Economic and Psychological Determinants of Tax Compliance

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ABSTRACT

Taxation represents a fundamental source of financing the public expenditure on goods and services that are available to all citizens. Looking at the broader context of the taxation function, it should be said that a balanced tax system contributes to the functioning of a sustainable economy and society as a whole. It is reflected not only in accessible education, health and public infrastructure, but also in a sustainable support for society's most vulnerable groups, stimulating business environment and social fairness.

In terms of responding to existing tax liabilities, there are two basic types of taxpayer behaviour: compliance with tax obligations that are voluntary or coercive; and non-compliance with tax obligations that may take the form of tax avoidance or tax evasion (Organisation for Economic Cooperation and Development [OECD], 2015). Based on the mentioned behaviours, it is obvious that citizens have different attitudes about respecting the law and fulfilling their tax obligations. Although previous research and analyses have established two main types of taxpayer behaviour, no consensus has been reached, nor have the researchers agreed on the determinants that driver and influence such behaviours. Therefore, the research subject of this doctoral thesis is the analysis and systematic connection of previous theoretical and scientific knowledge on the tax compliance concept, and within the framework of empirical research - defining categories of economic and psychological determinants of taxpayers' behaviour in the Republic of Croatia.

This doctoral thesis consists of three interrelated scientific papers, aimed at identifying and analysing the determinants of tax compliance behaviour on the Croatian national sample, and investigating the mechanisms through which they affect the taxpayers' compliance.

In all three scientific papers, a complex methodology was applied, which was tested through pilot research. The data were collected directly from Croatian taxpayers through questionnaires (using mobile phones and social networks). A total of 862 valid questionnaires were collected. Primarily, exploratory factor analysis was applied, followed by cluster analysis, which led to a new cognition regarding the motivation and preferences of Croatian taxpayers. Furthermore, in the empirical research, the correlation of selected tax compliance determinants and tax compliance was tested by using the partial least squares structural equations modeling method (PLS-SEM). The direct and moderating impact of sociodemographic variables on the selected model was also analysed through OLS regression analysis.

The results arising from this doctoral thesis have identified tax morale, social norms, tax audits and tax rates as determinants that affect tax compliance behaviour in the Republic of Croatia. In addition, it has been established that sociodemographic variables are an indispensable component of the tax compliance model. Taxpayers' age, gender, and education level are significantly associated with their compliance behaviour. Finally, moderating role of gender, education level and income level between economic/psychological determinants and tax compliance have been confirmed. Consequently, these results contribute to existing knowledge of the taxpayers' behaviour and its determinants in the context of the ongoing change of paradigm in this field. This research emphasizes the need of encompassing and analysing psychological determinants, as well as the undoubted need for models to contain and further analyse the impact of taxpayers' sociodemographic characteristics on tax compliance. The implications of these results are related to strengthening tax compliance and creating fairer and more efficient tax systems. Finally, in accordance to these results, it is obvious that the modern concept of tax compliance is a very complex one. A considerable attention of tax authorities and governments should be given to this concept, if adequately treating taxpayers is a part of their taxation strategies. This includes taking into account the complexity and mixture of determinants that shape the compliance behaviour.

Keywords: tax compliance, taxpayer behaviour, economic determinants, psychological determinants, OLS regression analysis, PLS-SEM, taxation strategies

JEL classification codes: D91, H26

PROŠIRENI SAŽETAK

Oporezivanje je za države temeljni izvor financiranja javnih rashoda za dobra i usluge koje su na raspolaganju svim građanima. Promatrajući širi kontekst funkcije oporezivanja, treba reći kako uravnotežen porezni sustav doprinosi funkcioniranju održive ekonomije, te društva u cjelosti. Ogleda se ne samo u dostupnom obrazovanju, zdravstvu i javnoj infrastrukturi, već i u održivoj potpori najosjetljivijim skupinama društva, poticajnom poslovnom okruženju te društvenoj pravednosti.

U smislu odgovora na postojeća porezna opterećenja, dvije su osnovne vrste ponašanja poreznih obveznika: ispunjavanje poreznih obveza koje je dobrovoljno ili je prisilno; te neispunjavanje poreznih obveza koje može biti u obliku izbjegavanja plaćanja poreza ili utaje poreza (Organizacija za ekonomsku suradnju i razvoj [OECD], 2015). S obzirom na navedenu klasifikaciju, jasno je kako se svi građani ne osjećaju niti ponašaju jednako po pitanju poštivanja zakona i ispunjavanja svojih poreznih obveza. Iako su dosadašnja istraživanja utvrdila dvije glavne vrste ponašanja poreznih obveznika, nije u potpunosti postignut konsenzus oko takvih pitanja niti su istraživanja usuglasila koje su to odrednice koje bi mogli biti pokretači i utjecati na ponašanje poreznih obveznika. Stoga je predmet istraživanja u ovom doktorskom radu analiza i sustavno povezivanje prethodnih teorijskih i znanstvenih spoznaja o konceptu porezne discipline, te u okviru empirijskog istraživanja definiranje kategorija ekonomskih i psiholoških odrednica ponašanja poreznih obveznika Republike Hrvatske.

Ovaj doktorski rad sastoji se od tri međusobno povezana znanstvena rada čiji je cilj identificiranje i utvrđivanje odrednica porezne discipline na hrvatskom nacionalnom uzorku te istraživanje mehanizama putem kojih iste utječu na poreznu disciplinu poreznih obveznika.

U sva tri znanstvena rada primjenjena je kompleksna metodologija koja je prethodno testirana putem pilot istraživanja. Podaci su se potom prikupljali izravno od hrvatskih poreznih obveznika putem upitnika (pomoću mobilnih telefona i društvenih mreža). Prikupljena su ukupno 862 valjana upitnika. Primarno se pristupilo eksploratornoj faktorskoj analizi te potom i klaster analizi koje su dovele do novih saznanja o motivaciji ali i sklonostima hrvatskih poreznih obveznika. Nadalje, empirijsko istraživanje testiralo je korelaciju odabranih odrednica s poreznom disciplinom koristeći strukturalno modeliranje jednadžbama primjenom metode parcijalnih najmanjih kvadrata (PLS-SEM). Također se pristupilo analizi direktnog i moderatorskog utjecaja sociodemografskih varijabli na odabrani model, primjenom OLS regresijske analize.

Rezultati ovog doktorskog istraživanja identificirali su porezni moral, društvene norme, poreznu kontrolu i porezne stope kao odrednice koji utječu na poreznu disciplinu u Republici Hrvatskoj. Uz to, utvrđeno je da sociodemografske varijable čine neizostavnu komponentu modela porezne discipline. Dob, spol i razina obrazovanja poreznih obveznika značajno su povezani s njihovim ponašanjem u pogledu izvršavanja poreznih obveza. Naposljetku, potvrđena je i moderacijska uloga spola, razine obrazovanja i razine primanja poreznih obveza u odnosu između ekonomskih/psiholoških odrednica i porezne discipline. Slijedom navedenog, ova disertacija doprinosi boljem razumijevanju ponašanja poreznih obveznika te odrednica istog u kontekstu promjene paradigme koncepta porezne discipline. Istraživanjem je dokazana važnost uključivanja i istraživanja psiholoških odrednica u analizi porezne discipline, kao i nesumnjivu potrebu da modeli sadržavaju i dalje analiziraju utjecaj sociodemografskih karakteristika obveznika na poreznu disciplinu. Implikacije navedenih rezultata vezane su za jačanje porezne discipline i kreiranje pravednijih i učinkovitijih poreznih sustava.

Naposlijetku, u skladu s tim rezultatima očito je kako je suvremeni koncept porezne discipline vrlo kompleksan. Tom konceptu porezna tijela i vlada trebaju posvetiti znatnu pažnju ukoliko je adekvatno postupanje prema poreznim obveznicima dio njihovih strategija oporezivanja. To uključuje i uzimanje u obzir složenosti i kombinacije odrednica koje oblikuju ponašanje poreznih obveznika. Osim toga, rezultati istraživanja služe kao osnova za izradu preporuka u svrhu osiguravanja odgovarajućih mjera porezne politike. Drugim riječima, mogućnost postizanja optimalne razine porezne discipline u Republici Hrvatskoj može se povećati i uz mjere i mehanizme temeljene na društvenim normama i poreznom moralu.

Ova doktorski rad sadrži uvod, pregled literature i metodologije korištene u istraživanju, te rezultate i zaključak istog. Uvodno se predstavljaju problem i predmet istraživanja. Ukazuje se na važnost ostvarivanja poreznih prihoda kroz same brojke na razini Europske Unije, te kroz prioritete porezne politike koje ističe i sama Europska komisija, među kojima se nalazi osiguravanje porezne discipline. Naglašava se kako iz problema porezne discipline i njezinog utjecaja na ekonomiju, ali i društvo u cjelini, proizlazi potreba za iscrpnim teorijskim i empirijskim istraživanjem ove teme. Definiraju se temeljna i pomoćne znanstvene hipoteze ovog doktorskog rada. Potonje su grupirane u tri skupine: one koje se odnose na ekonomske, na psihološke odrednice porezne discipline, te sociodemografske karakteristike poreznih obveznika. Također, u okviru uvodnog poglavlja se definiraju svrha i ciljevi doktorskog rada. Konceptualni ciljevi odnose se na na stvaranje zaokružene teorijske cjeline u pogledu koncepta porezne discipline i njenih odrednica. Nakon uspostavljanja teorijskog

okvira, slijedi korak u kojem se temeljem ciljeva empirijskog dijela istraživanja ispituje utjecaj odabranih kategorija odrednica porezne discipline na uzorku hrvatskih poreznih obveznika.

U drugom poglavlju daje se pregled relevantnih istraživanja, prvenstveno s ciljem da se ukaže na koncept i definicije, a s obzirom na značajne promjene u posljednja četiri desetljeća. Interes istraživačke zajednice rezultirao je razvojem same definicije porezne discipline. Prvenstveno je bila definirana kao formalno ispunjavanje poreznih obveza od strane poreznog obveznika, dok danas uključuje i volju poreznog obveznika da poštuje i ispunjava obveze, uz cijeli niz odrednica u takvom ponašanju. Slijedom toga, u ovom su poglavlju obuhvaćene sve odrednice porezne discipline koje prethodna istraživanja analiziraju. Pojašnjava se tradicionalni model i teorija porezne discipline koji su omogućili širenje teorije i izvornog modela u više pravaca, predstavljajući domininantnu paradigmu više od četiri desetljeća. Analiziraju se i novija istraživanja koja su u zadnja dva desetljeća rezultirala izmjenjenom definicijom porezne discipline koja uključuje i neekonomske odrednice. U ovom poglavlju se daje i prikaz istraživanja koja kombiniranjem ekonomskih i psiholoških odrednica u modelu upućuju na promjenu paradigme u području koncepta porezne discipline.

Metodologija istraživanja detaljno je objašnjena u trećem poglavlju disertacije. Opisana je tehnika prikupljanja podataka, postupak kreiranja upitnika te smjernice istraživačke etike na koje se postupak anketiranja oslanjao. Ujedno su predstavljene i pojašnjene veličina uzorka te struktura ispitanika. Ovo poglavlje sadrži i tablični prikaz metodologije korištene u priloženim znanstvenim radovima, uz pojašnjenje o svakoj korištenoj metodi. U ovom doktorskom radu korištena je kombinacija teorijskog i konceptualnog istraživanja. Metode istraživanja korištene u teorijskom dijelu su induktivna i deduktivna, analize i sinteze, metoda klasifikacije i deskripcije. Svrha je detaljnije objašnjenje proučene literature kako bi se na adekvatan način stvorio zaokružen teorijski okvir kao priprema za empirijski dio rada. U radovima koji čine ovaj doktorski rad se primjenjuje kvantitativna metodologija istraživanja. Empirijsko istraživanje provedeno je u Republici Hrvatskoj, na slučajnom stratificiranom te reprezentativnivnom uzorku građana starijih od 18 godina. Kao glavna tehnika prikupljanja podataka korišten je strukturirani upitnik.

U četvrtom poglavlju daje se detaljan prikaz rezultata istraživanja. Utvrđuje se koje su od testiranih hipoteza prihvaćene, a koje odbačene. U prvom radu, eksploratornom faktorskom analizom ekstrahirano je šest faktora porezne discipline: porezna kontrola, porezne stope, složenost poreznog sustava, porezni moral, društvene norme i percepcija pravednosti poreznih obveznika. Nadalje, klaster analizom utvrđene su četiri različite skupine poreznih obveznika koje proizlaze iz njihove percepcije prethodno navedenih čimbenika. U drugom radu, putem PLS-SEM analize, porezni moral i društvene

norme utvrđene su kao signifikantne odrednice porezne discipline. Rezultati trećeg rada uz ove prethodno navedene odrednice sugeriraju da i ekonomske odrednice (porezna kontrola i porezne stope) imaju utjecaj na poreznu disciplinu. Uz to, rezultati trećeg rada pokazuju da su dob, spol i razina obrazovanja poreznih obveznika povezani s njihovim ponašanjem u pogledu ispunjavanja poreznih obveza. Osim toga, potvrđen je i moderacijski utjecaj spola, razine obrazovanja i razine dohotka na odnos između ekonomskih/psiholoških odrednica i porezne discipline.

U zaključnom, petom poglavlju, daje se sinteza svemu prethodno napisanom. To se čini kroz diskusiju i osvrt na ciljeve i postavljene hipoteze u ovom doktorskom radu. Također se elaboriraju prednosti i nedostaci metodologije korištene u istraživanju. Prikazana je komparacija istraživanja s prethodnim relevantnim istraživanjima, te se utvrđuju sličnosti i razlike u zaključcima. Potom se pojašnjava doprinos cjelokupnog istraživanja za područje, a naposlijetku i implikacije za buduća istraživanja.

Ključne riječi: porezna disciplina, ponašanje poreznih obveznika, ekonomske odrednice, psihološke odrednice, OLS regresijska analiza, PLS-SEM, strategije oporezivanja

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1. INTRODUCTION

Fiscal authorities' need for continuous improvements in tax policies is quite justified, given the importance of taxation in promoting sustainable economic development and inclusive economic growth. Having in mind that they secure their income through taxes, it is essential for governments and fiscal authorities to establish a fair and efficient taxation system, and especially tax collection. Therefore, it is clear that tax evasion and fraud, tax avoidance and low tax compliance put major challenges in front of tax authorities and require a new rethinking of traditional and established paradigms.

According to data regarding European Union (EU), in 2021 tax revenues (including social contributions) amounted to 6 058 billion euros, accounting for a total of 41.7% of GDP (Eurostat, 2022). Consequently, already in 2012, the European Commission's Action Plan identified the fight against tax evasion as a priority problem seeking a solution. Building on this issue, the European Commission (2018) also highlighted 4 tax policy priorities:

- investment promotion
- providing employment support
- reducing inequality
- ensuring tax compliance.

Based on this, it follows that it is of utmost importance for the EU to form a tax system that can respond to the challenges of the modern economy and at the same time, to adequately support the wider objectives of the EU. This certainly includes ensuring and advancing tax compliance. Achieving optimal tax compliance can be acomplished by applying knowledge derived from behavioural economics. This is due to the fact that it is necessary to ensure that taxpayers voluntarily act correctly and meet their tax obligations at a given time (European Commission, 2018).

Undesirable behaviour of taxpayers such as tax evasion and tax avoidance, and low obedience as the primary problem of tax compliance occurs in developing countries, but also in developed countries. An optimal tax system ensures the financing of public expenditures

that are essential for the country, from education to social protection and health. Activities to restrain and combat tax fraud, evasion and avoidance of tax liabilities, and to achieve a transparent, fair and functional tax system are prerequisites for creating and preserving trust in government. This trust forms the basis of modern tax systems and puts emphasis on the valid definition of the economic and psychological determinants of tax compliance that determine the "climate" of the tax system itself.

1.1 THE PROBLEM AND THE SUBJECT OF THE THESIS

Taxpayers' noncompliance causes economic and political instability, and destabilizes society as well. In order to achieve optimal levels of tax compliance, it is necessary to define and investigate all the factors that are crucial to the behaviour and decision-making process of taxpayers. From the very problem of tax compliance and its impact on economics, but also on society as a whole, arises the need for an exhaustive theoretical and empirical research on this topic.

Alm et al. (2012) suggest that there is a strong cognition that analysis of tax compliance based on long-established economic considerations alone is not sufficient. Therefore, when analysing the tax compliance determinants, it is necessary to include those of a psychological nature, but also to take into account sociodemographic variables. Hofmann et al. (2017) point to the importance of including sociodemographic components in the survey of taxpayer behaviour. Also, there are several innovative tax compliance concepts, which should definitely be highlighted and taken into account in future research. Undoubtedly, one such model is the "Slippery Slope Framework", which points out that adequate predictors of the tax compliance are trust in authorities on one side, and the power of authorities on the other (Kirchler et al., 2008). This concept in a certain way introduces the idea of combining economic and psychological determinants, and it becomes a prerequisite for an adequate analysis of the taxpayers' behaviour.

The subject of this thesis is the analysis and systematic connection of current theoretical and scientific knowledge in the tax compliance field, and through empirical research definition of the economic and psychological determinants of tax compliance on the example of the

Republic of Croatia. Based on the results obtained, a model with predictive relevance will be developed, as well as guidelines for improving taxpayers' tax compliance, as well as for the cooperative interaction "climate" within the tax system.

1.2 THESIS´ HYPOTHESES

Main hypothesis: Economic and psychological determinants have a significant impact on taxpayers' compliance.

