In some of the models used in this research, the dependent variable is changed into **noncompliant behaviour** ($NonCompl_{it}$), measured as a size of shadow economy (as % of GDP) due to possibility of studying individual country effects and avoiding collinearity problems.

TABLE 1. **Tax behaviour determinants used in the analysis**

Vector x_{it} ={$TaxMor_{it}$; $Trust_{it}$; $Power_{it}$; $Inter_{it}$; $Dummy_{it}$; GDP_{it}; VAT_{it}}	
Tax morale (*TaxMor*$_{it}$)	A proxy for voluntary tax contributions (or cooperation between taxpayer and tax authorities); it does not represent the tax behaviour in itself, but rather stands as a measure of taxpayer's attitude. Following suggestions by Williams & Martínez (2014), tax morale variable is constructed as a multi-item index in a 10-point Likert scale through principal component analysis (PCA) using attitudinal questions from Eurobarometer No. 284 (2007) and 402 (2013) surveys. Results for each EU member state are provided in the appendix.
Trust (*Trust*$_{it}$)	Trust in tax authority (as main tax decisions are made by government, in this research it is equated to the theoretical concept of tax authority). Following suggestions by Richardson (2008), a measurement of *government effectiveness* from the Worldwide Governance Indicators (WGI) project is used as a proxy for trust, as it describes the way quality of public and civil services as well as the quality of policy development and implementation together with government's commitment to such policies are perceived.
Power (*Power*$_{it}$)	A perception of power of tax authority (government). Following suggestions by Richardson (2008), a proxy for power of government is an indicator of rule of law from the WGI project. It shows an extent to which individuals trust and follow the rules in a society (emphasising the quality of police and court work, enforcement of contracts and property rights and the prospect of criminal activities or violence) and, with an assumption that higher control by law allows the greater enforcement of tax policies, represents the concept of government power.
Interaction (*Inter*$_{it}$)	A product of trust and power ($Trust_{it}$*$Power_{it}$)
Dummy (*Dummy*$_{it}$)	A variable takes on a value of 1 if trust and power interaction value is higher than the respective mean. It intends to measure the impact of a higher than average interaction level than present in the observed country group.
Economic development (GDP_{it})	A control variable, represented by a natural logarithm of GDP per capita. Data is obtained from Eurostat.
VAT gap (*VAT*$_{it}$)	A control variable, representing tax noncompliance, used mainly for the increase in explanatory power of the models. Data is obtained from CASE/CPB (2015).
Vector y_{it}={$PowDis_{it}$; Ind_{it}; $Masc_{it}$; $UncAvoid_{it}$; $LongTermOr_{it}$; Ind_{it}}	
Power distance (*PowDis*$_{it}$)	A degree to which individuals that have less power in society accept and expect the overall unequal distribution of power. This indicator corresponds to the perception of tax system: the higher the power distance, the more likely individuals will believe in unequal treatment and unfair government and taxation system and, thus, choose to evade or avoid tax duties.
Individualism (*Ind*$_{it}$)	The preference for the strength of ties within a society. It reflects the individual's position in the overall social network through contraposition of self-images: individualistic "I" (expressing preference for loose social ties) and collectivistic "we" (expressing preference for tight social ties). A high level of individualism typically reflects equality and consistency in policy application for all groups within society, thus increasing a compliance possibility. However, in particular cases, individualism can be defined as placing personal goals over common welfare, thus exhibiting preference for unethical or illegal activities when needed.

TABLE 1 (continuation). **Tax behaviour determinants used in the analysis**

Masculinity ($Masc_{it}$)	A degree to which biological distinctness between sexes is used to define social roles. A highly masculine society expresses preferences for, e.g., material rewards, heroism, decisiveness, achievements, while highly feminine society favours, e.g., modesty, cooperation and caring for the weak. The interpretation of masculinity in tax compliance is ambiguous: a high level of masculinity can be associated with promotion of materialism (assuming that it comes as cost of higher likelihood for illegal transactions and non-compliant behaviour); on the other hand, highly masculine societies tend to be defined by the importance of social status that comes with an increased visibility within a society (and thus a higher probability of audits) and less tolerance for felonious activities.
Uncertainty avoidance ($UncAvoid_{it}$)	An extent to which society feels uncomfortable due to ambiguity and uncertainty; therefore, cultures with a high uncertainty avoidance index prefer strict codes of beliefs and behaviours (rule-oriented societies), while cultures with low index tolerate unorthodox ideas and actions do not exalt principles over practices. Rule-oriented societies are likely to have complex tax systems in order to reduce uncertainty and this can prompt noncompliant behaviour; nevertheless, the existence of rules can also work as guidance towards compliant behaviour by complicating the process of tax evasion and avoidance.
Long term orientation ($LongTermOr_{it}$)	The approach towards long term traditions and norms. Societies with a high index value express favourable views towards modern methods that help prepare for the future; on the contrary, a low index value suggests preference for time honoured traditions and mistrust in social changes. Therefore, tax avoidance and evasion can prevail in a society in which there is no incentive for long term welfare creation. However, it is also possible that orientation towards future is accompanied by a tendency towards high control and persistent orders as well as thrift and perseverance that can lead to potential noncompliant tax behaviour.
Indulgence (Ind_{it})	Represents a degree to which society prefers the existence of a relatively free satisfaction of basic and natural human needs related to enjoyment of life, as opposed to restraint societies, which believe in strict regulation of social norms and, thus, a suppression of the latter needs. Preference for restraint (as opposed to indulgence) can be associated with strict controls and a more likely feeling of unfair treatment, thus encouraging a choice of unlawful activities. On the other hand, lack of control and restrain (and too much indulgence) can provide appropriate circumstances for a noncompliant behaviour to thrive within a society.