Over the last forty years, a significant number of studies have analysed the causes behind taxpayers' behaviour and their motivation to meet or fail to meet their tax obligations. Despite the significant increase in the number of studies dealing with this topic, many researchers still continue to base their work on the conventional economic model, albeit gradually and with certain modifications. This, so-called standard model (Allingham & Sandmo, 1972; Jackson & Milliron, 1986) states that taxpayers actually make their decisions depending on economic determinants and intimidation mechanisms. Therefore, the first part of the hypotheses is as follows:

H1: Economic determinants have a significant impact on taxpayers' compliance.

H1a: Tax audits have a significant impact on taxpayers' compliance.

H1b: Tax rates have a significant impact on taxpayers' compliance.

H1c: Sanctions have a significant impact on taxpayers' compliance.

Even today, the research community does not dispute that a proportion of taxpayers still remain influenced by the above determinants. However, it has been shown that determinants based on deterrence can also have unwanted side effects, which is why psychological determinants of tax compliance come into focus (Stanimirović & Sever, 2022). Furthermore, Lois et al. (2019) and Franić (2020) emphasize that psychological factors are becoming more significant in predicting taxpayers' behaviour. Accordingly, it is a great challenge for the researchers to provide further evidence on potential to achieve adequate tax compliance (and

thus tax revenues) with the application of minimal coercive mechanisms. Therefore, the second group of hypotheses is:

H2: Psychological determinants have a significant impact on taxpayers' compliance.

H2a: The complexity of tax laws and the tax system has a significant impact on taxpayers' compliance.

H2b: Taxpayers' social norms have a significant impact on their tax compliance.

H2c: Taxpayers' fairness perceptions of the tax system have a significant impact on their tax compliance.

H2d: Taxpayers' tax morale has a significant impact on their tax compliance.

The existing literature also points to a large number of inconsistencies regarding sociodemographic characteristics and their impact on tax compliance. Jackson and Milliron (1986) were one of the first authors to put forward the argument that age, gender and education should always be included in tax compliance research. According to Fischer et al. (1992), sociodemographic variables do not directly affect tax compliance. However, in their research, these authors argue that there is a significant indirect impact, which is manifested through the opportunities that taxpayers have to avoid tax liability, and their attitudes towards taxes. Hofmann's et al. (2017) meta-analysis of studies in 111 countries insisted that sociodemographic variables should not be ignored in tax compliance models. Their results also gave significant arguments to put research focus on variables such as taxpayers' age, gender, education and income levels.

H3: There is a relationship between taxpayers' tax compliance and their sociodemographic characteristics.

H3a: There is a relationship between taxpayers' tax compliance and their age structure

H3b: There is a relationship between taxpayers' tax compliance and their gender structure

H3c: There is a relationship between taxpayers' tax compliance and their educational structure

H3d: There is a relationship between taxpayers' tax compliance and their income level

1.3 PURPOSE AND OBJECTIVES OF THE THESIS

The purpose of the research is to identify tax compliance key determinants and to provide a broader and deeper understanding of this concept. At the same time, to investigate on the example of Croatian taxpayers how the new paradigm of tax compliance could be used within the framework of future tax policies. Finally, the ultimate goal is to create a model for predicting taxpayers' behaviour and achieving an optimal and cooperative interaction climate within the tax system.

In accordance with the research subject and purpose of the research, the objectives of the thesis relate to the conceptual and empirical part of the research.

The objectives of the conceptual part of the thesis are:

1. To explore existing theoretical knowledge of economic and psychological tax compliance concepts
2. To define and describe the tax compliance concept
3. To define and describe the most important economic determinants of tax compliance
4. To define and describe the most important psychological determinants of tax compliance
5. To propose a conceptual model for measuring economic and psychological determinants with the aim of strengthening tax compliance.

The stated objectives of the conceptual part of the research are aimed at creating a rounded theoretical unit in terms of the tax compliance concept and its determinants. Due to the fact that the existing literature and discussions indicate a disunity in terms of definitions of concepts as well as factors that influence it, this is an important prerequisite for the empirical research. As a result of this disunity, it is necessary to focus on existing research in order to get an overview of relevant ideas and what tax compliance encompasses. The aim is, therefore, to synthesize existing concepts and definitions, and thus point out the most

significant tax compliance determinants. This surely fills in the research gap, and it is a step forward to comprehension and comparability of future studies within this field.

The objectives of the empirical part of the thesis are:

1. To examine the impact of established economic determinants on the taxpayers' tax compliance in the Republic of Croatia
2. To examine the impact of established psychological determinants on the taxpayers' tax compliance in the Republic of Croatia
3. To examine the impact of taxpayers' sociodemographic characteristics on their tax compliance in the Republic of Croatia
4. To compare results with previous research.

After the establishment of the theoretical framework, following step is the one in which the impact of selected categories of tax compliance determinants on a sample of Croatian taxpayers is examined. Based on this, it will be possible to create a precise model that would suit the tax system itself, as well as the tax climate of the Republic of Croatia and its taxpayers. Through this personalised approach, one can enter the more effective tax policy planning and observe those taxpayers' behaviours that can be influenced not only by coercive mechanisms, but also by less financially and organisationally demanding measures (such as "nugde" mechanisms). Also, all results obtained through the analysis of empirical research will be compared with relevant existing research in the field.

2. LITERATURE REVIEW

The concept and definition of tax compliance have undergone significant changes over the last four decades. The interest of the research community has resulted in the evolution of the definition itself, from mere fulfillment of tax obligations by the taxpayer, to eventually encompassing the entire range of determinants in this behaviour.

Thus, initially, the authors relied solely on an economic explanation of taxpayers' behaviour by following the traditional economic theory of crime and all its complementary

theories (Allingham & Sandmo, 1972; Srinivasan, 1973; Yitzaki, 1974; Pencavel, 1979; Roth et al., 1989; Yaniv, 1999). Jackson and Milliron (1986), following the above mentioned theories, suggest that tax compliance means reporting all income, tax liabilities, and paying taxes in accordance with the relevant tax laws, regulations, and tax orders. The aforementioned traditional model and theory, along with a significant number of accompanying works that cognitively contributed by expanding the original model in several directions, represented the domininant paradigm for more than four decades.

In further analysis and research devoted to this topic, the use of two theoretical approaches based on two quite influential theories in the study of human behaviour, Theory of Reasonable Action (Ajzen & Fishbein, 1980) and Theory of Planned Behaviour (Ajzen, 1985) were also widespread. First one explains human behaviour as a determinant of intent in behaviour and argues that intent itself depends on both attitude towards behaviour and subjective norms. In other words, this theory emphasizes a person's will and intention to act. When applied to tax compliance, it can be interpreted that a taxpayers' decision is based solely on their subjective norms and attitudes. Many researchers have used this in their tax compliance studies. For example, Hanno and Violette (1996), as well as Bobek et al. (2007) confirmed that attitudes have a significant positive effect on taxpayers' intention to obey the laws. These findings have also been confirmed in studies by Loo et al. (2009) and Saad (2012).

However, theoretical and empirical framework of tax compliance set in this way has received a substantial amount of criticism. The reason for this is that factors such as tax moral, ethics, tax knowledge, penalties and audit probabilities are being more and more recognized as significant determinants of taxpayers' behaviour, and here their impact is marginalized in a certain way. Ajzen, author and co-author of both of these theories (1985, p. 36) suggests: "The theory of Reasonable Action and the Theory of Planned Behaviour are identical theories when the subjective probability of success and the degree of control of internal and external factors reach their maximum values. However, when the subjective probabilities of success and actual control are less than perfect, we enter the domain of the Theory of Planned behaviour." Therefore, the latter can actually be cited as a kind of extension of the Theory of Reasonable Action, with the aim of improving predictability using an additional determinant, in addition to attitudes and norms - the perception of behavioural control. In a further discussion of tax

behaviour and tax compliance, many studies still recognize the importance of these theories (Jackson & Milliron, 1986; Damayanti et al., 2015; Saad, 2014).

A step forward was made when, within the framework of tax compliance defining, the question arose as to whether this refers to voluntary or enforced behaviour (James & Alley, 2002). Tax compliance research in the last two decades has resulted in a definition like Kirchler's (2007), which certainly includes taxpayers' willingness to behave and make decisions in a certain way. This is how the non-economic determinants of tax compliance have slowly entered the story as an indispensable part of modern tax compliance concepts (Richardson, 2006; Christian & Alm, 2014; Alm, 2019). Due to the valuable insights given by behavioural economics about the decision-making process, it can be concluded that this process is far more complexed than it was reckoned. It is, therefore, necessary to continue the path set by Nobel laureates such as Kahneman and Thaller in order to adequately analyse a phenomenon such as taxpayers' behaviour. Kahneman and Tversky (1979) describe the decision-making process due to the existence of uncertainty, and state that people often use heuristics, are prone to bias and estimate gains less compared to potential losses. Therefore, infrequently, instead of making optimal decisions they can be influenced by situational cues and framing effects.

Despite the fact that the idea of a combining economic and psychological determinants in the analysis of tax compliance has undergone affirmation in terms of numerous theoretical, but also empirical research lately, there are still works in the literature based on traditional theories and claims that coercive mechanisms are sufficient tools in ensuring adequate levels of tax compliance. Only a smaller number of studies actually conduct empirical research by taking into account a number of factors - combining economic and psychological determinants.

Table 1 provides an overview of relevant papers that combine both economic and psychological determinants in their tax compliance model. In other words, in addition to economic these studies introduce psychological determinants of tax compliance and prove their relevance during research. In doing so, the focus of research is on individual taxpayers.

Table 1 Overview of comparative empirical studies of tax compliance

Author(year)	Economic determinants	Psychological determinants	Methodology	Sample size (n)
Efebera et al. (2004)	Legal sanctions	Norms Equity	Factory analysis Regression analysis	146 low-income individual taxpayers
Blanthorne and Kaplan (2008)	Opportunity to underreport	Ethical beliefs Social norms	SEM	335 individual taxpayers
Bott et al. (2014)	Detection probability	Moral appeals	Regression analysis	18000 individual taxpayers
Dwenger et al. (2016)	Audit probability	Tax simplification Tax misperception Compliance rewards	Regression analysis	40,000 individual taxpayers
Scartascini and Castro (2015)	Deterrence	Equity Fairness	Regression analysis	23,000 individual taxpayers
Batrancea et al. (2019)	Power of authorities	Trust in authorities	Multilevel regression analyses	14,509 undergraduate and graduate students from 5 continents
Lois et al. (2019)	Competence and characteristics of tax administration officers	Perceived fairness of the tax system Tax morality Tax administration obedience	Regression analysis	164 individual taxpayers

Górecki and Letki (2020)	Tax rate Penalties	Fairness Norms	Regression analysis	1500 individual taxpayers in 14 CEE countries
e Hassan et al. (2021)	Tax rate	Perception of government spending Tax compliance simplicity Tax morale Perception of fairness	SEM	435 individual taxpayers
Hartmann et al. (2022)	Economic environment	Trust in government Attitude towards taxes Justice perceptions.	Regression analysis Exploratory analysis	1200 individual taxpayers

Source: Own compilation (2023)

The change in the tax compliance paradigm is an ongoing process, and it is parallel with an increase of research interest and theories in this area, whose goal is to understand the mechanisms of taxpayers' behaviour by including a greater number of economic and psychological determinants. In doing so, the contribution comes from various disciplines such as accounting, economics, political science, sociology, and psychology. In other words, over time, there has been significant sophistication in understanding of the tax compliance concept, and interdisciplinary research has contributed significantly to this (Yong et al., 2019). The result of these changes is the fact that two research approaches to tax compliance issues are dominant today: economic and behavioural (Nguyen et al., 2020). Inasius (2019) concluded that taxpayers' behaviour has become a major subject for contemplation, for both

developed and developing countries, which finally brings focus on taxpayers' responsibility to report income and thus take part in defining their tax liability.

3. METHODOLOGY

In this thesis, with the purpose of testing the above mentioned hypotheses, a combination of theoretical and conceptual research was used. Research methods used in the theoretical part are: inductive and deductive, analysis and synthesis, classification and description methods. The purpose was a more detailed explanation of the studied literature in order to adequately create a rounded theoretical framework as a preparation for the empirical part of the thesis.

Quantitative research methodology was applied in the papers, and the structured questionnaire was used as the main technique for data collection. Empirical research was conducted in the Republic of Croatia, on a random stratified and representative sample of citizens over the age of 18.

As far as sample size is concerned, the sample size should be 384 as suggested by Meyer (1979), Fox et al. (2007) for populations above 500,000. Another approach is a method known as "10-times rule" was used, based on which "sample size should be equal to the larger of (1) 10 times the largest number of formative indicators used to measure one construct or (2) 10 times the largest number of structural paths directed at a particular latent construct in the structural model" (Hair et al., 2017, p. 24). Therefore, the estimated sample size was 700 respondents, and the overall sample consisted of 862.

3.1 RESEARCH DESIGN

The questionnaire itself was developed based on the relevant literature, and, due to the specifics of the Croatian tax system, a pretest was conducted involving 40 respondents. After checking the content validity and reliability of the questionnaire and agreeing on certain ambiguities that the respondents pointed out, the main research was approached.

To eliminate those who are not Croatian taxpayers, respondents were asked whether they were earning any income in Croatia. All participants who answered no to this eliminating question, were not able to continue with questionnaire. In the final form of the questionnaire, 27 items were used and divided into economic determinants (9 items), psychological determinants (15 items), and tax compliance (3 items). Sanctions, tax audits and tax rates were chosen as economic determinants, and each measured with 3 items. Regarding the psychological determinants, questionnaire comprised tax system complexity, tax morale, fairness perceptions and social norms. The dependent variable, tax compliance, was measured with 3 items (Paleka et al., 2023). A 5-degree Likert scale (1 – I completely disagree, 5 – I completely agree) was applied. The last part of the questionnaire was related to the sociodemographic characteristics of the respondents (gender, education level, employment status, monthly income, seniority), examined by multiple choice questions.

3.2 DATA COLLECTION

Two sampling strategies were used to achieve adequate reach of the respondents – random SMS invitations to mobile phones and invitations through social networks (Facebook and Instagram). The procedures introduced by Rinken et al. (2020) have been followed, and in this way questionnaires were successfully directed to different sociodemographic groups. This resulted in two complementary subsamples with adequate representativeness in relation to the parameters of the population (age, gender, level of education).

In the first subsample, 699 SMS invitations were sent to a mobile phone of potential participants (mobile phone numbers were obtained by a digit randomisation). Prior to the invitation, the validity of a mobile phone number was checked through online phone book. This was necessary in order to minimise invitation to inactive numbers. Out of this number of invitations, 327 questionnaires were fully completed. In the total sample, first subsample comprised 37,9%. After preliminary analysis, some minor discrepancy in respondents' age structure regarding sample representativeness was noticed. For this reason, social network invitations (Facebook and Instagram) were sent to the participants from the second subsample. This resulted in 535 fully completed questionnaires. Out of the total number of

862, respondents, second subsample comprised 62.1% of the total sample (Paleka et al., 2023).

First survey was conducted from April to May 2021, with a goal to to reduce the number of factors (31 in total) to a smaller number. The main survey began in October 2021 and lasted until January 2022.

The survey was conducted in accordance with guidelines on research ethics (Bhattacherjee, 2012). For this purpose, respondents were asked to voluntarily participate in the survey, they were guaranteed the anonymity of the data as well as its confidentiality. In order to respect the rights of all respondents, at the beginning of the questionnaire there was an inctroduction about the purpose of the research and a guarantee that all collected data will be used exclusively for scientific research purposes.

3.3 DATA ANALYSIS

Results obtained in this survey are presented in three papers. First one, named “Tax compliance challenge through taxpayers' typology.” “Tax compliance determinants: empirical evidence from Croatia” is the second paper, while the third is named “The direct and moderating effect of sociodemographic variables on tax compliance behaviour.”

Regarding the sociodemographic structure of the respondents, 56.8% are women and 43.2% are men. Of the total number of respondents, 15.2% are aged 18 to 34, 33.5% between the ages of 34 and 44, 17.2% are between 45 and 54 years old. The remaining proportion of respondents are aged 55 to 64 years (13.5%), and 20.6% are over the age of 65. As for the educational structure of respondents, it is as follows: 28.5% have a high school or lower level of education, 15.9% have Bachelor degree, 41.2% with a Master's degree, and the rest of 14.4% are postgraduates. As far as the work experience of respondents is concerned, 9.5% have less than 5 years of experience, 48% between 6 and 20 years, and 42.5% have over 20 years of service.

Table number 2 provides an overview of the methodology used in scientific papers.

Table 2 Review of the methodology used in the attached scientific papers

Number of the paper	Geographical area / data collection period	Method	Sample size
1	Croatia / April - May 2021	Exploratory factor analysis Cluster analysis	n = 299
2	Croatia / October 2021 - January 2022	PLS-SEM	n = 862
3	Croatia / October 2021 - January 2022	Regression analysis	n = 862

Source: Own compilation (2023)

In the first scientific paper, exploratory factor analysis (EFA) of taxpayers' perceptual and attitudinal elements was undertaken, which significantly contributed to the reduction of factors within the model. Aditionally, with the aim of identifying groups of taxpayers with similar motivational factors, a cluster analysis was conducted. Through a non-hierarchical clustering method (K-Means clustering), taxpayers were divided into segments by using the tax compliance factor scores. Furthermore, ANOVA was employed to explore possible statistically significant differences between the four stablished taxpayer clusters.

In the second scientific paper, partial least squares structural equation modelling (PLS-SEM) was used in data analysis. The PLS-SEM has become well established in social sciences research in the last decade because of its estimating ability when it comes to complex models with numerous constructs, indicator variables, and structural paths without imposing distributional assumptions on the data. In addition to this, the method is acknowledged for its causal-predictive approach and user-friendly software packages (Hair et al., 2018).

In the third paper, OLS regression analysis was applied to test the direct and moderating effects of taxpayers' age, gender, income, and education level on their tax compliance. For this purpose, a path model was built that incorporated psychological (tax morale, social

norms) and economic (tax audits, tax rates, sanctions) latent constructs. Besides these explanatory variables, sociodemographic variables were also part of the model, together with latent construct of tax compliance as response variable (Paleka et al., 2023).

The thesis' methodology is presented and discussed in detail through the scientific papers attached as a part of this thesis. A more detailed description of the methodology can be found in the attached scientific papers.

4. RESULTS

This chapter presents the summarized results of the analyses obtained in the three above mentioned scientific papers.

In the first paper, after excluding the items with low communalities, exploratory factor analysis revealed following significant factors in explaining tax compliance: tax audits, tax rates, tax system complexity, tax morale, social norms and fairness perceptions.

Table 3 Exploratory factor analysis - results

	Factor							
Statement	**1**	**2**	**3**	**4**	**5**	**6**	**Mean**	**Std. Dev.**
Tax Morale								
Non-compliance with tax liabilities is never justified.	**0.589**						3.30	1.040
Non-compliance with tax liabilities is always justified.	**0.581**					−0.108	3.62	0.973
Non-compliance with tax liabilities is sometimes justified.	**0.734**					−0.130	2.76	1.024

I believe I should declare my entire income and pay the appropriate income tax according to that.	**0.597**		0.219			3.47	1.091
I find manipulating tax reliefs acceptable.	**0.625**				0.100	3.51	0.983
I find the practice of cash-in-hand payments an acceptable way to avoid paying taxes.	**0.657**					3.16	1.051
The opportunity to pay a smaller amount of tax should be taken, even if it is not legal.	**−0.585**	0.103	0.114	0.108		3.98	0.788
Tax evasion is justified if the tax rates are too high.	**−0.580**		0.163	0.112		3.30	1.040
Tax System Complexity							
Tax laws are written in a simple language.		**0.604**	−0.131			2.19	0.871
It does not take a lot of effort to understand the explanations regarding tax legislation and tax authorities' publications.		**0.725**				2.48	0.948
I understand the current regulations regarding my tax liabilities.		**0.596**	0.105		0.115	3.09	1.008

Terms used in tax laws and tax authorities' publications are difficult to understand.	**0.706**				2.28	0.888
I feel confident and well informed regarding current tax laws.	**0.683**			0.100	2.43	0.953
Tax Rates						
Income tax rates are too high.		**0.679**			4.22	0.918
Increasing income tax rates affects the shadow economy growth.		**0.779**			4.12	0.859
I believe that the total tax burden on labour at rates of 56.5% or 66.5% is too high.		**0.700**			4.35	0.858
Tax Audits						
If a citizen did not declare income for tax purposes, the tax authorities would certainly detect it.			**0.548**		2.97	1.036
Tax authorities' audits are frequent and profound.			**0.751**		2.47	0.854
Due to their knowledge and competence, tax authorities can detect quite every act of tax evasion.			**0.725**		2.31	0.986
Social Norms						

My family expects me to meet my tax obligations in accordance with the laws and regulations.	0.244		0.100		**−0.619**		3.59	0.998
My friends expect me to meet my tax obligations in accordance with the laws and regulations.					**−0.956**		3.14	0.986
People in my environment would strongly disapprove if I would not meet my tax obligations.				0.134	**−0.576**		2.55	0.987
Fairness Perceptions								
The decision processes and tax audits of the tax authorities are executed fairly.	−0.151	0.172		0.260	−0.160	**0.363**	2.06	0.779
The level of tax I pay is generally fair.	0.147	0.143	−0.218			**0.531**	2.20	0.885
I receive adequate public services for the taxes I pay.						**0.831**	1.92	0.891
Eigenvalue	4.896	3.218	2.273	2.196	1.316	1.160		
% of variance	17.542	10.809	7.201	6.836	3.624	2.882		
Cumulative variance	19.583	32.454	41.546	50.330	55.595	60.234		
Cronbach's alpha	0.703	0.797	0.773	0.709	0.768	0.701		
KMO = 0.785								
Bartlett's test of sphericity: χ2 = 2537.515; df = 298;	Sig. = 0.000							

Source: Paleka & Vitezić (2023, p.7)

As it can be seen, the first factor was “tax morale” and it comprises eight items affiliated to taxpayers’ intrinsic motivation towards tax liabilities. This factor explained 17.54% of the total variance (eigenvalue of 4.90). The second factor, “tax system complexity”, is comprised of five items related to the understanding of legislative and procedural framework of taxation. With an eigenvalue of 3.22, this factor explained 10.81% of the total variance. “Tax rates” is the third factor, with three items focused on taxpayers’ attitudes towards the tax burden and through this, towards tax compliance levels. “Tax rates” explained 7.2% of the total variance (eigenvalue of 2.27). The fourth factor, “tax audits”, deriving from three items associated to the efficiency of tax audits conducted by the authorities. This factor yielded an eigenvalue of 2.20 and explained 6.8% of the total variance. The fifth factor, “social norms”, was characterised by three items related to the influence of taxpayers’ surroundings on their tax compliance. “Social norms” explained 3.62% of the total variance, with an eigenvalue of 1.32. The last factor, “perception of fairness“, includes three items regarding general fairness in the tax system. This factor accounted for about 2.88% of the variance in the data (eigenvalue 1.16) (Paleka & Vitezić, 2023).

Furthermore, cluster analysis identified four different taxpayers’ groups deriving from their perceptions of the previously mentioned factors. In Table 4 the four-cluster solution and post-hoc analysis are presented.

Table 4 Cluster analysis - results

Factors (Overall mean)	**Clusters**				**F**	**Sig.**	**Post Hocª**
	Extrinsically motivated (1)	Morally committed (2)	Financially motivated (3)	Socially committed (4)			
Tax Morale (3.27)	3.27	**3.53**	2.94	3.34	34.689	.000***	1<2, 1>3, 2>4, 3<4

Tax System Complexity (2.48)	**2.78**	2.43	2.24	2.58	8.150	.000***	1>2, 1>3, 3<4
Tax Rates (4.21)	4.38	**4.48**	**4.62**	3.28	91.382	.000***	1<3, 1>4, 2>4. 3>4
Tax Audits (2.56)	**3.26**	2.27	2.20	2.75	42.796	.000***	1>2, 1>3, 1>4, 2<4, 3<4
Social Norms (3.07)	**3.33**	3.30	2.30	**3.41**	41.719	.000***	1>2, 2>3, 3<4
Fairness Perceptions (2.03)	**2.61**	1.75	1.60	**2.41**	65.010	.000***	1>2, 1>3, 2<4, 3<4
N	67	94	72	64			

Note. Level of significance at *p < .05. **p < .01. ***p < .001.

a Post hoc analysis using Hochberg GT2 or Games-Howell.

Source: Paleka & Vitezić (2023, p.9)

As it can be seen from the results presented in the Table 3, taxpayers' clusters are named as follows: "Extrinsically motivated", "Morally committed", "Financially motivated", and "Socially committed". Second (N=94) and fourth (N=64) cluster consist of a group of respondents who are significantly under the influence of psychological determinants. On the other side, first (N=67) and third (N=72) cluster seem to gather those taxpayers who are

mostly influenced by the economic factors. ANOVA post-hoc comparisons examined and confirmed statistically significant differences between these clusters. In the last step of analysis in this paper, sociodemographic differences between taxpayer segments were tested. Results reveal that the clustering procedure statistically differentiates the groups based on their monthly income.

Second paper followed the established two-stage analytical procedures for PLS-SEM to test eight hypotheses. As Hair et al. (2014) suggest, this was done through testing the measurement model (validity and reliability of the measures) and after that, testing the structural model.

In the first step, convergent validity was first tested through factor loadings, composite reliability (CR), and average variance extracted (AVE). Ass it can be seen from the Table 5, all values result to be as recommended. In other words, item loadings exceed 0.5, as suggested by Chin (1998), while CR values are above 0.7 and AVE above 0.5 (as suggested by Hair et al., 2014).

Table 5 Validity and reliability for constructs

Constructs	Items	Loadings	AVE	CR
Tax Audits	Audits_1	0.775	0.651	0.848
	Audits_4	0.804		
	Audits_5	0.841		
Sanctions	Penalties_1	0.618	0.689	0.866
	Penalties_2	0.923		
	Penalties_3	0.913		
Tax Rates	Rates_1	0.940	0.693	0.870
	Rates_2	0.828		
	Rates_3	0.715		
Tax System Complexity	Complexity_3	0.516	0.609	0.817
	Complexity_4	0.882		
	Complexity_1’	0.885		

Social Norms	Snorms_2	0.879	0.628	0.833
	Snorms_3	0.835		
	Snorms_4	0.643		
Tax Morale	Morale_1r	0.726	0.522	0.867
	Morale_2r	0.798		
	Morale_3	0.654		
	PN_1	0.663		
	PN_2r	0.698		
	PN_3r	0.784		
Fairness	Fairness_1	0.611	0.608	0.819
	Fairness_4	0.913		
	Fairness_5	0.786		
Tax Compliance	Compliance_1r	0.775	0.611	0.825
	Compliance_2r	0.741		
	Compliance_3	0.827		

Source: Paleka et al. (2022, p.1924)

To assess the discriminant validity, besides Fornell and Larcker criterion, aditional approach using the heterotrait-monotrait ratio of correlations (HTMT) was also used. Values are below the recommended HTMT.90 (Gold et al., 2001).

In the second step, structural model was tested through path coefficient (β), t-values, coefficient of determination (R2), the predictive relevance (Q2) and effect sizes (f2). Table 6 shows some of the mentioned estimates.

Table 6 Structural estimates (hypotheses testing)

HYPOTHESES	Beta	Standard Deviation (STDEV)	T Value	P Values	Decision
H1a: Tax Audits -> Tax compliance	-0.026	0.031	0.836	0.403	Not supported

H1b: Tax Rates -> Tax compliance	-0.052	0.036	1.454	0.146	Not supported
H1c: Sanctions-> Tax compliance	0.049	0.033	1.494	0.135	Not supported
H2a: Tax System Complexity -> Tax compliance	0.020	0.028	0.701	0.483	Not supported
H2b: Social Norms -> Tax compliance	0.122	0.032	3.840	0.000	**Supported**
H2c: Fairness -> Tax compliance	0.023	0.030	0.778	0.437	Not supported
H2d: Tax Morale -> Tax compliance	0.582	0.029	20.312	0.000	**Supported**

Source: Paleka et al. (2022, p.1926)

Effects of social norms (β = 0.122, p-value = 0.000) and tax morale (β = 0.582, p-value = 0.000) on tax compliance were positive and significant, with factual t-values were greater than 2.58 at ($p < 0.01$) (Paleka et al., 2022). Based on these results, two hypotheses (H2b and H2d) involving social norms and tax morale, are supported. Hypotheses H1a, H1b, H1c, H2a and H2c that hypothesised about the effects of tax audits, tax rates, sanctions, tax system complexity and fairness perceptions regarding the tax system on tax compliance were rejected.

Next assessment criteria, the coefficient of determination (R2), was also examined. Its value (R2=0.437) indicates that model's explanatory power is substantial since it is above 0.26, based on Cohen's (1988) guidelines. In addition to this, effect size (f2) of tax morale and social norms on tax compliance was tested. Cohen's (1988) criterion suggests that values higher than 0.02, 0.15, and 0.35 depict small, medium, and large effect sizes. Having in mind this criterion, effect size of tax morale on tax compliance was large (f2= 0.485), and of social norms on tax compliance was small (f2=0.020). Finally, model's predictive accuracy is calculated based on the Q2 value, through blindfolding procedure that eliminates single points in the data matrix, assigns removed points with the mean, and estimates the model parameters (Hair et al., 2018; Sarstedt et al., 2014). The obtained value of Q2=0.256 suggests that model has a predictive relevance.

In the third paper, besides economic and psychological determinants, the focus was on interactions of sociodemographic variables and tax compliance. Moderating effects of these variables between psychological/economic determinants and tax compliance were also tested. On those grounds, results are presented in two parts.

The results of the tested model with only direct effects show that age is the only sociodemographic variable with such effect. Additionally, tax audits are the only economic determinant with significant impact on tax compliance, while both tax morale and social norms as psychological determinants are significantly correlated to tax compliance in the mentioned model.

In the second model in this paper, moderating effects were introduced. Table number 7 presents results regarding these effects.

Table 7 Results of the tested model with moderating effects

Variables	Lat_TaxCompliance
Age	0.025**
	(0.010)
Age^2	-0.000*
	(9.68e-05)
Sanctions	0.037
	(0.025)
Gender (Male)	0.064
	(0.040)
Rates	-0.056**
	(0.027)
Morale	0.556***
	(0.030)
Income below	-0.032
	(0.056)
Income above	-0.012

	(0.048)
Audit	-0.007
	(0.028)
Education bachelor	0.009
	(0.065)
Education master	0.056
	(0.051)
Education postgraduate	0.056
	(0.070)
Social Norms	0.097**
	(0.027)
Constant	0.547*
	(0.296)
Observations	844

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Paleka et al. (2023, p. 41)

Regarding the main effects, only tax rates have a significant negative impact (-0,100***) on tax compliance. Sanctions and tax audits are insignificantly correlated to taxpayers' compliance. On the other hand, out of tested psychological determinants, social norms (0,081*) and tax morale (0,507***) have positive significant impact on tax compliance (Paleka et al., 2023). Tested main effects regarding sociodemographic variables suggest that age, gender, and education level have a significant impact on compliance behaviour, while results show that the income level may not be a factor in impacting tax compliance.

The results regarding moderating effect analysis represent the second part of the results. The findings of this paper show that gender positively moderates the effect of tax rates (0,094*) and tax morale (0,108**) on tax compliance (Paleka et al., 2023). Regarding education level, a significant positive (0,183**) moderating effect on social norms towards tax compliance was reported. Findings also show that monthly income negatively moderates

relationships of audits (-0,154**) and positively moderates effect of sanctions (0,130**) on tax compliance (Paleka et al., 2023).

This chapter summarized the results from three scientific papers as a part of the thesis, covering its problem, purpose and objectives. First paper served as a preliminary research phase in order to evaluate and adjust the measuring instrument, as well as to identify different groups of Croatian taxpayers based on their perceptions. Second and third paper tested the thesis' hypotheses.

5. CONCLUSION

The question of collecting the adequate amounts of tax revenues is one of the most challenging ones for tax authorities, policymakers and researchers on the global level. Controlling axpayers' evasion and avoidance is closely related to countries' ability to generate public revenues which are used to provide welfare for citizens and businesses. However, understanding such behaviours is even of greater value. The central challenge lies in in identifying the determinants of taxpayers' compliance with a goal to create evidence based and innovative taxation strategies.

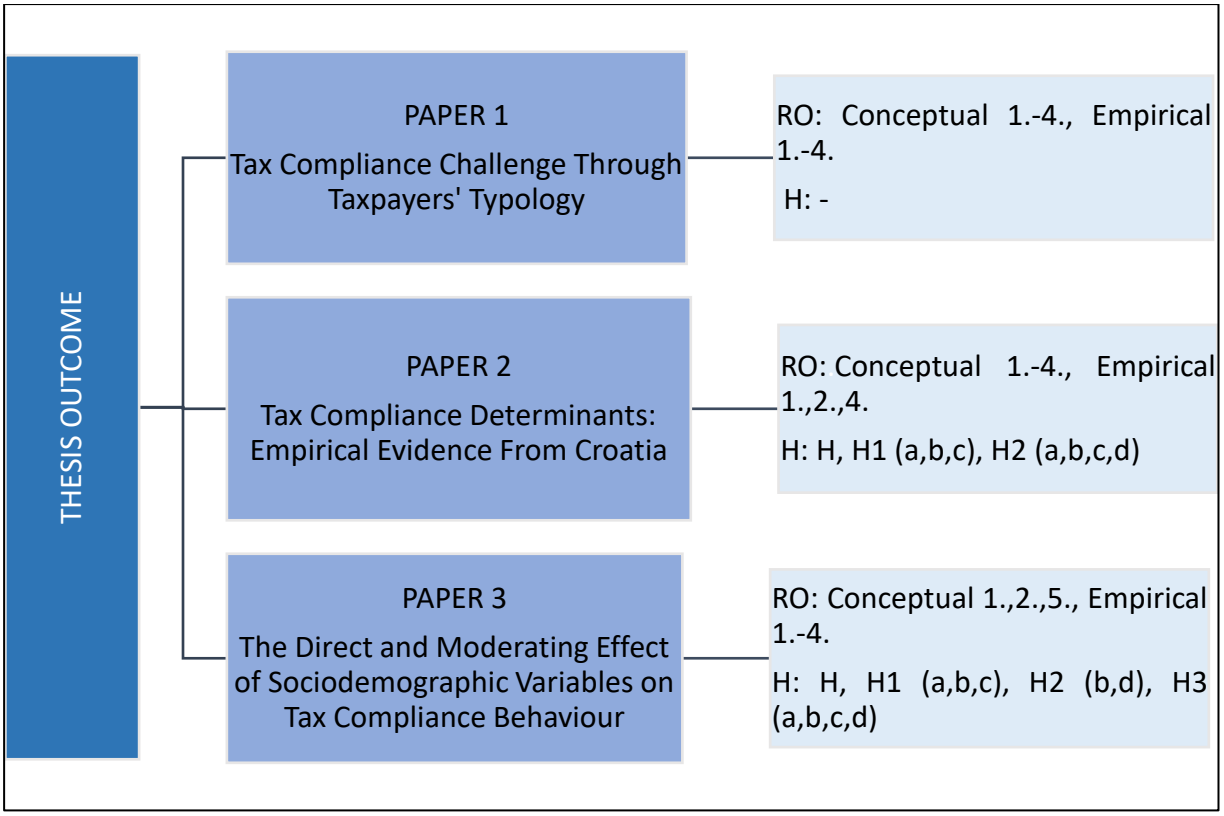
This doctoral thesis has systematically analysed an integrated framework of the tax compliance concept, and through empirical research to identify the economic and psychological determinants of tax compliance on the example of the Republic of Croatia. Based on the results obtained, a model with predictive relevance is proposed, as a more effective approach to the specificities of Croatian tax system.