According to Roth, Scholz & Dryden-Witte (1989), culture is reflected in individual values and norms, which in turn are continuously employed in tax compliance decisions. The selection of variables for the analysis of connection between tax compliance and cultural factors is based on a research by Richardson (2008), who employed *inter alia* Gert Hofstede's cultural dimensions as representatives of cultural specifics in the model on tax evasion and cultural influences. These indicators of cultural specifics are widely accepted as probably the most widely recognised and used cultural indicators in empirical research, considering national values in the area of social sciences (Richardson, 2008). Cultural dimensions have been chosen instead of data from the European or World Value surveys as representatives of potential social and individual tax behaviour determinants because these cultural indicators are assumed to be more comprehensive and rigorous.

Looking at the aforementioned tax behaviour determinants, it might be difficult to draw conclusions on their direct representativeness through socio-cultural variables. Nevertheless, the use of Hofstede's dimensions allows substantiation of some of the identified relationships between taxpayers as well as their individual characteristics in the model. Power distance and individualism reflect an underlying perception of fairness in the society (which can be endogenously formed or influenced by the actions and beliefs of other taxpayers); masculinity is one of the strongest variables that reflect social network effects, as it is based on a relative comparison of an individual taxpayer with other members of society; uncertainty avoidance, long term orientation and indulgence can be interpreted as a representation of the degree of norms existing in the society and its inclination to obey them. Thus, socio-cultural dimensions are employed in the model as representations of the previously mentioned tax behaviour determinants' categories.

Analysis of tax behaviour determinants' impact in European Union countries is performed using panel data, consisting of 28 cross-sectional units (EU member states) and 12 time periods, corresponding to annual data for years 2003-2014. Majority of variables are drawn form a balanced panel, with an exception of tax morale (calculated only for years 2007 and 2013) and VAT gap (presented for years 2009-2013). Research is undertaken using Microsoft Excel and *gretl* software. Data is obtained from Eurostat, World Bank and research papers. Analysis has been carried out using pooled Ordinary Least Squares (OLS), fixed effect (FE) or random effect (RE) models. All of them have first been constructed as pooled OLS with White's test on heteroskedasticity and Woolridge's test on serial correlation performed. Additionally, panel diagnostics have been carried out, providing F-test (for FE) and Breusch-Pagan Lagrange Multiplier (LM) test (for RE) statistics, allowing to choose between FE, RE or pooled OLS. Null hypothesis states that pooled OLS is adequate for both tests; if it is rejected in one of the cases, the appropriate model (FE or RE) is used; if it is not rejected in either of the cases, pooled OLS is preferred. If it is rejected in both cases, the Hausman test is performed to choose between FE and RE (with null hypothesis that Generalized Least Squares (GLS) estimates are consistent and RE is preferred). The fixed effect model is estimated by the Least Square Dummy Variable model, including country dummies in pooled OLS in order to observe specific country effects. If a model is found to have problems pertaining to heteroskedasticity and/or autocorrelation (with low p-values for Wooldridge's test and White's test), robust heteroskedasticity and autocorrelation consistent (HAC) standard errors are used. The 0.1 level of significance is used throughout the models. Further model selection and estimation results are provided in the appendix.

Due to limited availability of data, three types of models are formed to test the hypotheses. Firstly, an aggregate model on tax behaviour in the European Union is constructed; afterwards, panel data is subdivided into four geographical regions of the EU (formed on the basis of a geographical scheme used by the United Nations – Northern, Eastern,

Western and Southern European Union member states) and new models are estimated in order to look for underlying geographical variance of determinant effects; finally, nine additional models are constructed for the assessment of *slippery slope framework* for country groups, constructed on the basis of relative tax morale levels. Due to a shorter time horizon for the tax morale index (T=2) and VAT gap (T=5) as well as collinearity problems with cultural indicators, these determinants are tested only in the aggregate and regional models. A detailed composition of regions is provided in the appendix. Each model is estimated in linear and logarithmic transformations: the linear model allows avoiding collinearity problems (especially arising for *Interaction* term from s*lippery slope framework* and country dummies) and the logarithmic model provides analysis of variable elasticity. The impact of determinants is generalised through the persistency of estimates' direction of effect in both *lin* and *log* models.

There are a few limitations of this research. Firstly, tax behaviour depends on numerous variables and the ones applied in this paper represent only a minor part of them (the results of the research give only a general overview on potential tax behaviour specifics in selected countries). Secondly, the time horizon used for research, operating on publicly available data, is short (with T = 12, annual data); panel data tends to be unbalanced, therefore it is almost impossible to include more explanatory variables when using panel data or seeking to observe a situation in an individual country. Independent surveys and experiments would introduce a collection of up-to-date data and an expansion of the time horizon would greatly increase the robustness of study results. Therefore, further works in this area could concentrate on developing methodology for a comprehensive assessment of tax behaviour in the country.

3. Results of tax behaviour analysis in the European Union

A research on tax behaviour determinants was comprised of three different types of influence factors: impact coming from the relationship with tax authorities (tested through implementing the *slippery slope framework*), individual characteristics and beliefs (such as tax morale) and social influence (represented by socio-cultural variables). Summarised results from all the models are presented in table 2.

An overall analysis has revealed heterogeneity in the effects tax behaviour determinants'. One particularly interesting case is observed in the s*lippery slope framework* analysis. A great body of research has been devoted for analysis of the types of authority power impact on tax decisions. Lisi (2012) has performed a cross-section analysis on the *slippery slope framework* using data from the World Values Survey, World Bank and International Monetary Fund: the overall analysis underlined the importance and significance of both trust and power in determining overall tax compliance, and trust was found to have more intense positive impact than power. Muehlbacher, Kirchler, &

Schwarzenberger (2011) tested SSF on data from the Czech Republic, Austria and the United Kingdom, and confirmed the initial assumptions that trust has a positive impact on voluntary compliance; therefore, if tax authorities seek to implement effective tax policies, they should consider including trust-based measures as a cheap and effective method for inducing tax compliance. Power was found to have positive, but lower impact or was insignificant in explaining tax compliance.