5.1 DISCUSSION

In order to identify economic and psychological determinants of tax compliance, a complex methodology was applied to analyse the data collected directly from Croatian taxpayers. In Figure 1, thesis outcome based on results and conclusions from all three papers is presented.

As it can be seen from the presented figure, both conceptual (5) and empirical (4) research objectives (RO) have been achieved throughout the papers. The stated objectives of the conceptual part of the research created a rounded theoretical unit in terms of the tax compliance concept and its determinants. Existing concepts and definitions have been synthesized and this resulted in proposed model with a combination of economic and psychological tax compliance determinants.

Figure 1 Thesis outcome: published papers



Source: Own compilation (2023)

Empirical research objectives have also been achieved by analysing the impact of selected economic and psychological determinants, as well as sociodemographic variables, on tax compliance. All results obtained through the analysis of empirical research were compared with relevant existing research in the field.

Furthermore, a summary of hypotheses testing is given in the table 8.

Table 8 Summary of results - hypotheses testing

HYPOTHESIS	DECISION	
	Article 2	Article 3
Main hypothesis: Economic and psychological determinants -> Tax compliance	Not supported	Partially supported
H1: Economic determinants -> Tax compliance	Not supported	Partially supported
H1a: Tax Audits -> Tax compliance	Not supported	Supported
H1b: Tax Rates -> Tax compliance	Not supported	Supported
H1c: Sanctions-> Tax compliance	Not supported	Not supported
H2: Psychological determinants -> Tax compliance	Partially supported	Partially supported
H2a: Tax System Complexity -> Tax compliance	Not supported	-
H2b: Social Norms -> Tax compliance	Supported	Supported
H2c: Fairness -> Tax compliance	Not supported	-
H2d: Tax Morale -> Tax compliance	Supported	Supported
H3: Taxpayers' sociodemographic characteristics -> Tax compliance	-	Supported
H3a: Taxpayers' age -> Tax compliance	-	Supported
H3b: Taxpayers' gender -> Tax compliance	-	Supported
H3c: Taxpayers' education level -> Tax compliance	-	Supported
H3d: Taxpayers' income level -> Tax compliance	-	Supported

Source: Own compilation (2023)

As it can be seen from the table 8, the main hypothesis is partially supported, based on the research results. First two auxiliary hypotheses regarding the economic and psychological determinants of tax compliance are also partially supported, while the third auxiliary hypothesis regarding the sociodemographic variables is supported. Both papers offer evidence about the significance of social norms and tax morale for taxpayers' compliance, however by applying different methodology in third paper, tax audits and rates have also been established as a significant determinants of tax compliance.

Based on the evidence and results presented in table 8, it is suggested that sociodemographic variables should always be included in the tax compliance model, since age, gender, education and income level significantly impact taxpayers' compliance.

5.2 METHODOLOGICAL CONSIDERATIONS

With concluding remarks, there are several methodological considerations that should be highlighted.

As Slemrod (1992) summarized, the research methods in the field of tax compliance can be divided into three categories. Precisely, those are historical data, surveys and experiments. Each of these categories has its own advantages and disadvantages, but their limitations are closely related to a fact that researching and analysing taxpayers' decisions is quite difficult. For those who have an intention to be noncompliant, they will surely try to cover up such behaviour and probably be dishonest about it in any kind of research method. Despite these problems regarding the data and methodologies used in the tax compliance research, Alm (2019) emphasized the value of such insights. To conclude, this is surely an adequate argument to make a research with data triangulation in future.

This previous limitation is partly the motivation for the methodological divergence regarding the data analyses in papers. Since there are different results (regarding the impact of economic determinants of tax compliance) in second (PLS-SEM) and third paper (OLS

regression), the conclusion of the author is that future studies scrutinizing the effects of different methodological choices in the field of tax compliance are needed.

Next, taxpayers' attitudes were in the focus of this research. There are intense debates (existing over the last century) whether attitudes are behaviour predictors or not. Ajzen and Fishbein (2005) suggest that attitudes are important and useful concept for the adequate prediction of behaviour. Although caution is needed when interpreting, Ajzen (1991) suggests that the likelihood of valid outcomes is raised by measuring attitudes specifically related to the behaviour (such as tax compliance attitudes). Onu (2016, p.11) concludes that the question should not be "…whether attitudes are predictive for tax compliance decisions, we believe it is important to acknowledge that attitudes play a part in explaining tax behaviour, and rather focus on understanding when it is most likely that attitudes will influence behaviour."

5.3 COMPARISON WITH OTHER STUDIES

The research results in this dissertation relate to previous research in the field. Identified taxpayers' clusters from the first paper have certain similarities with Torgler's (2003) taxpayers' typology. Both cluster analysis identified four clusters. Torgler's (2003) "Intrinsic taxpayer" and "Morally committed" taxpayer from the first paper in this dissertation are motivated by their individual emotions and responsibilities (Paleka & Vitezić, 2023). Furthermore, both analyses confirmed that there is a group of taxpayers who express their tax compliance as a social commitment, as well as those who are mostly under the influence of of extrinsic factors.

Regarding the economic and psychological determinants of tax compliance, the results are in line with the rising number of researchers who claim that the psychological determinants have the strongest impact on tax compliance (Richardson, 2006; Kirchler, 2007; Christian & Alm, 2014). Moreover, Alm and Torgler (2006) and Franić (2020) identify tax morale as a crucial determinant of taxpayers' compliance. Similar to this, tax morale has a statistically significant impact on tax compliance in the second and third paper of this

dissertation. Opposite of this dissertation's results, Antinyan and Asatryan (2020) suggest that tax morale is not significant regarding the taxpayers' behaviour.

In addition to this, research results from both the second and third paper point to the fact that taxpayers' behaviour is influenced by social norms. Similar results were obtained by Górecki and Letki (2020), Hallsworth et al. (2017), and Bott et al. (2019). However, the obtained results are opposite to existing studies claiming that social norms have no effect on tax compliance (Torgler, 2004; Wenzel, 2005; Fellner et al., 2013).

Furthermore, in the third paper, besides psychological, some economic determinants have also been established as significant for taxpayers' compliance. Precisely, those are tax audits and tax rates. These results can be compared to the ones obtained by Sinning and Zhang (2023), suggesting that compliance could be improved by a combination of enforcement and social norms. Combining the traditional (economic) to emerging, psychological determinants and creating taxation strategies based on this is something that can be related to the work of Alm et al. (2012), Batrancea et al. (2019), Kirchler et al. (2008).

Regarding the relationship between tax compliance and sociodemographic variables, this research emphasizes that age, gender, income and education level are significantly associated with taxpayers' behaviour. This is in line with previous results obtained by Jackson and Milliron (1986), as well as Hofmann's et al. (2017). However, this result contrasts with some previous studies which suggest that sociodemographic variables have no impact on tax compliance (Ashby et al., 2009; Grasmick & Bursik, 1990).

5.4 SCIENTIFIC AND APPLIED CONTRIBUTION

As for the conceptual part of the papers and the dissertation, the contribution is manifested through the development of scientific thought and a more thorough understanding on the concept of tax compliance and its determinants.

Across the methodological part, the contribution is visible through the determination of economic and psychological factors as well as sociodemographic variable for the future strengthening of tax compliance in the Republic of Croatia, and testing the impact of

established determinants on tax compliance. It also defines critical gaps in understanding taxpayer heterogeneity.

In the preliminary stage of the research, significant contribution is made through the development and validation of measurement instrument, adapted to Croatian tax system specificities. This thesis also provides a methodological contribution to the body of knowledge by using PLS-SEM to analyse the proposed model, since the regression analysis is still dominant method in the field.

Regarding the applied contribution, the results of the research further enrich the understanding of taxpayers' behaviour. The contribution gives new insights into the significant tax compliance determinants, especially about the effects of psychological determinants. Based on this, there is a greater potential within the tax system to improve cooperation and predict future behaviour of taxpayers, with the aim of reducing tax evasion and avoidance.

In addition, the results of the research serve as the basis for creating recommendations with the purpose of ensuring adequate tax policy measures. These measures point to the possibility of creating an optimal level of tax compliance in the Republic of Croatia, since the research results confirm that nudge mechanisms and non-deterrence (social norms and tax morale) messages should be incorporated into taxation strategies.

5.5 IMPLICATIONS FOR FURTHER RESEARCH

The findings based on this research and data related to Croatian taxpayers provide a unique insight to tax policymakers through the perspective of taxpayers themselves and potentially serve as a starting point to countries in surroundings with similar economic and fiscal policies (Paleka et al., 2022). Useful direction for future research should be considered through developing this research framework and expanding it to a larger international comparative study (Paleka & Vitezić, 2023).

Although this research introduces novel results and suggestions for tax authorities regarding tailoring the taxation policies in accordance to the taxpayers’ attitudes and beahviour, extended research is needed to increase confidence in these results. Additionally,

there is a need for detailed analysis of fairness concept in tax compliance research. In this research, the term "general fairness" is used, as sugessted in some previous studies (Etzioni 1986; Richardson, 2006a). However, it is well known that fairness is a multidimensional concept. It would be useful to address this issue in the extension of similar research.

Based on this research, it is also obvious that there is a need for data triangulation in future, due to limitation associated with studies based on surveys. It would be useful to use the actual compliance data, assuming it will be provided by the tax authorities. In addition to this, hopefully more researchers will feel enthusiastic about the behavioural approach in tax compliance research and provide further insights through qualitative studies.

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9. APPENDIX

9.1 THE LIST OF APPENDED SCIENTIFIC PAPERS AND DOCTORAL CANDIDATES` CONTRIBUTION

Scientific paper 1	Appendix 1
Author(s)	*Paleka, H., & Vitezić, V.*
Title of the paper	Tax compliance challenge through taxpayers' typology
Year of publication	2023
Journal	Economies
ISSN/ISBN number (e-ISSN)	2227-7099
Publisher	Multidisciplinary Digital Publishing Institute
Volume and Issue number	11(9)
Pages (from-to)	219
Language	English
Indexation	Q2 Scopus
Scientific contribution of the paper	This study identifies critical gaps in understanding taxpayers' heterogeneity. It significantly contributes to a better understanding of taxpayers' motivation and behaviour.
Scientific contribution of the doctoral candidate	Development and validation of the measurement instrument throughout the first stage of the research. Wide theoretical framework of relevant tax compliance

	determinants, together with factor and cluster analysis leading to a precise perspective upon Croatian taxpayers.
Applied contribution of the paper	The results of the study may contribute regarding the possible improvements in the tax policies and tax system. Additionally, its contribution can be visible in differentiated tax policy measures. The findings provide a unique insight into the taxpayers' perspective and are applicable to countries with similar economic and fiscal policies.

Scientific paper 2	Appendix 2
Author(s)	*Paleka, H., Karanović, G., & Badulescu, D.*
Title of the paper	Tax compliance determinants: empirical evidence from Croatia
Year of publication	2022
Journal	Technological and Economic Development of Economy
ISSN/ISBN number (e-ISSN)	2029-4913 / 2029-4921
Publisher	Vilnius Gediminas Technical University (VILNIUS TECH), Lithuania
Volume and Issue number	28(6)
Pages (from-to)	1915–1932
Language	English
Indexation	Q1 Scopus, Q1 WOS
Scientific contribution of the paper	The main contribution of this paper stems from the fact that this research is the first publicly available attempt of tax compliance research in Republic of Croatia that includes both economic and psychological factors.
Scientific contribution of the doctoral candidate	Within the tax compliance concept paradigm shift towards the behavioural approach has started in last two decades. In this paper, except that hypotheses were tested, the paradigm shift was noticed in Croatian tax system as well.

Applied contribution of the paper	Research results further improve the understanding of taxpayers' behaviour. The contribution can also be observed through significant insights regarding the importance of psychological determinants of tax compliance, the ability to enhance cooperation within the tax system and predict the future behaviour of taxpayers.

Scientific paper 3	Appendix 3
Author(s)	*Paleka, H., Karanović, G., & Štambuk, A.*
Title of the paper	The direct and moderating effect of sociodemographic variables on tax compliance behaviour
Year of publication	2023
Journal	The South East European Journal of Economics and Business
ISSN/ISBN number (e-ISSN)	1840-118X / 2233-1999
Publisher	School of Economics and Business in Sarajevo
Volume and Issue number	18 (2)
Pages (from-to)	34-48
Language	English
Indexation	Q2 WoSCC, Q2 ESCI
Scientific contribution of the paper	Added scientific value of the published paper can be observed in the evidence about the significance of sociodemographic variables for taxpayers' compliance. Moreover, the results confirm moderating role of gender, education level, and income level on chosen tax compliance determinants.
Scientific contribution of the doctoral candidate	Besides testing the third group of hypotheses, in this paper contribution is significant for deeper understanding of

	various channels and complex interactions between sociodemographic, economic, psychological variables and tax compliance.
Applied contribution of the paper	Research results have a significant impact on society and policy, offering evidence that fiscal revenues can be raised without increasing tax rates or lowering public spending, but by giving additional attention to a certain group of taxpayers. In that way efficient and evidence-based fiscal strategies may arise from these results.

9.2 COPYRIGHT

Scientific Paper 1 **Tax compliance challenge through taxpayers' typology** is published as Open Access Paper.

Scientific Paper 2 **Tax compliance determinants: empirical evidence from Croatia** is published as Open Access Paper.

Scientific Paper 3 **The direct and moderating effect of sociodemographic variables on tax compliance behaviour** is published as Open Access Paper, with a permission from School of Economics and Business in Sarajevo.

9.3 APPENDED SCIENTIFIC PAPER 1: TAX COMPLIANCE CHALLENGE THROUGH TAXPAYERS' TYPOLOGY

Tax compliance challenge through taxpayers' typology

Paleka, H. & Vitezić, V. (2023)

Economies, 11(9), 219.

https://doi.org/10.3390/economies11090219

economies

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Article

Tax Compliance Challenge through Taxpayers' Typology

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Abstract: Tax compliance has become a very popular academic research topic. Understandably so, as all modern societies face the challenge of limiting tax evasion and the losses this phenomenon causes to government revenues. Given the increase in duties in the aftermath of the economic downturn affected by COVID-19, increasing taxpayer compliance is one of the main tasks for governments worldwide. This study aimed to identify critical gaps in understanding taxpayer heterogeneity. For this purpose, an exploratory factor analysis of taxpayer perceptual and attitudinal elements was carried out. Our analysis revealed six factors influencing taxpayer compliance with the tax system. Furthermore, the cluster analysis identified four groups of taxpayers, and significant differences between the clusters and the descriptive profile of each cluster were also found. The specificities of these clusters point to a conclusion that the time has come for policy makers to employ strategies that stimulate voluntary tax compliance with minimum cost to the tax system.

Keywords: tax compliance; tax evasion; economic determinants; psychological determinants; taxpayer segmentation

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1. Introduction

Over the last forty years a significant number of studies have analysed taxpayers' motivation towards their tax liabilities. The literature often emphasises the complexities of tax compliance, suggesting it is influenced by a large number of determinants (Onu et al. 2018; Hashimzade et al. 2013). Tax compliance and related issues are as old as taxes themselves (Andreoni et al. 1998) and continue to be a hot topic, even today.

Despite the increase in research in this area, many studies continue to use the conventional economic model and its alterations to explain the taxpayers' reasoning. Allingham and Sandmo (1972) and similar models, derived from the theory of Nobel laureate Becker (1968), are based on the assumption that tax payments are made only because of the economic consequences that follow in the case of indiscipline. Although the traditional approach was under criticism (claiming it did not completely explain taxpayer compliance), its variations are still being developed and adapted further. Fischer et al. (1992) and Alm et al. (1995) argued that some non-economic factors also affect tax compliance. In the last two decades, many studies have discussed the division between economic and psychological factors that contribute to tax compliance (Bobek et al. 2007; Kirchler 2007; Lewis et al. 2009; Saad 2014; Alshira'h et al. 2020; Santoro et al. 2021). In this regard, Alm et al. (2012) and Marandu et al. (2015) claimed that tax compliance and its mechanisms could not be fully explained by purely economic considerations, just as enforcement is not the only determinant influencing it. In a recent large-scale experiment of 44 nations across five continents, Batrancea et al. (2019) suggested that both traditional and emerging, trust and power-based strategies were important in order to positively influence taxpayer compliance. Since there is still no consensus between researchers regarding the dominant tax compliance model, the conceptual objectives of this paper are to explore the existing theoretical knowledge of economic and psychological tax compliance concepts to define and describe the most important economic and psychological determinants of tax compliance.

The paradigm shift in the tax compliance concept has led to more research in this area, aimed at understanding the mechanisms of taxpayers' reasoning, intersecting different disciplines such as accounting, economics, political science, sociology and psychology. Over time, there has been significant sophistication in understanding the tax compliance concept, and interdisciplinary research has contributed significantly to this (Yong et al. 2019). Finally, two research approaches are now used in investigating tax compliance: economic and behavioural (Nguyen et al. 2020).

Based on the combination of these two approaches and the model proposed by Alm et al. (2012), this paper's empirical objectives are to examine the impact of established economic and psychological determinants on the taxpayers' tax compliance in the Republic of Croatia, to examine the impact of taxpayers' sociodemographic characteristics on their tax compliance in the Republic of Croatia and to compare the results with previous research. The data was collected through a survey and analysed using factor analysis to identify clusters of characteristics that lead to differences in tax compliance. The factor-cluster analysis can help achieve the research objective of better understanding the relationships and patterns between the variables within the identified clusters and factors. These patterns can be useful in understanding the underlying structure of the data and in making informed decisions based on the characteristics of the identified clusters. Finally, this work will hopefully contribute to a better understanding of taxpayer motivation and reasoning. The results of the study may shed light on possible improvements to the tax system that lead to more differentiated tax policies. In addition, the study aimed to identify not only the clusters of taxpayers, but also the economic and psychological factors that influence them. For the tax system to work and be satisfactory to the government and taxpayers, all factors that contribute to tax compliance must be defined and studied. The results provide tax policy makers with insight into taxpayer heterogeneity and may be useful for countries with similar economic and fiscal policies.

The remaining sections are Theoretical Perspective, Methodology, Results, and Discussion and Conclusions where the implications and limitations of the study are presented together with the directions for future research.

2. Theoretical Perspective

2.1. Tax Audits

Allingham and Sandmo's (1972) economic deterrence theory of tax compliance and the findings of many other authors have emphasised audit probability and rates as crucial factors in their tax compliance models. For example, Alm (1991) and Alm et al. (1995), argued that the taxpayers' judgments were affected significantly by the level of audit rate and audit strategy. Slemrod et al. (2001) reported that taxpayers who were provided with feedback about the certainty of being audited more closely scrutinised their tax report in the subsequent period than those who were not given such information. In line with Slemrod et al. (2001), other studies showed higher compliance in taxpayers who were more likely to be audited (Alm et al. 2012; Blackwell 2007; Dubin et al. 1990; Webley et al. 1991; Nguyen 2022). Kleven et al. (2011) conducted a large-scale field experiment in Denmark to test the predictions of an augmented classical tax compliance model. They showed that previous audits and threat-of-audit letters had a substantial positive impact on self-reported income. Nguyen et al. (2020) showed that voluntary tax compliance was directly affected by three factors: audit probability, corporate reputation and business ownership. It has been suggested that audits have not only a large impact but a persistent one as well (Advani et al. 2017). This effect reaches approximately 26 per cent (on average) in the fourth year after the tax year to which the audit applies.

However, a number of studies reported different and mixed findings, claiming that audit has no significant impact on tax compliance (Graetz et al. 1986; Cowell 1990; Erard and Feinstein 1994), while others (e.g., Ghosh and Crain 1996) claimed the opposite. Mendoza et al. (2017) suggested that the association between auditing level and tax compliance was non-linear. Their findings showed that that there was a level of auditing after which

compliance declined, suggesting that the enforcement strategies might have a certain limit regarding the taxpayers' behaviour.

In their laboratory experiments, Guala and Mittone (2005) presented another interesting phenomenon that should be included in further research of audit probability and economic determinants of tax compliance. They named it the "bomb crater effect" and defined it as a considerable diminution of taxpayer compliance directly after an audit. Later on, the "bomb crater effect" was examined and its significance confirmed by numerous studies (Mittone et al. 2017; Kastlunger et al. 2009; DeBacker et al. 2015; Maciejovsky et al. 2007).

The broad scope of the literature on audit level and probability surely serves as a verification of its importance. However, the problem with audits is that they represent a significant cost to public finance and yet eliminate only a part of tax evasion. In other words, audits should be adequately combined with other tax compliance factors. In addition to this, and more recently, authors proposed that "nudge" mechanisms can be useful during auditing. Some authors propose the self-funding reward system in combination with the traditional auditing process to improve compliance rates (see Fatas et al. 2021).

2.2. Tax Rate

Almost every fundamental theory of tax compliance includes tax rate as one of the most influential factors. Similar to Allingham and Sandmo (1972), Srinivasan (1973) and Fischer et al. (1992) highlighted the role of tax rate in obtaining tax compliance. However, the standard economic model and its expansions do not offer a clear explanation of the relationship between tax rate and tax compliance (or tax evasion).

Generally, studies report mixed findings on the relationship between tax rate and tax compliance. One group of authors argues that higher tax rates reduce effective income and, consequently, make tax evasion lucrative. In other words, they suggest that compliance is lower at high tax rates (Ali et al. 2001; Boylan and Sprinkle 2001; Christian and Gupta 1993; Lang et al. 1997; Collins and Plumlee 1991). Blackwell's (2007) meta-analysis of twenty laboratory experiments, carried out between 1987 and 2006, showed that higher tax rates might lead to less compliance. Similar findings were found in a study by Alm et al. (2012). There are many studies with opposite findings, suggesting that a reduction in effective income leads to an increase in absolute risk aversion, and therefore, tax evasion declines (Alm et al. 1995; Feinstein 1991). A small number of studies show that tax rates have zero impact on tax compliance (Baldry 1987; Porcano 1988; Modugu et al. 2012).

2.3. Tax System Complexity

With the increasing sophistication of tax legislation, the complexity of the tax system has become an ongoing and developing issue (Richardson and Sawyer 2001). Depending on its form, the term "tax complexity" has been differently explained in the literature. Cuccia and Carnes (2001) focus on the complexity of tax rules, while Cox and Eger (2006) emphasise procedural complexity. In another set of studies, researchers are focused on the taxpayers' view, and specifically on the low degree of legibility (Barney et al. 2012; Pau et al. 2007; Saw and Sawyer 2010) as a determinant of tax complexity.

Evans and Tran-Nam (2014) define tax complexity as a multidimensional concept viewed differently by different categories of people in the tax system. They categorised three separate definitions of tax complexity—from the tax accountants', tax advocates' and taxpayers' points of view. Tax preparers undoubtedly play a role in tax system simplification, and in that way, they can often facilitate tax noncompliance. Erard (1993) emphasised the need for a joint analysis of tax preparation and tax compliance levels. Although the author established the connection between certified tax preparation and a higher level of noncompliance, he suggested that some beneficial social outcomes (especially educational) were significant. In addition to this, the motivation to use tax preparers is to reduce incertitude and fill in the data correctly—which suggests that tax system complexity is an important issue (Hite et al. 1992; Niemirowski and Wearing 2003).

Furthermore, numerous other studies link tax system complexity to tax compliance issues (Chau and Leung 2009; Cox and Eger 2006). After examining different determinants of noncompliance across 45 countries, Richardson (2006) concluded that complexity is the most important determinant for a taxpayer's compliance. Kirchler et al. (2006) claimed that when tax laws are perceived as less complex, taxpayers' intention to comply is higher. In their analysis, Saad (2014) recommended that future research should examine the impact of tax complexity on taxpayers' noncompliance. Finally, today there is a tendency to use technology that can both simplify the tax system and help increase its integrity by reducing corruption options (Bird and Zolt 2008).

2.4. Social Norms and Tax Morale

Insights from behavioural economics have been embraced and implemented in two extensive (but partially overlapping) areas of research. One sequel keeps its focus on the individual factor (personal norms), while the other extends to the analysis of group considerations, mainly social norms (Alm 2019).

The concept of "social norms" as a tax compliance factor has been studied by many researchers in this field (Alm et al. 1999; Slemrod 2016; Scholz and Pinney 1995; Wenzel 2004a, 2004b). However, Cialdini and Trost (1998) were the first authors to define the term as "rules and standards that are understood by members of a group, and that guide and/or constrain social behaviour without the force of law" (p. 152). Alm et al. (1995) conducted a study regarding unrecognised inter-country diversities in compliance rates, due to social norms discrepancies. Many other authors followed this example, referring to different societal norms in connection with the taxpaying culture (i.e., Cummings et al. 2006; Torgler 2002). Their results generally suggest that social norms play a role in tax compliance, but also emphasise the need for the precise differentiation of the term. In a large-scale natural field experiment carried out in the United Kingdom on more than 200,000 individuals, Hallsworth et al. (2017) revealed that social norm messages persistently affect tax compliance behaviour. In the research of the determinants of active filing behaviour, the results from Santoro et al. (2021) suggest that social norms could significantly encourage filing. Torgler (2011, p. 5) concludes, by linking social norms and tax morale, that "an increase in social norms increases the moral costs of behaving illegally and, therefore, reduces the incentives to evade taxes".

In analysing tax compliance, numerous studies were found that incorporated and examined the role of attitudes, although they were not always labelled as such. In their analysis of factors beyond the purely economic, Alm et al. (2012) found that attitudes were repeatedly identified as the source of tax morale. This is consistent with the study by Schmölders (1959), which showed that tax morale is reflected in attitudes towards tax compliance and tax evasion. Torgler (2006) defined tax morale as "intrinsic motivation" to meet tax obligations. However, some of the researchers consider tax morale as an umbrella term encompassing all observed tax compliance (Luttmer and Singhal 2014).

Andreoni et al. (1998), Kirchler (2007) and Torgler (2011) empirically demonstrated that incorporating tax morale into tax compliance models was effective. Many other studies showed that taxpayers' attitudes are significantly positively correlated to tax compliance (Ali et al. 2014; Cummings et al. 2009; Kornhauser 2007; Nguyen 2022). They also argue that tax morale should complement, not substitute, other determinants of tax compliance. The OECD (2019) points to complex interactions between tax morale and other drivers of tax compliance while the recent increasing application of behavioural economics in the field of tax compliance shows that tax administrations are seeking to use tax morale knowledge to improve compliance (OECD 2017).

2.5. Fairness

Although defined in the 1980s, as one of Jackson and Milliron's (1986) key variables of compliance behaviour, only later did fairness become the focus of other researchers. As Richardson and Sawyer (2001) pointed out, studies regarding perceptions of fairness

and their linkage to compliance behaviour were on the rise, but their number was still inefficient to lead to conclusive results. The same authors went on to conclude that the importance of the perception of fairness should not be neglected in future research.

It is generally accepted that fairness is a multidimensional determinant that comprises vertical, horizontal, procedural, distributive and retributive dimensions. In this research, the term "general fairness" will be used (see Richardson 2006). Research in the tax compliance field most often deals with distributive fairness and procedural fairness. Researchers agree that if citizens perceive the allocation of tax burdens and benefits as fair, and if they are satisfied with the quality of public services, they consequently show more willingness to obey tax laws and regulations voluntarily (Bosco and Mittone 1997; Braithwaite 2003; Falkinger 1995; Hartner et al. 2008; Kim 2002; Richardson 2005; Verboon and Goslinga 2009; Kirchler et al. 2008; Guzel et al. 2019; Gobena 2021). In their research, which aimed to identify when and why procedural fairness positively influenced voluntary tax compliance, van Dijke and Verboon (2010) found that trust in authorities may be the core prerequisite for this phenomenon. Koumpias et al. (2021) made a significant contribution in examining trust in government organizations and its effects. In their paper, they established differences in the levels of trust based on citizens interactions with organizations. In other words, trust in output government organizations (those ensuring public goods and services) has a stronger and more positive association with tax morale than trust in an input government organization (Koumpias et al. 2021, p. 4).

3. Methodology

Researching and understanding taxpayer compliance has never been straightforward, primarily because those taxpayers who evade or avoid taxes are strongly motivated to cover up that behaviour (Alm and McKee 2006). Research methods in this area can be classified into one of the following groups—historical data, surveys, and experiments (Slemrod 1992). Kirchler and Wahl (2010) suggested combining methods with the aim of broadening the understanding of taxpayers' reasoning. Alm (2019) argued that, regardless of the specificity of the data source or methodology, one should keep in mind that there are disadvantages in using any of the available methods in this field of study. Nevertheless, it must be acknowledged that such methods have provided many important insights. Moreover, one should be aware of the fact that attitudes do not necessarily anticipate behaviour. However, Onu (2016) argues that there are theoretical arguments backing the attitudes and behaviour relationship. Moreover, Ajzen (1991) suggests that by measuring attitudes specifically related to the behaviour (such as tax compliance attitudes) raises the chances of valid results.

Based on the existing literature and established research gaps, the empirical objectives of this paper are to examine the impact of the chosen economic and psychological determinants on the taxpayers' compliance, to examine the impact of the taxpayers' sociodemographic characteristics on tax compliance and to compare the results with previous research.

3.1. Research Design

A questionnaire was chosen as the main method and instrument for data collection in the current study. To better understand taxpayers' attitudes and motivations, a self-administered questionnaire was developed. It consisted of three parts: (1) the economic determinants of tax compliance, (2) the psychological determinants of tax compliance, and (3) the socio-demographic data (gender, education level, employment status, monthly income, seniority). The economic determinants of tax compliance (tax audits and tax rates) were measured with 6 items, as proposed by Tenidou et al. (2015) and van Dijke et al. (2019). Psychological determinants of tax compliance (tax morale, social norms, tax system complexity and fairness perceptions) were assessed with 19 items as suggested by Onu et al. (2018), Kirchler et al. (2006), and Hauptman et al. (2015). The two aforementioned scales were slightly modified due to the specificities of the Croatian tax system. To express their

opinion, respondents were presented with a 5-point Likert scale ranging from "1-Strongly Disagree" to "5-Strongly Agree".

3.2. Data Collection

The study was conducted in Croatia from April to May 2021. It was carried out online and invitations were sent to a random sample of Croatian individual taxpayers (income tax). The sampling was based on the willingness and availability of participants to complete the questionnaires. In order to ensure the content validity of the questionnaire and to test the respondents' understanding of the questions, the questionnaire was piloted with a sample of 40 participants. Some minor issues were identified during the pilot. As a result, wording of some of the questions was changed to ensure that the participants could clearly articulate and answer the questions.

To optimise the scope in this online survey, two sampling strategies were used. Regarding the first subsample, the data was collected by random sms invitations to mobile phones. In a second subsample, social media invitations via paid Facebook and Instagram advertisements were created, targeting specific sociodemographic groups (inspired by Rinken et al. 2020). Only individuals older than 18 years were asked to participate in the survey. A total of 299 were valid and accepted for this study, representing a response rate of 69.5%.

3.3. Data Analysis

The data were analysed in five steps using IBM SPSS Statistics 26. First, a descriptive analysis was carried out to examine the socio-demographic profile of respondents. This was followed by an exploratory factor analysis (EFA) to reduce the number of determinants of tax compliance (31 in total) to a smaller number of factors. The original multi-item constructs were reduced in the first step and also adjusted to the specificities of the tax system. Therefore, the theoretical framework was significantly modified through the EFA.

Principal axis factoring with direct oblimin rotation was used as the factor extraction method. Prior to factor analysis, the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) and Bartlett's test for sphericity were applied. In addition, only factors with eigenvalues greater than 1 were retained, while items with factor loadings and communalities greater than 0.3 were retained in the final factor matrix. Reliability alphas within each dimension were calculated to best determine the internal consistency of a factor. Third, participants were then divided into segments through cluster analysis using the tax compliance factor scores. In this study, a non-hierarchical clustering method was used, more specifically the K-means clustering method. Fourth, possible statistically significant differences between taxpayer segments in terms of tax compliance factors were explored through ANOVA. This was supported by a subsequent post hoc analysis using the Hochberg GT2 post hoc test in the case of homogeneous/nearly equal variances and the Games–Howell post hoc test in the case of non-homogeneous variances. Finally, possible significant sociodemographic differences between taxpayer segments were tested.

4. Results

Exploratory factor analysis yielded a KMO measure of sampling adequacy of 0.785, a significant Bartlett's test of sphericity with chi-square = 2537.515 (df = 300) and $p = 0.000$, indicating that the covariance matrix was appropriate for conducting factor analysis. Six items with low communalities (less than 0.30) were excluded from further analysis. Finally, EFA with direct oblimin rotation from the 25 perception items yielded six factors with eigenvalues greater than one, which explained 60.23% of the total variance (see Table 1). According to Hair et al.'s (2013) rule of thumb, all standardised factor loadings (except one) were greater than 0.50, which suggests that the sample size of 299 participants was large enough to increase the significance level of the findings. Additionally, three or more items for each factor and the level of communalities indicated moderately good conditions and sufficient sample size (Leandre et al. 2012). Furthermore, all Cronbach's alpha values

were at the acceptable reliability level, i.e., higher than the recommended standard of 0.70 (Cortina 1993). Table 1 shows the results of the exploratory factor analysis, indicating standardised factor loadings, mean values, and standard deviations of all items examined.

Table 1. Results of exploratory factor analysis.