TABLE 2. **Direction of the determinant effect in tax behaviour analysis: impact on tax compliance levels**

	EU	Nr	We	Ea	So	G1	G2	G3	G4	G5	G6	G7	G8	G9
Trust	+	+	-	+	+	+	+	+	-	+	+	+	-	+
Power	-	-	-	+	-	-	-	+	-	-	-	+	-/+	+
GDP	+	-	+	+	-	+	+	+	+	+	+	+	+	+
Dummy	+	+	o	-	-	o	-	-	+	+	+	-	-	+
Inter	-	-	+	+	+	+	+	-	+	+	+	+	+	-
Power distance	-	-	-	-	+									
Individualism	+	-	+	-	-									
Masculinity	-	+	-	+	+									
Uncertainty Avoidance	+	-	+	+	-									
Long Term Orientation	+	+	-	+	o									
Indulgence	+	-	o	+	o									
Tax morale	+*													

+ Variable significant and has the same direction of effect in *lin* and *log* models

+ Variable significant only in one of the models; direction of effect is the same

+ Variable significant only in one of the models; direction of effect differ

Note: significant tax behaviour determinants are marked in different colours (light grey for negative impact variables and darker grey for positive impact variables); 'o' indicates omitted variables, * to avoid confusion, tax morale is marked to have a positive impact on compliance, though the *Tax Morale* indicator has a negative coefficient (because higher values indicate a higher willingness to evade).

Further research has employed experiments as a tool to test the persistence of SSF assumptions. Kogler et al. (2013) carried out an experiment on SSF in Austria, Hungary, Romania and Russia and found that the highest level of tax compliance was observed in the presence of both high power and high trust. Results obtained from the analysis of tax behaviour in this paper do not suggest identical conclusions. In general theory, power of tax authorities is expected to have a positive, but potentially lower impact on compliance levels. Regional analysis has revealed that in the majority of regions (the only exception being Eastern EU) increase in power is associated with a decrease in tax compliance. Such direction of effect is observed throughout the majority of country groups too. Only in Bulgaria, Romania, Ireland, United Kingdom, Lithuania, Latvia and

Estonia the expansion of a coercive government power is expected to improve compliance levels. The *Trust* determinant provides even more unusual results: in the majority of models, trust in a government has been observed to have a positive impact on compliant behaviour; however, in the Czech Republic, Poland, Slovakia, Slovenia (group 4), Denmark, Finland and Sweden (group 8), the increase in *Trust* is associated with negative parameter estimates. Variations in *Trust* levels exhibit a downward trend in these cases, which is also observed in the *noncompliance* indicator (unlike as in compliance, which follows the contrary direction); therefore, the growth of tax compliance throughout time in these countries has been accompanied by decreases in both *Trust* and *Noncompliance*. Without any further model estimations, it is assumed in this paper that such fluctuations and growth patterns can only indicate the disengagement between these two factors: the perception of quality of policy as developed by the government and the willingness to evade taxes. The movements of these two factors do not indicate strong interconnection. In an overall EU model, *Trust* was found to be insignificant in explaining variations in tax compliance. The interaction term, which represents a combination of both coercive and persuasive measures, was found to have a mainly positive impact on compliance levels: even though, in an overall EU model, *Interaction* has a negative parameter estimate, it is insignificant as in the Northern and Western EU regions. Nevertheless, an individual country group analysis suggests that by combining and implementing both types of measures it is possible to decrease shadow activities and noncompliance levels (as observed in 7 out of 9 groups). Policy makers should be observant, though: overly exerted power (measured with a dummy variable) in some countries can call out an unexpected reaction, thus decreasing compliance levels (e.g., in Southern Europe, which also includes group 2). In general, despite high variability in regression results, in the majority of cases, *slippery slope framework* determinants were found to have a significant impact (either positive or negative) on a dependent variable. For these reasons, the first hypothesis on the *slippery slope framework* has been accepted.

Tax morale has been a subject of numerous studies. Williams & Martínez (2014) have used a self-constructed tax morale index as a dependent variable in order to observe factors of influence (such as demographic characteristics) on tax morale in the European Union. In a research by Halla (2010), a causal relationship between tax morale and compliant behaviour has been observed, drawing conclusions that higher tax morale does decrease shadow activities (shadow production), so it can be used as a determinant in explaining people's willingness to pay taxes when detection probabilities and fine rates are low. In this research, seeking a higher level of accuracy, the tax morale index has been constructed through survey data using principal component analysis method and used as an explanatory variable in regression with compliance as a dependent variable. Results suggested that there is a positive link between tax morale and compliant behaviour in

a EU model, thus confirming the findings from previous studies. Such results should not be overlooked by policy makers: manipulation of tax morale (especially through persuasive measures) can help manage noncompliant behaviour in a comparably lower cost way (costs lower than using pure coercive measures). For the following reasons, the hypothesis on tax morale has been accepted[5].