	Factor							
Statement	**1**	**2**	**3**	**4**	**5**	**6**	**Mean**	**Std. Dev.**
Tax Morale								
Non-compliance with tax liabilities is never justified.	0.589						3.30	1.040
Non-compliance with tax liabilities is always justified.	0.581					−0.108	3.62	0.973
Non-compliance with tax liabilities is sometimes justified.	0.734					−0.130	2.76	1.024
I believe I should declare my entire income and pay the appropriate income tax according to that.	0.597		0.219				3.47	1.091
I find manipulating tax reliefs acceptable.	0.625					0.100	3.51	0.983
I find the practice of cash-in-hand payments an acceptable way to avoid paying taxes.	0.657						3.16	1.051
The opportunity to pay a smaller amount of tax should be taken, even if it is not legal.	−0.585	0.103	0.114	0.108			3.98	0.788
Tax evasion is justified if the tax rates are too high.	−0.580		0.163	0.112			3.30	1.040
Tax System Complexity								
Tax laws are written in a simple language.		0.604	−0.131				2.19	0.871
It does not take a lot of effort to understand the explanations regarding tax legislation and tax authorities' publications.		0.725					2.48	0.948
I understand the current regulations regarding my tax liabilities.		0.596	0.105			0.115	3.09	1.008
Terms used in tax laws and tax authorities' publications are difficult to understand.		0.706					2.28	0.888
I feel confident and well informed regarding current tax laws.		0.683				0.100	2.43	0.953
Tax Rates								
Income tax rates are too high.			0.679				4.22	0.918
Increasing income tax rates affects the shadow economy growth.			0.779				4.12	0.859
I believe that the total tax burden on labour at rates of 56.5%. or 66.5% is too high.			0.700				4.35	0.858
Tax Audits								

Table 1. *Cont.*

Statement	Factor 1	2	3	4	5	6	Mean	Std. Dev.
If a citizen did not declare income for tax purposes, the tax authorities would certainly detect it.				0.548			2.97	1.036
Tax authorities' audits are frequent and profound.				0.751			2.47	0.854
Due to their knowledge and competence, tax authorities can detect quite every act of tax evasion.				0.725			2.31	0.986
Social Norms								
My family expects me to meet my tax obligations in accordance with the laws and regulations.	0.244		0.100		−0.619		3.59	0.998
My friends expect me to meet my tax obligations in accordance with the laws and regulations.					−0.956		3.14	0.986
People in my environment would strongly disapprove if I would not meet my tax obligations.				0.134	−0.576		2.55	0.987
Fairness Perceptions								
The decision processes and tax audits of the tax authorities are executed fairly.	−0.151	0.172		0.260	−0.160	0.363	2.06	0.779
The level of tax I pay is generally fair.	0.147	0.143	−0.218			0.531	2.20	0.885
I receive adequate public services for the taxes I pay.						0.831	1.92	0.891
Eigenvalue	4.896	3.218	2.273	2.196	1.316	1.160		
% of variance	17.542	10.809	7.201	6.836	3.624	2.882		
Cumulative variance	19.583	32.454	41.546	50.330	55.595	60.234		
Cronbach's alpha	0.703	0.797	0.773	0.709	0.768	0.701		
KMO = 0.785								
Bartlett's test of sphericity: $\chi 2 = 2537.515$; df = 298;	Sig. = 0.000							

Note. Extraction method: principal axis factoring. Rotation method: oblimin with Kaiser normalisation [a].
[a] Rotation converged in six iterations.

The first factor, "tax morale", comprised eight items related to personal attitudes towards tax liabilities in order to better understand the decision-making process in tax manipulation, particularly in relation to the justification of tax compliance. With an eigenvalue of 4.90, this factor explained 17.54% of the total variance. The second factor, "tax system complexity", is characterised by five items relating to the understanding of tax legislation and a clear understanding of the tax regulation. This factor had an eigenvalue of 3.22 and explained 10.81% of the total variance. The third factor, "tax rates", included three items focusing on attitudes towards the level of tax rates and their impact on the shadow economy and the labour market. This factor had an eigenvalue of 2.27 and explained 7.2% of the total variance. Like the first factor, the third component had a higher mean (4.20) and a reliability alpha of 0.83. The fourth factor, "tax audits", was derived from three items relating to the efficiency of tax audits conducted by the authorities. It yielded an eigenvalue of 2.20 and explained 6.8% of the total variance. The fifth factor, "social norms", was characterised by three items relating to the influence of social groups, namely

family, friends and people from the neighbourhood, on the respondents' tax compliance. This factor yielded an eigenvalue of 1.32 and explained 3.62% of the total variance. The final factor, "perception of fairness", comprised three items reflecting the respondents' perceptions of fairness in tax audits, the level of taxes, and the decision-making processes and public services executed and provided by tax authorities. This factor had an eigenvalue of 1.16 and accounted for about 2.88% of the variance in the data.

Having uncovered the dimensions underlying the tax compliance determinants, the next step in the analysis was to cluster the respondents. The cluster analysis identified different groups of respondents based on their perceptions of the six factors described in the previous analysis. A non-hierarchical K-means clustering method was used as this method is more efficient with larger data sets (n > 200) and is more suitable for grouping cases rather than variables compared to the hierarchical technique (Johnson and Wichern 1998). After checking cluster membership, distance information, and final cluster centres, a four-cluster solution was found to be most appropriate. Furthermore, the mean values of each factor were calculated for the members of each cluster (see Table 2). The resulting ANOVA tests showed that all six factors contributed to the differences between the four clusters (Sig., $p < 0.001$) (Table 2). In addition, post hoc analyses using Hochberg GT2 or Games–Howell tests examined the differences between the clusters on all six tax compliance factors. Comparison of the means showed that the taxpayer segments differ from each other, confirming the statistically significant differences in the means. Finally, four segments were labelled based on the importance of the factors for tax compliance.

Table 2. Clusters and post hoc analysis.

Factors (Overall Mean)	Clusters				F	Sig.	Post Hoc [a]
	Extrinsically Motivated (1)	Morally Committed (2)	Financially Motivated (3)	Socially Committed (4)			
Tax morale (3.27)	3.27	3.53	2.94	3.34	34.689	0.000 ***	1 < 2, 1 > 3, 2 > 4, 3 < 4
Tax system complexity (2.48)	2.78	2.43	2.24	2.58	8.150	0.000 ***	1 > 2, 1 > 3, 3 < 4
Tax rates (4.21)	4.38	4.48	4.62	3.28	91.382	0.000 ***	1 < 3, 1 > 4, 2 > 4. 3 > 4
Tax audits (2.56)	3.26	2.27	2.20	2.75	42.796	0.000 ***	1 > 2, 1 > 3, 1 > 4, 2 < 4, 3 < 4
Social norms (3.07)	3.33	3.30	2.30	3.41	41.719	0.000 ***	1 > 2, 2 > 3, 3 < 4
Perception of Fairness (2.03)	2.61	1.75	1.60	2.41	65.010	0.000 ***	1 > 2, 1 > 3, 2 < 4, 3 < 4
N	67	94	72	64			

Note. Level of significance at * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$. [a] Post hoc analysis using Hochberg GT2 or Games–Howell.

The largest number of taxpayers fell into the second (N = 94) and third (N = 72) clusters, while the first (N = 67) and fourth (N = 64) clusters were almost equal according to the number of respondents. Participants gathered in the first cluster perceived the combination of economic and psychological determinants as crucial for their tax compliance, but the dominant ones were tax rates and tax audits (tax rates = 4.38; tax audits = 3.26). Since the taxpayers in this cluster were significantly under the influence of the financial and deterrence factors, it is obvious that external (system) changes could stimulate their tax compliance. The type of taxpayer elicited in this cluster might be defined as "Extrinsically motivated" taxpayers.

The taxpayers in the second cluster were the ones under the influence of the financial factor (tax rates = 4.48) but characterised by strong tax morale (tax morale = 3.53) as well. Respondents from this cluster can be described as the ones who possess an intrinsic motivation in complying with their tax liabilities. Their voluntary tax compliance could be stimulated, with minimum cost to the tax system, by empowering a psychological contract between taxpayers and government. This cluster might be recognizable as "Morally committed" taxpayers.

In the third cluster, taxpayers were highly focused on tax rates, questioning the level of income tax rates and the overall tax burden (rates = 4.62). This group of taxpayers is slightly frustrated with the current tax system (tax system complexity = 2.24) and rates the fairness of the system as very low (perception of fairness = 1.60), while they do not perceive that their family or friends have any expectations regarding their tax compliance (social norms = 2.30). Since psychological factors could not stimulate their compliance, the type of taxpayer described in this cluster could be named "Financially motivated" taxpayers.

Taxpayers in the fourth cluster considered that the opportunity to pay a smaller amount of tax should not be taken and they agreed that people in their surroundings have some expectations regarding their tax compliance (social norms = 3.41). This suggests that they perceived paying taxes as their personal duty, and they might cooperate for the common good. This cluster is named "Socially committed" taxpayers.

The results of the ANOVA post hoc comparisons for the cohorts of taxpayers (Table 2) showed some statistically significant differences between the four groups. Extrinsically motivated taxpayers differ significantly from morally committed taxpayers on perceptions of tax system complexity, tax audits, social norms and perceptions of fairness. Extrinsically motivated taxpayers differ significantly from financially motivated taxpayers regarding tax morality, the complexity of the tax system, tax audits and perceptions of fairness. The comparison between extrinsically motivated taxpayers and the last group of taxpayers, socially committed taxpayers, shows some statistically significant differences in terms of tax rates and tax audits. Morally committed taxpayers differ significantly from extrinsically motivated and socially committed taxpayers in terms of tax morality. Moreover, the same group of taxpayers differs significantly from socially committed taxpayers in terms of tax rates, while social norms distinguish them from financially motivated taxpayers. The third group of taxpayers, financially motivated taxpayers, differs from extrinsically motivated and socially committed taxpayers in terms of tax rates. The last group of taxpayers, namely the socially committed taxpayers, differs significantly from the financially motivated taxpayers in terms of tax morale, complexity of the tax system, social norms and perceptions of fairness. Furthermore, the same cohort's perceptions of tax audits and perceptions of fairness differ significantly from those of morally committed taxpayers.

Table 3 shows the socio-demographic characteristics of the four clusters. All identified homogeneous case clusters averaged between 41 and 44 years of age (with a standard deviation of approximately ±12.3) and were predominantly female. Respondents in all four groups predominantly held master's degrees and worked in the private sector with more than 11 years of professional experience. Possible statistically significant socio-demographic differences between the segments of taxpayers were tested, pointing out one difference—monthly income. It was evident that the majority of the financially motivated cohort came from the highest income range, which was clearly different from the other groups, especially the extrinsically motivated and socially committed cohorts.

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Table 3. Differences between taxpayer segments.

	Taxpayer Segments					
Variables	**Extrinsically Motivated (1)**	**Morally Committed (2)**	**Financially Motivated (3)**	**Socially Committed (4)**	**F**	**Sig.**
Age in years (avg (SD))	44 (14.6)	43 (11.3)	41 (12.7)	44 (10.5)	0.893	0.473
Gender (%)					0.611	0.609
Male	35.8	34.1	31.9	28.1		
Female	64.2	65.9	68.1	71.9		
Education level					0.561	0.641
High school	14	22	20	18		
Bachelor	10	10	4	12		
Master	35	44	39	29		
MBA; PhD	8	17	9	5		
Employment status					1.148	0.330
Employed public sector	23	21	21	20		
Employed private sector	32	59	35	35		
Unemployed	3	2	4	0		
Retired	8	8	5	5		
Income monthly					3.592	0.014 *
<700 €	19	14	15	14		
701–1000 €	26	38	19	29		
1000–1500 €	16	28	18	14		
1500 € >	6	13	30	7		
Seniority					1.860	0.136
<5	14	9	10	7		
6–10	11	16	20	11		
11–20	20	47	30	27		
20>	22	21	12	19		
N	67	94	72	64		

Note. Level of significance at * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

5. Discussion and Conclusions

This paper focused on identifying taxpayer clusters and examining the factors that shape these clusters using a sample of 299 individual taxpayers. The results followed the well-established idea that taxpayers are not a homogeneous group and that they are stimulated and motivated to meet their tax obligations by very different mechanisms. A factor analysis was conducted that identified the following significant factors: tax audits, tax rates, complexity of the tax system, tax morale, social norms, and perceptions of fairness.

The cluster analysis identified four distinct groups of respondents based on their perceptions of the six factors significant to tax compliance. The clusters were named as follows: "Extrinsically motivated", "Morally committed", "Financially motivated", and "Socially committed" taxpayers. The first and third clusters seemed to be mostly influenced by the economic factors, while second and fourth were significantly under the influence of psychological determinants, which is somewhat similar to the Torgler's (2003) results of the typology of taxpayers. Torgler's (2003) "Intrinsic taxpayer" can be compared to a "Morally committed" taxpayer in this case, since they are driven by their individual emotions and responsibilities. The same author also identified the type of taxpayers who were socially committed (as our fourth cluster) and named them "Social taxpayers". The specificities of these clusters offer a practical solution for tailoring taxation strategies towards them. It is obvious that there are still many taxpayers who fulfil their tax liabilities because of the existence of deterrent factors such as tax audit, or the crucial role for their decision is played by a financial determinant (tax rate). But it should be noted there are also morally and socially committed taxpayers who make their decisions according to their own moral standards or taking into account the social norms in their environment. This is consistent with Braithwaite's (2003) statement about how tax compliance can be improved

by persuading and encouraging taxpayers to cooperate. Thus, the time has come for policy makers to employ such strategies and stimulate voluntary tax compliance. In addition, it needs to be emphasised that such strategies do not necessarily imply a high level of expense to the tax system. After all, researchers have lately offered significant evidence about the fact that enforcement strategies do not always bring efficiency (Mendoza et al. 2017; Kirchler et al. 2008).

This might be an opportunity to analyse and introduce a reward mechanism which, for example, redistributes the collected fines from noncompliant to compliant taxpayers in a form of a symbolic rewards (especially given its positive effects, see Fatas et al. 2021). Combatting the tax evasion problem by incorporating this new evidence about taxpayers would surely be a step forward towards service-based and trust-based climates (Kaplanoglou and Rapanos 2015; Gangl et al. 2020) beyond purely enforced interventions.

Jackson and Milliron (1986) were some of the first authors to argue that age, gender and education should always be taken into account when examining tax compliance. According to Fischer et al. (1992), sociodemographic variables have no direct influence on taxpayer compliance. However, they do show that there is a significant indirect influence that is evident in the possibility of tax evasion and attitude. Hofmann et al. (2017) made an important contribution with their meta-analysis of survey studies in 111 countries, demonstrating the importance of sociodemographic factors and arguing that they should not be neglected in future studies. In their study, they focused on age, gender, education, and income in order to estimate the impact on compliance while taking geographical regions into account. A more thorough and nuanced study of the tax compliance by the wealthy taxpayers is of utmost importance for public efficiency (Gangl and Torgler 2020). The results of this study suggest that the clustering procedure statistically differentiates the groups regarding their monthly income. Moreover, it sheds light on a better understanding of the determinants of the tax compliance of wealthy citizens and implies the need for practical solutions that would lead to an optimised and fair tax system for the middle, lower and upper class citizens. The results also point out that although it is very important to rely on an economic framework, evidence strongly suggests that taxpayers are motivated by other factors, many of them beyond purely financial. In the last 20 years of research, a whole range of potential determinants was identified; they should be acknowledged and used to incentivise tax compliance. Therefore, a major challenge for upcoming researchers is to investigate how these emerging determinants shape tax compliance. Understanding and improving tax morale and the fairness of the system as well as analysing the norms surely hold the potential to increase revenue with minimal enforcement mechanisms. This is the reason why regulatory institutions should recognise that there is no one-size-fits-all solution for taxpayers. Above all, it is an important task to initiate a change in the discussion on taxation and replace the traditional frameworks with different strategies that combine economic and socio-psychological factors (Batrancea et al. 2019). In other words, the traditional tax system infrastructure calls for measures that encourage taxpayers' willingness to pay—with or without the tax authority watching over their shoulders (Braithwaite 2003).

The results of this study raise some questions for policy makers and may help them to understand and promote voluntary tax compliance in Croatia, but they may also be a helpful starting point for research in countries with similar economic and fiscal policies. After identifying clusters and the factors behind taxpayer attitudes, these findings can hopefully stimulate future research on taxpayer heterogeneity and optimal strategies to promote tax compliance. Although this work contributes new insights to existing research, it has certain limitations that should be kept in mind. First, it focuses exclusively on income tax. However, it is well known that, in reality, taxpayers often suffer from the overall tax burden. As a result, there may be differences in taxpayer compliance. Second, despite the fact that questionnaires are widely used in the field of tax compliance research, these instruments have their own disadvantages (Alm and Torgler 2011), such as unconscientious and dishonest responses, lack of personalization, difficulties in conveying

feelings and emotions, etc. In this research, the term "general fairness," is used but it is undeniable that this is a multidimensional concept. Therefore, future research calls for more detailed elaboration and differentiation between distributive (horizontal, vertical, exchange), procedural and retributive justice. It would also be quite important to continue the discussion regarding the influence of the presence of third-party reporting (an external, economic factor) in voluntary tax compliance. In this context, in line with present studies such as that by Kleven et al. (2011), taxpayers' employment status information should indicate whether individuals are self-employed or salaried. Finally, the findings are not necessarily generalizable to the context of countries beyond Croatia (and similar countries). Future research could consider other analysis techniques, such as regression analysis or causal inference methods, including instrumental and control variables that can be used to address the potential presence of endogeneity and its impact on the interpretation of results. Moreover, future research should focus on developing this research framework and expanding it to a larger international comparative study. Conducting surveys of taxpayers from other countries could shed light on whether there are differences and similarities that could lead to the assumption that there are common characteristics in taxpayer compliance. In addition, taxpayers' perceptions and attitudes should be observed over time to better understand how fiscal changes affect taxpayer tax compliance. Finally, future studies could use a more comprehensive list of the determinants of tax compliance and extend the findings of the current study.