Socio-cultural determinants also exhibit heterogeneous effects. In a study by Richardson (2008) using four main Hofstede's cultural dimensions, uncertainty avoidance and individualism were found to be the only significant variables that explain tax evasion in a sample of 47 countries, unlike the very first research including Hofstede's dimensions by Tsakumis, Curatola & Porcano (2007), where noncompliance is determined by high power distance, uncertainty avoidance and low individualism and masculinity. Neither of 6 observed variables had the same effect in four regions and EU models, thus it is not possible to confirm or reject previous theories. This implies the possibility for a broad interpretation of each determinant. *Power Distance* was the most consistent throughout models: both in the aggregate and in the Northern, Western and Eastern EU models unequal and unfair treatment by government has a negative impact on compliance. *Individualism*, in the most straightforward sense, can be interpreted as a position of "I" against the collectivistic "we" in a society; on the one hand, this can indicate a need for equality and consistency in policy application for all groups within a society (as observed with positive parameter estimates in the EU and Western models), on the other hand, a high level of individualism can indicate promotion of personal goals against common welfare and bring negative impact on tax compliance, as observed in the Northern and Eastern European Union. *Masculinity* has been recognised to have generally varying results in different studies: positive parameter estimates in Northern, Eastern and Southern EU models might indicate a limited tolerance for felonious activities (in a society that promotes rewards), as well as a positive relationship between a successful state of being and high visibility within a society (as observed in this model); the negative parameter estimate (as observed in the aggregate and Western EU models) can indicate the fact that highly masculine societies express preference for materialistic achievements and thus seek to neglect legal obligations. *Uncertainty Avoidance* and *Long Term Orientation* do look similar in their essence, however there is a major difference: societies which are more likely to seek uncertainty avoidance in the future tend to be very rule-oriented with potentially highly complex regulation mechanisms; however, these rules can be understood differently. In some societies, rules are accepted as limitations and thus are associated with an increase in shadow activities (the analysis indicates existence of such situation in Northern and Southern regions); in other societies, rules help to guide people

[5] It should be noted that a time horizon for the verification of the stated hypothesis is very short, thus further modifications and an inclusion of more observations could result in highly different estimations.

towards compliant behaviour and provide less temptation to evade or avoid taxes (as observed in the Eastern, Western and overall EU models). *Long Term Orientation*, on the other hand, can be characterised by an underlying tendency towards high control and persistent orders that can lead to potential noncompliance in individual's tax behaviour (a negative parameter estimate is calculated for the Western region). On the other hand, orientation towards future and implementation of potentially restrictive rules can have a positive impact on compliance levels if a conscious understanding of the current action impact on future welfare prevails in the society (as observed in the Northern, Eastern and overall EU models). The last socio-cultural determinant is *Indulgence*: this determinant can be associated with restrictions on indulgent tendencies within a society which may have a contrary effect on the overall compliance levels (as observed in Northern EU region); on the other hand, lack of control and restraint (and too much indulgence) can provide appropriate circumstances for noncompliant behaviour to exist unhampered in a society (as seen in the aggregate and Eastern EU models). Overall, though with varying effects, socio-cultural determinants have proven to be significant in explaining variations in tax compliance levels. For such reasons, the hypothesis on socio-cultural determinants has been accepted.

Conclusions

- Tax evasion and avoidance pose a threat for efficient long-term functioning of a government and call for precise and deliberate tools for fighting noncompliant behaviour. It is very intuitive to assume that classical measures, due to a low number of explanatory factors (governmental control through audits and penalties, modification of tax rate and taxpayer's endowment (i.e. income)) encompass only a limited set of functional capabilities, therefore having limited extent of impact on tax behaviour.
- Results from the empirical analysis on tax behaviour in the European Union suggest that despite varying effect, the selected determinants (impact from taxpayer's relationship with tax authorities, impact from social networks and influence of individual characteristics) were mostly significant in explaining variations in tax (non) compliance, thus allowing to accept the previously stated hypotheses of research. For the *slippery slope framework* hypothesis, *Power* of tax authorities was found to be associated mainly with a negative reaction to coercive measures, while *Trust*, on the contrary, was shown to impact compliance positively. Research also suggests that interaction between trust and power can have a decreasing effect of noncompliant behaviour, though overly exerted persuasive and coercive measures could result in evasive behaviour. Tax morale was found to have a positive impact on tax compliance. Though socio-cultural determinants have varied greatly throughout the models, it is possible to draw a conclusion on their significance in explaining the level of

compliance. By underlying the perception of fairness in the society was found to have a positive effect on compliant behaviour, though an overly individualistic worldview can be associated with preference for personal gain contrapositioned against contribution to social welfare. Preference for achievements and materialistic rewards was associated both with higher noncompliant behaviour and a positive effect on tax compliance (explained by positive relationship between a successful state of being and high visibility within a society and a limited tolerance for felonious activities). The inclination towards rules, regulations and restrictions within a society as well as the degree of their complexity is also an ambiguous question.

- It is highly recommended for policy makers to be careful when assessing new policies or considering to undertake reforms. An increase in trust can provide a great effect on the management of noncompliant behaviour; however, on its own, it will not be enough for significant changes. An optimal combination of trust and power is a considerably difficult outcome to arrive to: not enough power and trust will have no effect, whereas overly exerted power will bring negative impact on tax compliance. Moreover, a decision on persuasive or coercive measures should be done in respect to the socio-cultural environment. The application of coercive measures in societies with, e.g., preference for a relatively basic and unrestrictive rule and regulation system, can result in contrary effects on compliance levels.
- It is highly recommended for policy makers to identify socio-cultural settings, characterise the relationship between tax payers and tax authorities, and assess (depending on possibilities) the taxpayers' characteristics before designing, applying or modifying tax policies. Future research in this area could further expand the model and include more tax behaviour determinants. However, such modification requires additional data; therefore, it is recommended to include the use of uniform surveys, questionnaires or experiments in order to gather more information, form a balanced panel data with more observations and improve the accuracy and scope of research. Particular modifications for future research could include refinements of the tax morale index, an introduction of more detailed socio-cultural determinants and different proxy measurements for trust and power.

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TABLE 1**. Tax morale indices**

	2007	2013		2007	2013
Austria	7.340	5.890	Italy	6.722	5.762
Belgium	6.556	6.244	Latvia	8.226	8.581
Bulgaria	6.227	4.938	Lithuania	7.115	6.687
Croatia	*na*	4.535	Luxembourg	3.899	4.365
Cyprus	3.816	3.602	Malta	3.810	4.180
Czech Republic	6.647	6.913	Netherlands	4.801	4.733
Denmark	4.621	3.919	Poland	6.249	6.683
Estonia	5.399	5.681	Portugal	6.016	6.208
Finland	4.336	4.346	Romania	4.804	4.882
France	5.174	4.894	Slovakia	6.252	6.998
Germany	4.443	3.971	Slovenia	4.765	4.625
Greece	4.706	4.794	Spain	4.938	4.659
Hungary	6.580	6.456	Sweden	3.824	3.452
Ireland	5.367	6.258	United Kingdom	4.831	4.685

Source: calculated by the authors.

TABLE 2. **Composition analysis of country groups used for SSF and socio-cultural determinant effects**

4 geographical EU regions			
North	**West**	**East**	**South**
United Kingdom, Ireland, Sweden, Finland, Estonia, Latvia, Lithuania, Denmark	Belgium, France, Netherlands, Luxembourg, Germany, Austria	Poland, Czech Republic, Slovakia, Slovenia, Hungary, Romania, Bulgaria	Croatia, Cyprus, Greece, Italy, Malta, Portugal, Spain

9 country groups for SSF analysis								
Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Group 7**	**Group 8**	**Group 9**
Italy Portugal Spain	Greece Cyprus Malta Croatia Hungary	Bulgaria Romania	Czech Republic Slovakia Slovenia Poland	Austria France Germany	Belgium Nether-lands Luxem-bourg	Ireland United Kingdom	Denmark Finland Sweden	Lithuania Latvia Estonia
Tax Morale index average								
5.72	4.70	5.21	6.14	5.29	5.10	5.29	5.17	6.95

TABLE 3. **Model selection**

	Lin				*Log*			
	F-test	**LM-test**	**Hausman test**	**Model**	**F-test**	**LM-test**	**Hausman test**	**Model**
EU	<0.0001	<0.0001	0.00146573	FE	<0.0001	<0.0001	0.0122303	RE
EU (tax morale)	<0.0001	<0.0001	0.118705	RE	<0.0001	<0.0001	0.0370408	RE
North	<0.0001	0.0252992	insuff. d.f. for RE	FE	0.0003122	0.0252992	insuff. d.f. for RE	FE
West	0.252377	0.0528075	insuff. d.f. for RE	Pooled OLS	<0.0001	0.0528075	insuff. d.f. for RE	FE
East	0.815232	0.0364698	insuff. d.f. for RE	Pooled OLS	0.721028	0.0364698	insuff. d.f. for RE	Pooled OLS
South	0.00366919	0.0770999	insuff. d.f. for RE	Pooled OLS	0.0037208	0.0506992	*not needed*	FE
Group 1	<0.0001	0.214395	*not needed*	FE	<0.0001	0.724867	*not needed*	FE
Group 2	<0.0001	0.000118382	insuff. d.f. for RE	FE	<0.0001	0.0986476	insuff. d.f. for RE	FE
Group 3	<0.0001	0.841889	*not needed*	FE	<0.0001	0.873241	*not needed*	FE
Group 4	0.00087278	0.49828	*not needed*	FE	<0.0001	<0.0001	insuff. d.f. for RE	FE
Group 5	0.00087278	0.605821	*not needed*	FE	<0.0001	0.578986	*not needed*	FE
Group 6	<0.0001	0.423511	*not needed*	FE	<0.0001	0.200825	*not needed*	FE
Group 7	0.00689951	0.302266	*not needed*	FE	0.002405	0.303625	*not needed*	FE
Group 8	<0.0001	0.625731	*not needed*	FE	<0.0001	0.646887	*not needed*	FE
Group 9	<0.0001	<0.0001	insuff. d.f. for RE	FE	0.0037013	0.304893	*not needed*	FE

Note. In certain cases there have been insufficient degrees of freedom for Random Effects model; they are indicated under Hausman test as "insuff. d.f. for RE".

TABLE 4. **Estimation results**

EU model							
FE: LSDV model, dependent variable *Compl*				RE: GLS, dependent variable l_*Compl*			
const	2.13617	(0.0022)	***	const	−3.02794	(<0.0001)	***
Trust	0.0971305	(0.7427)		l_Trust	0.0483685	(0.6878)	
Power	−0.287776	(0.0350)	**	l_Power	−0.631598	(0.0005)	***
Inter	−0.162252	(0.6806)		l_PowDis	−0.184499	(0.0178)	**
PowDis	−0.0160882	(0.0063)	***	l_Indiv	0.112344	(0.1306)	
Indiv	0.0112338	(0.0044)	***	l_Masc	−0.0549783	(0.1723)	
Masc	−0.00303264	(0.0359)	**	l_UncAvoid	0.198016	(0.0551)	*
UncAvoid	0.00197899	(0.0084)	***	l_LongTermOr	0.0876364	(0.3309)	
LongTermOr	0.00875386	(0.0129)	**	l_Indulg	0.244171	(0.0006)	***
Indulg	0.00399839	(0.1324)		l_VAT	−0.00916325	(0.3456)	
l_VAT	−0.00248544	(0.2465)		Dummy	0.109215	(0.0363)	**
Dummy	0.0667203	(0.0290)	**	l_GDP	0.0169888	(0.3842)	
l_GDP	0.0203233	(0.3252)					
R-squared	0.981320			'Between' variance	0.0153844		
Adjusted R-squared	0.975350			'Within' variance	0.00072376		
Wooldridge test	<0.0001						
White's test p-value	0.026321						
N				129			
Dummy variables omitted due to exact collinearity				*l_Inter omitted due to exact collinearity*			

Note: p-values in parentheses; * denotes significance at 10% level, ** at 5% level, and *** at 1% level