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9.4 APPENDED SCIENTIFIC PAPER 2: TAX COMPLIANCE DETERMINANTS: EMPIRICAL EVIDENCE FROM CROATIA

Tax compliance determinants: empirical evidence from Croatia

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TAX COMPLIANCE DETERMINANTS: EMPIRICAL EVIDENCE FROM CROATIA

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Abstract. Governments ensure majority of their revenues through taxes. If properly designed, taxation policies can be mechanisms of promoting sustainable economic development and inclusive economic growth. However, the main issue of government authorities remains achieving tax compliance among taxpayers. The question of noncompliance intersects different fields from public finance, law, ethics, and its complexity presents a challenge for the society in general.

This study aims to examine the influence of chosen economic and psychological determinants on tax compliance. In order to identify the determinants of taxpayers' behaviour, a total of 862 questionnaires were administered and collected directly from Croatian taxpayers. Partial least squares structural equation modelling (PLS-SEM) was applied to analyse the survey data. The results suggest that social norms and tax morale influence taxpayers' compliance significantly.

Overall, findings of this study contribute to the better understanding of tax compliance and its determinants in the context of a genuine paradigm shift in the field. This emphasizes the importance of including and exploring psychological determinants in tax compliance analysis.

Keywords: tax compliance, taxation policies, taxpayers' behaviour, economic determinants, psychological determinants, PLS-SEM.

JEL Classification: D91, H26.

Introduction

Taxpayer behaviour, such as tax evasion and tax avoidance, occur in developing countries, but also in developed countries. Taxpayer noncompliance is hampering government efforts to generate tax revenue. Several authors point to the fact that tackling this problem should be a priority, highlighting that recent estimate of tax evasion in the European Union (EU) alone point to a figure of 825 billion Euros per year (Murphy, 2019; Raczkowski, 2015). Not only an illegal form of tax noncompliance is a problem, but tax avoidance as well. Tørsløv et al.

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(2020) claim that in 2018 tax-avoidance strategies of multinational companies resulted in transferring more than 900 billion dollars in profits to tax havens, lowering global corporate tax receipts by 10%. They also pointed out that the highest profit loss is actually happening in (non-haven) EU countries, leaving tax authorities in the EU without 20% of their tax revenues.

In Croatia, fiscal reform began in 1992. Since then, there have been many modifications to the tax system complemented by legislative changes. As a result, from the taxpayers' perspective, the system can be described as complex. Cvrlje (2015) points to the fact that ensuring stability and reducing the complexity of Croatian tax system is indeed a challenge, and this is related to the fact that the Croatian legislation, with regard to finance, budget and taxes is not clear enough. Moreover, taxpayers' very low trust in authorities and their perception of tax administration's inefficiency and corruption open up many issues and lead to complex tax-related challenges. The numbers on tax revenues follow these premises, since Croatia is among the countries with the lowest tax-to-GDP ratio in the EU. According to Eurostat (2022), current taxes on income, wealth, etc. as a ratio to GDP amounted to 13.0% in the EU in 2020. On one side lies Denmark, which raised the equivalent of 30.9% of GDP from these taxes in 2020, while Romania (4.7% of GDP), Bulgaria (5.9% of GDP) and Croatia (6.5% of GDP) hold the opposite side of scale. When comparing the size of the shadow economy, Bulgaria, Romania and Croatia remain the hot topic in EU context (ATKearney, 2013).

As well as being a significant problem for the economy and society, tax compliance has attracted the attention of scientists willing to explore the factors behind it. Many studies investigated corporate income tax or constructs like tax evasion, corruption, and the underground economy (Allingham & Sandmo, 1972; Braithwaite, 2017; Nguyen et al., 2020; Richardson, 2006). However, understanding individual taxpayers' attitudes towards taxation is challenging for researchers and has become their focus in last two decades. While the research so far has established two main types of taxpayer behaviours (compliance and noncompliance), it has not fully investigated the determinants that influence and drive these behaviours. Although it is important to follow the traditional economic framework, more recent research strongly suggests that taxpayers are motivated by other factors (Kirchler, 2007; Alm et al., 2012; Alm, 2019; Nguyen et al., 2020). The evolution of research topics in the tax compliance field has begun to recognise the importance of social and psychological factors. As a result, a whole range of potential determinants that can be used to encourage tax compliance has been identified. The biggest challenge for future researchers, therefore, is to analyse how "non-economic" determinants affect taxpayers' behaviour.

This research was aimed to identify and establish these determinants in Croatia. The compliance data and information on economic and psychological factors were collected directly from taxpayers through questionnaires administered online to mobile phones and social networks. Furthermore, empirical research determined the correlation between the selected determinants with tax compliance using partial least squares structural equation modelling (PLS-SEM).

Research results follow a paradigm shift present in the field and emphasize that traditional economic tools are becoming less influential in ensuring tax compliance. If there is an awareness about limited tax evasion by the majority of compliant taxpayers, this makes

people more willing to comply with their tax liabilities (Walsh, 2012). Based on the findings presented here, the authors join the challenging new context with an idea to shape softer policy measures which would stimulate the culture of voluntary tax compliance (Kirchler, 2007; Williams & Puts, 2017; Franić, 2020).

Keeping these results in mind, it is now possible to create tailored made tax model that would encompass unique tax climate as well as Croatian taxpayers' habits and behaviour. This personalised approach to taxpayers' noncompliance is enabling government authorities to predict this effect more accurately and empowers them to create tailor-made tax policies. Finally, the findings based on this research and data related to Croatian taxpayers will provide an insight into tax policy through the taxpayers' perspective of themselves and potentially be useful to countries with similar economic and fiscal policies. Additionally, this study may be useful to bring to light peculiarities of Croatian taxpayers as opposed to other EU members taxpayers.

The structure of the paper is as follows: after a short introductory part, a theoretical background is presented to emphasize the most relevant findings on the subject matter. The next section focuses on the methodology used and the data obtained. The fourth part elaborates the research results. Finally, the last section provides the discussion, conclusions, limitations, and the direction of further research.

1. Theoretical background

The first step in a coherent approach to the topic of tax compliance is to adequately define it. In the literature, it is often emphasised that tax compliance is a complex concept which is influenced by a large number of determinants (Hashimzade et al., 2013; Onu et al., 2019). Jackson and Milliron (1986) define tax compliance behaviour as reporting all income and tax liabilities and paying taxes to the tax authorities by following the relevant tax laws, regulations, and tax orders. Roth et al. (1989) emphasize that compliance means fulfilling tax liabilities accurately and in accordance with the legal framework.

These definitions and their authors rely solely on an economic perspective of taxpayer behaviour. They follow the so-called traditional economic theory of crime and all its related theories (Allingham & Sandmo, 1972; Cowell, 1981; Pencavel, 1979; Srinivasan, 1973; Yaniv, 1999; Yitzaki, 1974). In terms of tax compliance, these models assume that tax payments are made only because of the economic deterrence.

A step away from traditional theories was made by Andreoni et al. (1998), who introduced a concept of taxpayers' willingness to comply with all legal frameworks, inter alia, with the goal of maintaining country's economic stability. James and Alley (1999) define tax compliance as a taxpayers' willingness to follow the "spirit and letter" of tax law and administration, implying that this should be without the use of any coercive activities. In doing so, the authors emphasize the importance and complexity of convincing taxpayers to respect the above mentioned. These authors later give a more precise description of tax compliance as a wide range of behavioural choices for taxpayers to adjust to society's overall goals, all in line with tax policy (James & Alley, 2002).

More recent research in the last two decades has led to the awareness that taxpayer behaviour and its analysis should include other, especially psychological, determinants. In this regard, studies suggest that the tax compliance and its mechanisms cannot be fully explained by purely economic considerations, just as deterrence is not the key to achieving it (Kirchler, 2007; Torgler, 2011; Alm et al., 2012; Marandu et al., 2015; Alm, 2019; Enachescu et al., 2019; e Hassan et al., 2021). The behaviour of taxpayers has become an important subject of consideration for both developed and developing countries, and the focus has been on the taxpayers' responsibility and willingness to declare income and thus participate in defining their tax liability (Inasius, 2019).

Of the authors who have recently tried to give a universal definition of tax compliance, Kirchler (2007) described it as the taxpayers' willingness to respect their tax obligations. Furthermore, Alm et al. (2012) argued that it was becoming increasingly clear that taxpayer behaviour could not be analysed solely under the classical economic considerations, thus introducing a psychological perspective. Through it, tax compliance determinants range from tax audit and penalties to attitudes, social norms, and fairness. Moreover, there is a body of empirical evidence on the impact of the whole spectrum of determinants that needs to be included when researching and analysing taxpayer behaviour (Alm, 2019). It is, therefore, extremely important to consider those determinants in both the research on the topic, and in the case of tax policy interventions (Alm et al., 2020). For the purpose of this research, authors compiled a table referring to the prior research on tax compliance determinants. This table also served as a basis for the idea of combining diverse tax compliance determinants when setting a research model.

As can be seen from Table 1, some authors offer evidence about the crucial role of economic determinants such as audits and sanctions (Kleven et al., 2011; Nguyen et al., 2020). Conversely, Richardson (2006) and Christian and Alm (2014) argue that non-economic determinants have the strongest impact on taxpayers' behaviour. Even though their analysis proves audits are effective in achieving tax compliance, Alm et al. (2020) suggest that policy makers should be cautious about this and avoid generalization due to the taxpayers' heterogeneity. Franić (2020) suggests that intrinsic factors, namely tax morale, stand out as a key component regarding Polish taxpayers' compliance. Górecki and Letki (2020) emphasize the significance of norms in the tax compliance model, suggesting that strong subjective norms can even replace penalties and their deterrent effect. Saad (2014) claims that high tax complexity can be contributing factors towards taxpayers' non-compliance, suggesting that this problem can be solved through better education and system and tax law simplification. Similar findings are available regarding the fairness perceptions of taxpayers. Farrar et al. (2018) and Hartner et al. (2008) emphasize that if taxpayers perceive the tax system as fair, then it is possible to incentivize voluntary compliance and, in so doing, mitigate tax avoidance and tax evasion.

In general, there is a strong trend towards the idea that enforcement mechanisms or tax rate levels may not be a first-choice tool towards ensuring taxpayers' compliance (Matthews, 2005; Christian & Alm, 2014; Swistak, 2016; Górecki & Letki, 2020).

Table 1. Prior research on tax compliance determinants (source: authors' own compilation, 2021)

Authors (Year)	Economic Determinants	Psychological Determinants	Methodology	Sample
Wenzel (2004)	Personal norms	Social norms	Regression analysis	Australian citizens (valid N = 1,406)
Torgler and Schneider (2005)		Tax morale	Regression analysis	Austria's individual taxpayers, WVS/EVS data
Richardson (2006)	Income source Marginal tax rates	Self-assessment Tax morale Fairness Complexity	Regression analysis	45 countries
Bobek et al. (2007)		Subjective norms Personal norms	Factor analysis	student and non-student population (Australia, Singapore, and the U.S.)
Blanthorne and Kaplan (2008)	Opportunity to underreport	Ethical beliefs Social norms	SEM	355 individual taxpayers (USA)
Hartner et al. (2008)		Procedural fairness	Structural equation modelling (SEM)	Secondary data
Kleven et al. (2011)	Audit probability		Regression analysis	42800 income taxpayers
Bott et al. (2014)	Detection probability	Moral appeals	Regression analysis	18,000 taxpayers in Norway
Christian and Alm (2014)		Sympathy Empathy	Experimental methods	100 participants (undergraduate and graduate students)
Helhel and Ahmed (2014)	Tax rates Audits Penalties	Tax complexity Tax knowledge Fairness	Regression analysis	170 individual taxpayers (Yemen)
Saad (2014)		Tax Knowledge Tax complexity	Thematic analysis	30 individual taxpayers (New Zealand)
Dwenger et al. (2016)	Audit probability	Tax simplification Tax misperception Compliance rewards	Regression analysis	40,000 individual taxpayers in Bavaria, Germany
Doerrenberg and Schmitz (2017)		Information transmission Morale appeals	Regression analysis	142 small accounting firms in the Slovenian region of Kranj
Hallsworth et al. (2017)		Social norm messages	Large-scale natural field experiments	Secondary data – 200,000 individuals in the UK
Farrar et al. (2018)		Fairness	Exploratory factor analysis (EFA), Structural equation analysis (SEA)	sample of 501 individual taxpayer (USA)

End of Table 1

Authors (Year)	Economic Determinants	Psychological Determinants	Methodology	Sample
van Dijke et al. (2019)		Procedural and distributive justice Citizens' perceptions of the tax authority's power	Regression analysis	273 taxpayers from Ethiopia & 248 from USA
Onu et al. (2019)		Personal norms Fairness Societal norms Tax knowledge	Exploratory factor analysis Regression analysis	330 owners or part-owners of micro-business in the UK
Alm et al. (2020)	Audit rate		Regression analysis	278 subjects (students) across the five experimental studies
Cranor et al. (2020)	Financial incentives	Social norms	Regression analysis	Delinquent Taxpayers
Crnogorac and Lago-Peñas (2020)		Tax morale	Regression analysis	Former Yugoslavian countries – data from EVS (individual taxpayers)
Franić (2020)	Financial problems Detection risk Expected sanctions	Tax morale	Regression analysis	Secondary data
Górecki and Letki (2020)	Tax rate Penalties	Fairness Norms	Regression analysis	1500 individual taxpayers in 14 CEE countries

2. Methodology and hypotheses development

Researching, analysing and understanding taxpayer behaviour has always been a challenging task, regardless of the specificity of the data source or methodology (Alm & McKee, 2006; Alm, 2019). Understandably so, since noncompliant taxpayers' intent to cover up that behaviour. Despite problems with the data and methodologies in the field of this topic, they provide new insights into the topic and contribute new ideas as well as new solutions. Based on the relevant literature and theoretical approach created by Alm et al. (2012), we propose the research model presented in Figure 1.

While the established economic framework of tax compliance is still acknowledged in the field, more recent studies strongly suggest that taxpayers are motivated by a combination of diverse factors (Marandu et al., 2015; Dwenger et al., 2016; Onu et al., 2019; Franić, 2020). As a result of this process, the whole research paradigm has been changed and shifted from economic towards psychological perspective (Alm et al., 2012). This study follows the idea of paradigm shift and combines three economic and four psychological determinants of tax compliance in the model. Hypotheses are, therefore, as follows:

H1a: Tax audits have a significant impact on taxpayers' compliance.

H1b: Tax rates have a significant impact on taxpayers' compliance.

H1c: Sanctions have a significant impact on taxpayers' compliance.

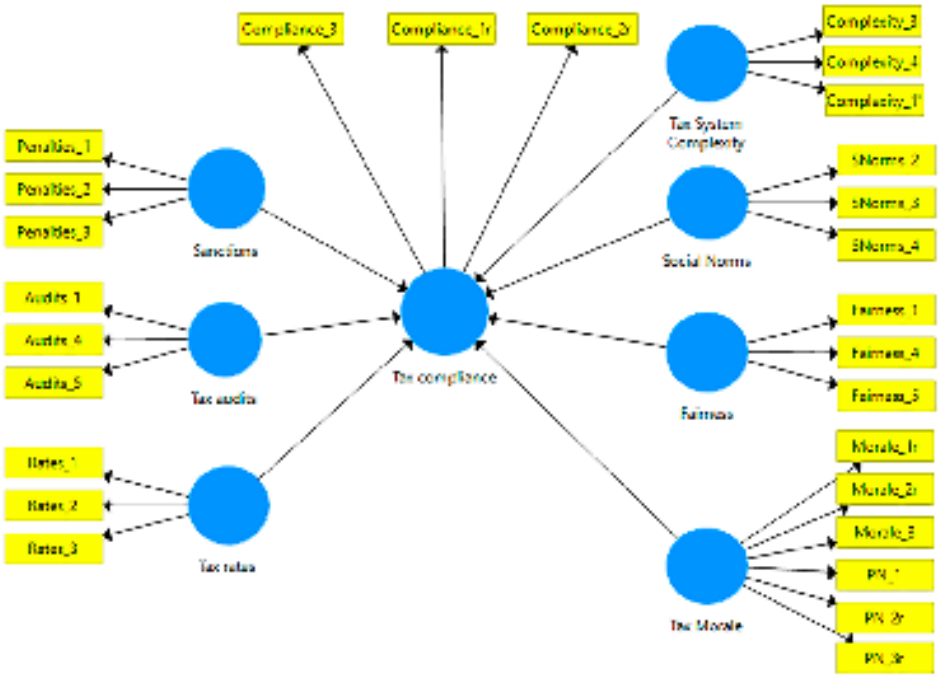

Figure 1. Croatian Tax compliance model (2021)

H2a: The complexity of tax laws and the tax system has a significant impact on taxpayers' compliance.

H2b: Taxpayers' social norms have a significant impact on their tax compliance.

H2c: Taxpayers' fairness perceptions of the tax system have a significant impact on their tax compliance.

H2d: Taxpayers' tax morale has a significant impact on their tax compliance.