TABLE 4.1. **EU model (tax morale)**

RE model, dependent variable *Compl*				RE model, dependent variable l_*Compl*			
const	0.202093	(0.0120)	**	const	−1.42008	(<0.0001)	***
TaxMor	−0.00634123	(0.0275)	**	TaxMor	−0.0872418	(0.3291)	
l_GDP	0.0164973	(0.0056)	***	l_GDP	0.0456198	(<0.0001)	***
Between variance	0.00210923			Between variance	0.0149465		
Within variance	0.000280617			Within variance	0.00222431		
N				N	55		

TABLE 4.2. **Northern EU**

FE: LSDV model, dependent variable *Compl*				FE: LSDV model, dependent variable l_*Compl*			
const	2.00925	(0.0018)	***	const	29.3569	(0.0002)	***
Trust	0.751395	(0.0818)	*	l_Trust	0.236043	(0.0848)	*
Power	−0.330092	(0.4040)		l_Power	−2.50171	(<0.0001)	***
Inter	−0.854742	(0.1256)		l_GDP	−0.110292	(0.0042)	***
l_GDP	−0.0464064	(<0.0001)	***	l_PowDis	−0.957973	(0.0059)	***
PowDis	−0.0153072	(0.0143)	**	l_Indiv	−4.34565	(0.0002)	***
Indiv	−0.00801777	(0.0198)	**	l_Masc	0.278446	(<0.0001)	***
Masc	0.00302378	(<0.0001)	***	l_UncAvoid	−2.91383	(0.0001)	***
UncAvoid	−0.0263256	(0.0010)	***	l_LongTermOr	2.10826	(<0.0001)	***
LongTermOr	0.0143225	(<0.0001)	***	l_Indulg	−5.09724	(<0.0001)	***
Indulg	−0.0439417	(0.0003)	***	l_VAT	−0.00786601	(0.4447)	
l_VAT	−0.00332881	(0.2908)		dum_n	9.46479	(<0.0001)	***
dum_n	2.89443	(<0.0001)	***				
F(12, 26)	374.2107			F(11, 27)	427.3404		
P-value (F)	<0.0001			P-value (F)	<0.0001		
R-squared	0.994243			R-squared	0.994289		
Adjusted R-squared	0.991586			Adjusted R-squared	0.991962		
Wooldridge test	0.0113021			Wooldridge test	0.0362824		
White's test p-value	0.375408			White's test p-value	0.636697		
N				N	39		
Dummy variables omitted due to exact collinearity				*Dummy variables and l_Inter omitted due to exact collinearity*			

TABLE 4.3. **Western EU**

Pooled OLS model, dependent variable *Compl*				FE: LSDV model, dependent variable *l_Compl*			
const	0.125565	(0.9682)		const	−39.5025	(0.0489)	**
Trust	−3.91123	(0.2865)		l_Trust	−0.00975461	(0.9756)	
Power	−3.8964	(0.2678)		l_Power	−0.312403	(0.6688)	
Inter	4.65348	(0.2857)		l_GDP	0.183653	(0.0546)	*
l_GDP	0.0869496	(0.0408)	**	l_PowDis	−11.1768	(0.0640)	*
PowDis	−0.0698602	(0.0475)	**	l_Indiv	10.8149	(0.0653)	*
Indiv	0.0573194	(0.0512)	*	l_Masc	−0.499395	(0.0487)	**
Masc	-0.00791303	(0.0665)	*	l_UncAvoid	16.2402	(0.0576)	*
UncAvoid	0.0660515	(0.0402)	**	l_LongTermOr	−8.05001	(0.0642)	*
LongTermOr	−0.0473152	(0.0502)	*	l_VAT	−0.00867453	(0.3382)	
l_VAT	−0.0034067	(0.3911)					
F(10, 19)	46.48559			F-test (9, 20)	58.01110		
P-value (F)	<0.0001			P-value (F)	<0.0001		
R-squared	0.960732			R-squared	0.963106		
Adjusted R-squared	0.940065			Adjusted R-squared	0.946504		
Wooldridge test	0.0405635			Wooldridge test	0.0560313		
White's test p-value	0.404981			White's test p-value	0.553845		
N				N	30		

TABLE 4.4. **Eastern EU**

Pooled OLS model, dependent variable *Compl*				Pooled OLS, dependent variable l_*Compl*			
const	−1.52738	(0.0259)	**	const	17.7476	(0.1187)	
Trust	-0.263698	(0.2309)		l_Trust	0.196286	(0.0220)	**
Power	0.556912	(0.0253)	**	l_Power	0.119939	(0.6119)	
Inter	−0.749716	(0.0482)	**	l_GDP	0.163408	(0.0224)	**
l_GDP	0.0414303	(0.0868)	*	l_PowDis	−1.95167	(0.0262)	**
PowDis	−0.00228457	(0.2472)		l_Indiv	−1.70859	(0.0303)	**
Indiv	−0.00515035	(0.2112)		l_Masc	0.715356	(0.0162)	**
Masc	0.00456521	(0.1011)		l_UncAvoid	−1.61714	(0.1187)	
UncAvoid	0.00763	(0.0239)	**	l_LongTermOr	−0.834816	(0.1101)	
LongTermOr	0.00626253	(0.0127)	**	l_Indulg	0.482582	(<0.0001)	***
Indulg	0.00979452	(0.0001)	***	l_VAT	0.000693776	(0.9674)	
l_VAT	0.00478772	(0.3952)		dum_e	−0.0209968	(0.2498)	
dum_e	−0.00369299	(0.5770)					
R-squared	0.976873			R-squared	0.975391		
Adjusted R-squared	0.964258			Adjusted R-squared	0.963621		
Wooldridge test	0.00393601			Wooldridge test	0.00155242		
White's test p-value	0.289511			White's test p-value	0.279883		
N				35			
Corrected for serial correlation				*Corrected for serial correlation* *L_Inter omitted due to exact collinearity*			

TABLE 4.5. **Southern EU**

Pooled OLS model, dependent variable *Compl*				FE: : LSDV model, dependent variable l_*Compl*			
const	27.6651	(0.5826)		const	−17.5289	(0.1860)	
Trust	2.90372	(0.0210)	**	l_Trust	0.0883743	(0.7844)	
Power	−3.26653	(0.0156)	**	l_Power	−0.220268	(0.1433)	
Inter	4.56757	(0.0180)	**	l_GDP	−0.404471	(0.0100)	***
l_GDP	−0.0729198	(0.1666)		l_PowDis	20.722	(0.3200)	
PowDis	0.342092	(0.6579)		l_Indiv	−0.210907	(0.3010)	
Indiv	−0.0753615	(0.6099)		l_Masc	2.0434	(0.0289)	**
Masc	0.0161613	(0.7175)		l_UncAvoid	−15.473	(0.0138)	**
UncAvoid	−0.00289587	(0.9422)		l_VAT	0.0324617	(0.5129)	
l_VAT	0.00204991	(0.8947)		dum_S	−17.5289	(<0.0001)	***
R-squared	0.959569			F-test (8, 16)	159.9295		
Adjusted R-squared	0.935311			P-value (F)	<0.0001		
				R-squared	0.951102		
				Adjusted R-squared	0.945155		
Wooldridge test	0.00920159			Wooldridge test	0.181815		
White's test p-value	0.330330			White's test p-value	0.375957		
N				25			
Corrected for serial correlation *Dum_S, LongTermOr and Indulg omitted due to exact collinearity*				*L_Inter, l_LongTermOr and l_Indulg omitted due to exact collinearity*			

TABLE 4.6. **Group 1: Portugal, Spain, Italy**

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable l_*NonCompl*			
const	2.14481	(<0.0001)	***	const	10.0778	(<0.0001)	***
Trust	-0.970982	(<0.0001)	***	l_Trust	−0.191197	(0.1304)	
Power	1.0984	(<0.0001)	***	l_Power	0.276479	(0.1042)	***
l_GDP	−0.19267	(<0.0001)	***	l_GDP	−0.844165	(<0.0001)	***
du_Portugal	−0.347551	(<0.0001)	***	du_Portugal	−1.51753	(<0.0001)	***
du_Italy	0.127746	(<0.0001)	***	du_Italy	0.518023	(<0.0001)	***
Inter	−1.48877	(<0.0001)	***				
F-test (6, 29)		90.53235		F-test (5, 30)		59.89423	
P-value (F)		<0.0001		P-value (F)		<0.0001	
R-squared		0.949318		R-squared		0.908945	
Adjusted R-squared		0.938832		Adjusted R-squared		0.893769	
N				36			

TABLE 4.7. **Group 2: Greece, Cyprus, Malta, Croatia, Hungary**

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable l_*NonCompl*			
const	0.604028	(0.0016)		const	1.19233	(0.0007)	***
Trust	0.334661	(0.2740)		l_Trust	-0.298679	(0.0005)	***
Power	0.298127	(0.2278)		l_Power	0.237411	(0.3788)	
Inter	−0.336203	(0.4002)		l_GDP	−0.274283	(<0.0001)	***
dum_2	0.0007280	(0.9139)		dum_2	0.00435373	(0.8447)	
l_GDP	−0.072304	(<0.0001)	***	du_Croatia	0.822737	(<0.0001)	***
du_Croatia	0.212682	(<0.0001)	***	du_Cyprus	0.31533	(<0.0001)	***
du_Cyprus	0.0816697	(<0.0001)	***	du_Greece	1.04552	(<0.0001)	***
du_Greece	0.271314	(<0.0001)	***	du_Hungary	0.729562	(<0.0001)	***
du_Hungary	0.189797	(<0.0001)	***				
F-test (9, 50)		45.74192		F-test (8, 51)		53.96471	
P-value (F)		<0.0001		P-value (F)		<0.0001	
R-squared		0.891699		R-squared		0.894348	
Adjusted R-squared		0.872205		Adjusted R-squared		0.877775	
N				60			

TABLE 4.8. **Group 3: Bulgaria, Romania**

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	1.332470	(0.0001)		const	0.0656092	(0.8180)	
Trust	−1.19394	(0.0569)	**	l_Trust	−0.0804527	(0.5129)	**
Power	−1.21395	(0.1061)		l_Power	−0.292267	(0.0677)	*
Inter	2.036810	(0.1411)		l_GDP	−0.13225	(<0.0001)	***
dum_3	0.005220	(<0.0001)		dum_3	0.00976095	(0.5564)	**
l_GDP	−0.0299865	(<0.0001)	***	du_Bulgaria	−0.081333	(<0.0001)	***
du_Bulgaria	−0.0303438	(<0.0001)	***				
F-test (6, 17)		91.05121		F-test (5, 18)		111.5597	
P-value (F)		<0.0001		P-value (F)		<0.0001	
R-squared		0.914098		R-squared		0.968739	
Adjusted R-squared		0.890237		Adjusted R-squared		0.960055	
N				24			

Group 4: Czech Republic, Slovakia, Slovenia, Poland

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	0.323184	(<0.0001)	***	const	0.765776	(<0.0001)	***
Trust	0.705872	(0.0383)	**	l_Trust	0.336341	(0.1860)	
Power	0.471178	(0.0005)	***	l_Power	−0.439752	(0.1665)	
Inter	−1.00182	(<0.0001)	***	l_GDP	−0.209505	(<0.0001)	***
l_GDP	−0.0386773	(<0.0001)	***	dum_4	−0.0245328	(0.0128)	**
dum_4	−0.0076437	(0.0002)	***	du_CzechR	−0.074702	(0.0033)	***
du_CzechR	−0.0237436	(0.0009)	***	du_Poland	0.4763	(<0.0001)	***
du_Poland	0.0795376	(<0.0001)	***	du_Slovakia	−0.369001	(<0.0001)	***
du_Slovakia	−0.0881872	(<0.0001)	***				
F-test (8, 39)		396.1565		F-test (7, 40)		363.1251	
P-value (F)		<0.0001		P-value (F)		<0.0001	
R-squared		0.987844		R-squared		0.984507	
Adjusted R-squared		0.985350		Adjusted R-squared		0.981796	
N				48			

Group 5: Austria, France, Germany

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	0.264596	(0.2828)		const	11.7183	(<0.0001)	***
Trust	-1.75317	(<0.0001)	***	l_Trust	0.356104	(0.1630)	
Power	1.87305	(<0.0001)	***	l_Power	0.718313	(0.1915)	
Inter	−2.1239	(<0.0001)	***	l_GDP	−1.11327	(<0.0001)	***
l_GDP	−0.137336	(<0.0001)	***	dum_5	−0.0132265	(0.6587)	
dum_5	−0.0006386	(0.7713)		du_France	2.5123	(<0.0001)	***
du_France	0.302554	(<0.0001)	***	du_Germany	2.9704	(<0.0001)	***
du_Germany	0.358574	(<0.0001)	***				
F-test (7, 28)		226.3620		F-test (6, 29)		284.2726	
P-value (F)		<0.0001		P-value (F)		<0.0001	
R-squared		0.982636		R-squared		0.983282	
Adjusted R-squared		0.978295		Adjusted R-squared		0.979823	
N				36			

Group 6: Belgium, Netherlands, Luxembourg

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	−0.815555	(0.4284)		const	2.56029	(0.0072)	***
Trust	-1.76814	(0.0204)	**	l_Trust	-1.04138	(0.0013)	***
Power	1.72909	(0.1497)		l_Power	1.43618	(0.0025)	***
Inter	−1.88996e-07	(0.0626)	*	l_GDP	−0.361272	(<0.0001)	***
l_GDP	−2.07378	(0.0266)	**	dum_6	−0.0836592	(0.0205)	**
dum_6	−0.0325071	(0.0498)	**	du_Belgium	0.161809	(0.0088)	***
du_Belgium	−0.00681545	(0.0001)	***	du_Netherl	−1.14942	(<0.0001)	***
du_Netherl	0.00466046	(0.0164)	**				
F-test (7, 28)		1225.077		F-test (6, 29)		430.7467	
P-value (F)		<0.0001		P-value (F)		<0.0001	
R-squared		0.997253		R-squared		0.930873	
Adjusted R-squared		0.996439		Adjusted R-squared		0.916571	
N				36			

Group 7: Ireland, United Kingdom

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	−0.267302	(0.4713)		const	5.31945	(0.0005)	***
Trust	−1.73884	(0.0436)	**	l_Trust	−1.00341	(0.0747)	*
Power	1.34613	(0.1038)		l_Power	−1.27687	(0.0123)	**
Inter	−1.9157	(0.0951)	*	l_GDP	−0.52485	(<0.0001)	***
l_GDP	−0.0597572	(0.0006)	***	dum_7	0.0227093	(0.4821)	
dum_7	0.00258847	(0.4940)		du_Ireland	−1.02446	(0.0014)	***
du_Ireland	−0.11563	(0.0048)	***				
F-test (6, 17)	39.43863			F-test (5, 18)	50.01701		
P-value (F)	<0.0001			P-value (F)	<0.0001		
R-squared	0.932974			R-squared	0.932857		
Adjusted R-squared	0.909317			Adjusted R-squared	0.914206		
N				24			

Group 8: Denmark, Finland, Sweden

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	−0.23881	(0.9235)		const	8.26977	(0.0018)	***
Trust	2.35027	(0.3784)		l_Trust	0.0856614	(0.0983)	*
Power	2.21509	(0.3886)		l_Power	−0.830245	(0.1806)	
Inter	−2.63568	(0.3811)		l_GDP	−0.799684	(0.0002)	***
l_GDP	−0.123684	(<0.0001)	***	dum_8	0.0264523	(0.3423)	
dum_8	0.00480496	(0.2829)		du_Denmark	−0.421795	(<0.0001)	***
du_Denmark	−0.0653046	(<0.0001)	***	du_Finland	−0.623029	(<0.0001)	***
du_Finland	−0.0958988	(<0.0001)	***				
F-test (7, 28)	30.17407			F-test (6, 29)	35.07697		
P-value (F)	<0.0001			P-value (F)	<0.0001		
R-squared	0.882952			R-squared	0.878895		
Adjusted R-squared	0.853690			Adjusted R-squared	0.853839		
N				36			

Group 9: Lithuania, Latvia, Estonia

FE: LSDV model, dependant variable *NonCompl*				FE: LSDV model, dependant variable *NonCompl*			
const	2.24176	(<0.0001)	***	const	0.359781	(0.0289)	**
Trust	−2.22112	(0.0001)	***	l_Trust	−0.284542	(0.1331)	
Power	−2.2793	(0.0002)	***	l_Power	0.0630806	(0.6045)	
Inter	3.21081	(0.0002)	***	l_GDP	−0.170481	(<0.0001)	***
l_GDP	−0.03831	(<0.0001)	***	dum_9	−0.0365895	(0.0702)	*
dum_9	−0.0068422	(0.0756)	*	du_Latvia	−0.0773252	(<0.0001)	***
du_Latvia	−0.0254499	(0.0002)	***	du_Lithuania	0.0731194	(<0.0001)	***
du_Lithuania	0.0129177	(0.1333)					
F-test (7, 28)	97.79048			F-test (6, 29)	65.08622		
P-value (F)	5.64e-18			P-value (F)	<0.0001		
R-squared	0.960704			R-squared	0.93087		
Adjusted R-squared	0.950879			Adjusted R-squared	0.916571		
N				36			