2.1. Research design

In order to identify the economic and psychological factors that determine tax compliance, primary research was conducted using the survey method. The measuring instrument in the empirical research was a structured questionnaire in the Croatian language, designed on the basis of previously used and tested measuring instruments and scales from the relevant literature (Kirchler et al., 2006; Hauptman et al., 2015; Tenidou et al., 2015; Onu et al., 2019; van Dijke et al., 2019). For the research, this was pretested and piloted, to check the content validity and reliability of the questionnaire before conducting the main survey. After that, the questionnaire was slightly modified due to the specificities of the Croatian tax system.

The questionnaire contains four sections: economic determinants (9 items), psychological determinants (15 items), tax compliance (3 items) and sociodemographic characteristics (gender, education level, employment status, monthly income, seniority). The Likert scale

was applied, and respondents expressed their degree of agreement on a five-point scale (1 – I completely disagree, 5 – I completely agree). Sociodemographic characteristics were examined by multiple-choice questions.

2.2. Data collection

The main issue in the survey empirical research is identifying statistically significant sample. There are different recommendations for the sample size. The PLS-SEM method does not require that the variables have a normal distribution; it is suitable for achieving quite precise results with a small sample. However, there are recommendations that the sample size should be at least ten times larger than the largest number of formative indicators for a single construct or ten times larger than the largest number of structural paths in the model (Nunnally & Bernstein, 1994; Hair et al., 2014b). According to these recommendations, for the purposes of this study, authors estimated sample size of 700 respondents.

Based on the objectives and hypotheses set, the above research was conducted in the Republic of Croatia on a random sample of Croatian individual taxpayers (income tax). The sampling was based on the willingness and availability of participants to complete the questionnaires. The study was conducted in Croatia from October 2021 to January 2022. For this purpose, 2 subsamples were examined – one by mobile phone invitations (from a phone book), and the other through social network invitations (Facebook and Instagram). Targeting two specific sociodemographic groups, these subsamples were combined to achieve the greatest possible representativeness of the sample in relation to population parameters (inspired by Rinken et al., 2020). A total of 862 responses were valid and accepted for this study, representing a response rate of 60.9%.

Another important component, the ethical behaviour of researchers, was considered when planning and conducting research, since the sensitivity of the topic is undeniable. The guidelines that serve as expected ethical behaviours are widely accepted in the scientific community, as stated by Bhattacherjee (2012): voluntary participation of respondents in research, guaranteed anonymity of respondents and confidentiality of data, a statement of the purpose of the study and a guarantee that all collected data will only be used for scientific research purposes only.

2.3. Data analysis

Partial least squares structural equation modelling was applied to analyse the survey data, through SmartPLS 3.0 software (Ringle et al., 2015). PLS-SEM is widely used in a variety of fields, from marketing to behavioural sciences. It is more and more popular due to its ability to model latent constructs under conditions of non-normality and small to medium sample sizes (Hair et al., 2014a). So far, few authors have recently used this method in the field of tax compliance research (Saad, 2012; Inasius, 2019; Djajanti, 2020; Ya'u et al., 2020; e Hassan et al., 2021).

The preliminary analysis was processed using Statistical Package for Social Sciences (SPSS), version 20.0. The purpose was to obtain basic information, a summary of the structure and characteristics related to the tested sample. A summary of the respondent's profile can be seen in Table 2.

Table 2. Respondent's profile (2022)

Category		Number	Percentage
Gender	Female	490	56.8
	Male	372	43.2
	Total	862	100.0
Age	18–24	18	2.1
	25–34	113	13.1
	35–44	289	33.5
	45–54	148	17.2
	55–64	116	13.5
	>65	178	20.6
	Total	862	100.0
Education	High school or less	246	28.5
	Diploma/Bachelor's	137	15.9
	Master's	355	41.2
	Postgraduate	124	14.4
	Total	862	100.0
Working experience	<5 years	82	9.5
	6–20 years	414	48.0
	>20 years	366	42.5
	Total	862	100.0

After assessing the demographic profile of the sample, SmartPLS 3.0. was employed to test the measurement and structural model. The following sections present a detailed evaluation of both measurement and structural model.

3. Findings

According to Hair et al. (2014a), the recommended two-stage analytical procedures for PLS-SEM include testing the measurement model (validity and reliability of the measures) and then the structural model.

To examine the reflective measurement model, convergent validity was first tested. This was done through factor loadings, composite reliability (CR), and average variance extracted (AVE). Table 3 shows result of this assessment.

Table 3 shows that all item loadings exceed 0.5 which is regarded as acceptable value (Chin, 1998). For reflective models, these indicators depict the trajectory of the latent variable towards the observed variables. The composite reliability results also indicated that the measures were robust in terms of internal consistency reliability, since they are all above the acceptable level of 0.7. Finally, the average variance extracted, indicating the amount of variance in the indicators accounted for by the latent construct, exceeds the recommended value of 0.5 (Hair et al., 2014a).

Table 3. Validity and reliability for constructs

Constructs	Items	Loadings	AVE	CR
Tax Audits	Audits_1	0.775	0.651	0.848
	Audits_4	0.804		
	Audits_5	0.841		
Sanctions	Penalties_1	0.618	0.689	0.866
	Penalties_2	0.923		
	Penalties_3	0.913		
Tax Rates	Rates_1	0.940	0.693	0.870
	Rates_2	0.828		
	Rates_3	0.715		
Tax System Complexity	Complexity_3	0.516	0.609	0.817
	Complexity_4	0.882		
	Complexity_1'	0.885		
Social Norms	Snorms_2	0.879	0.628	0.833
	Snorms_3	0.835		
	Snorms_4	0.643		
Tax Morale	Morale_1r	0.726	0.522	0.867
	Morale_2r	0.798		
	Morale_3	0.654		
	PN_1	0.663		
	PN_2r	0.698		
	PN_3r	0.784		
Fairness	Fairness_1	0.611	0.608	0.819
	Fairness_4	0.913		
	Fairness_5	0.786		
Tax Compliance	Compliance_1r	0.775	0.611	0.825
	Compliance_2r	0.741		
	Compliance_3	0.827		

Next step in analysis is assessing the discriminant validity outcomes. They determine whether the constructs in the model are correlated among themselves. It is aimed to assess that a reflective construct has the strongest relationships with its own indicators in the PLS path model (Hair et al., 2022). Table 4 demonstrates adequate discriminant validity, since diagonal values (square root of the AVE) of each construct are larger than its corresponding correlation coefficients (Fornell & Larcker, 1981).

However, Henseler et al. (2015) argue that the above-mentioned approach does not reliably recognize the lack of discriminant validity in common research situations. Therefore, they suggest the use of alternative approach, based on the multitrait-multimethod matrix, to assess discriminant validity: the heterotrait-monotrait ratio of correlations (HTMT). The results of this alternative method are presented in Table 5. As it can be seen, all values are below the recommended HTMT.90 (Gold et al., 2001).

Table 4. Discriminant validity

Constructs	1	2	3	4	5	6	7	8
Fairness	0.780							
Sanctions	0.218	0.830						
Social Norms	0.221	0.269	0.793					
Tax Morale	0.187	0.223	0.413	0.723				
Tax System Complexity	0.324	0.164	0.193	0.141	0.781			
Tax Audits	0.339	0.448	0.259	0.140	0.170	0.807		
Tax Compliance	0.180	0.198	0.374	0.646	0.136	0.119	0.782	
Tax Rates	–0.242	0.195	0.076	0.002	0.010	0.014	–0.037	0.833

Table 5. Heterotrait-monotrait (HTMT)

Constructs	1	2	3	4	5	6	7
Fairness							
Sanctions	0.306						
Social Norms	0.389	0.367					
Tax Morale	0.230	0.282	0.511				
Tax System Complexity	0.468	0.199	0.260	0.160			
Tax Audits	0.518	0.586	0.383	0.176	0.240		
Tax Compliance	0.228	0.264	0.495	0.852	0.160	0.167	
Tax Rates	0.291	0.277	0.117	0.101	0.058	0.051	0.095

In the next step, structural model assessment follows. According to the recommended procedure (Hair et al., 2014b), structural model is estimated through the following criteria:

1. path coefficient (β) for strength and direction of relationships between latent variables;
2. t-values;
3. coefficient of determination (R2).

In addition to this, it is also suggested that one should report the predictive relevance (Q2) and the effect sizes (f2). Table 6 shows structural estimates.

To test hypotheses H1a-c and H2a-d the significance of the β coefficients and their p-values, were assessed. As it can be seen, the effects of social norms ($\beta = 0.122$, p-value = 0.000) and tax morale ($\beta = 0.582$, p-value = 0.000) on tax compliance were positive and significant. Therefore, hypotheses H2b and H2d were supported. In addition to this, all factual t-values were greater than 2.58 at ($p < 0.01$) which indicates the confirmation of above-mentioned hypotheses in the research. In other words, taxpayers will be willing to comply if people in their surroundings are compliant as well, which is in line with the previous studies that emphasize the potential and importance of including social norms in the tax compliance research (Hanno & Violette, 1996; Alm et al., 1999; Davis et al., 2003; Wenzel, 2005; Slemrod, 2016; Alm, 2019). As a taxpayers' intrinsic motivation and sense of duty in paying taxes, tax morale is a tax compliance determinant existing regardless of legal rules (Torgler & Schneider, 2009; Mitrakos et al., 2014). Research results suggest that compliance significantly depends upon an individual's tax morale, which is similar to previous results by Frey (1997) and Franić (2020).

Table 6. Structural estimates (hypotheses testing)

HYPOTHESES	Beta	Standard Deviation (STDEV)	T Value	P Values	Decision
H1a: Tax Audits -> Tax compliance	–0.026	0.031	0.836	0.403	Not supported
H1b: Tax Rates -> Tax compliance	–0.052	0.036	1.454	0.146	Not supported
H1c: Sanctions -> Tax compliance	0.049	0.033	1.494	0.135	Not supported
H2a: Tax System Complexity -> Tax compliance	0.020	0.028	0.701	0.483	Not supported
H2b: Social Norms -> Tax compliance	0.122	0.032	3.840	0.000	Supported
H2c: Fairness -> Tax compliance	0.023	0.030	0.778	0.437	Not supported
H2d: Tax Morale -> Tax compliance	0.582	0.029	20.312	0.000	Supported

Note: * Critical t-values 2.58 ($p < 0.01$).

Based on these results, techniques such as "nudge" should be considered as a valuable tool for a gentle push made by governments (especially in the surroundings where the role of social norms is significant). As Peša et al. (2021) pointed out, there is a lack of nudging mechanisms in Croatian public policy and its future reforms should certainly incorporate nudging. In addition to this, Riahi-Belkaoui (2004) implicated that increasing tax compliance can be achieved through campaigns that highlight the sense of duty and solidarity linked to the fulfilment of personal tax duties. Such campaigns have already been presented and effectively used in the UK in the field of public health, pension system, education system as well as the tax system (Peša et al., 2021). Similar nudging mechanisms are incorporated in EU agency's campaign, and this is definitely a tool that should be widely used in Croatia, according to these research results.

On the other hand, the effect of tax audits ($\beta = -0.026$, p-value = 0.403), tax rates ($\beta = -0.052$, p-value = 0.146), sanctions ($\beta = 0.049$, p-value = 0.135), tax system complexity ($\beta = 0.020$, p-value = 0.483), and fairness ($\beta = 0.023$, p-value = 0.437), was not significant. Therefore, hypotheses H1a, H1b, H1c, H2a and H2c are not supported.

The R2 value of the dependent variable was also examined, analysing exogenous variables' combined effect on the endogenous variable. R2 value of 0.437 suggests that 43.7% of the variance of tax compliance is explained by this model. Cohen (1988) uses values 0.26 (substantial), 0.13 (moderate) and 0.02 (weak), which in this case shows substantial explanatory power of the dependent variable.

In the next step, effect sizes (f2) are estimated. It can be determined by calculating change in R2 value when a specific construct is eliminated from the model. According to Cohen's (1988) guidelines, value of 0.02 is for small effects, 0.15 for medium effects, and 0.35 for large effects. As it can be seen in Table 7, the effect size of tax morale on tax compliance was large and of social norms on tax compliance was small. Effect size of all other exogenous constructs on endogenous construct was none.

In the last step, we tested the predictive relevance of the model (Q2) through the blindfolding procedure. A Q2 value greater than 0 means that the model has predictive relevance, while less than 0 means the model has no predictive relevance. In our research, Q2 was estimated using cross-validated redundancy procedures and the value gained is Q2 = 0.256 with acceptable predictive relevance.

Table 7. Relative effect size

	Relative effect size (f^2)	Assessment
Fairness	0.001	None
Sanctions	0.003	None
Social Norms	0.020	Small
Tax Morale	0.485	Large
Tax System Complexity	0.001	None
Tax Audits	0.001	None
Tax Rates	0.004	None

Conclusions

Investigating the patterns of taxpayer behaviour is a prerequisite of functional taxation policies and systems as well. The need for comprehensive empirical research on this topic arises from the actual problem of low tax compliance levels and its impact on the economy, but also on society as a whole. With these priorities in mind, it is necessary to identify the relevant determinants of tax compliance and thus highlight the potential for improvements in the tax system.

This study's main goal was to evaluate the economic and psychological determinants that form tax compliance of Croatian taxpayers. The purpose was to achieve better understanding of the crucial tax compliance determinants, through the analysis of taxpayers' attitudes towards taxation. This can certainly be a step forward to an improved voluntary compliance and the efficiency of the tax administration. A growing body of literature in this field suggests tax compliance is determined by a whole palette of determinants – from pure economic, such as audits and penalties, to psychological like norms and fairness. By combining three economic and four psychological determinants, this paper offers detailed insight into the decision-making process of 862 Croatian taxpayers. This research proposed that tax rate, tax audit, sanctions, tax system complexity, fairness perception, social norms and tax morale are indicators that measure tax compliance.

The contribution of this work lies in the determination of economic and psychological factors for the future strengthening of tax compliance in the Republic of Croatia, as well as testing the impact of established economic and psychological factors on tax compliance. Regarding the practical implications of the study, research results further enrich the understanding of taxpayers' behaviour. The contribution is also visible through new insights into the importance of psychological determinants for tax compliance, the ability to improve cooperation within the tax system and predict the future behaviour of taxpayers, all with the aim of reducing tax evasion.

After the analysis in PLS-SEM, results suggest that social norms and tax morale impact positively and significantly the compliance process. Confirming the hypothesis about social norms means that knowledge about family, friends and peer behaviour can be prevalent in one's compliance decision.

These results also bring to light the fact that Croatia's economic and political specificities (such as low public sector efficiency and trust in government) can play a key feature in the minimalisation of unwilling tax behaviour. By confirming the influence of tax morale on tax compliance, these research results suggest that more actions should be aimed towards increasing the level of taxpayers' tax morale and using this as a preventive tool as well as a part of taxation strategy.

These findings follow a paradigm shift in the field, implying that deterrence and traditional economic tools have less and less influence in ensuring tax compliance. In general, educating citizens about the importance and role of taxes in society can be a good starting point in minimising tax avoidance and evasion. Apart from the encouragement to advance our knowledge about these issues, the paper calls for the government actions to put more emphasis on improving the psychological contract between the state and citizens. It also seems crucial to shape softer policy measuers in the light of voluntary tax compliance.

Study has couple limitations, that result from the complexity of the topic. First one is related to the study's sample. It is comprised of taxpayers' population, while non-taxpayers' perspectives is something that could also provide an interesting addition. Similar to this, only income taxpayers were in focus of the research, while there is no doubt that the overall tax burden is significantly bigger. And finally, regardless of the wide use of questionnaires in tax compliance research, these instruments can have their own limitations. It is recommended for future studies to consider experimental methods to avoid some of the obstacles in analysing taxpayers' behaviour.

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9.5 APPENDED SCIENTIFIC PAPER 3: THE DIRECT AND MODERATING EFFECT OF SOCIODEMOGRAPHIC VARIABLES ON TAX COMPLIANCE BEHAVIOUR

The direct and moderating effect of sociodemographic variables on tax compliance behaviour

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THE DIRECT AND MODERATING EFFECT OF SOCIODEMOGRAPHIC VARIABLES ON TAX COMPLIANCE BEHAVIOUR

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Abstract

The purpose of this study is to empirically examine whether taxpayers' age, gender, income, and education level impact their (non)compliance. It expands the analysis through the investigation of the moderating role of selected sociodemographic variables. This research was operated in Croatia and in total it comprised 862 fully completed questionnaires. Based on this sample of individual taxpayers (income tax), to interpret the obtained results, OLS regression analysis was employed. The moderation model has been used to explore the influence of sociodemographic variables on tax compliance. The study discloses several results. First, it demonstrates that taxpayers' age, gender, and education level are significantly associated with their compliance behaviour. In addition to this, the results confirm moderating role of gender, education level, and income level on chosen tax compliance determinants. The findings of this research contribute to policy implications in understanding the groups that require additional attention to create adequate and efficient fiscal strategies.

Keywords: *tax compliance; age; gender; income level; education level; fiscal strategies*

JEL classification: *D91; H26*

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1. Introduction

According to Eurostat data for the European Union (27 member states - EU-27), tax revenues (including social contributions) amounted to 6.058 billion EUR in 2021. The average percentage of income from taxes and social contributions in the EU-27 in 2021 was 41.7% of GDP. In 2021, tax revenue to GDP ratio was highest in Denmark (48.8 % of GDP), France (47.0 % of GDP) and Belgium (46.0 % of GDP), while being the lowest in Ireland (21.9 % of GDP), Romania (27.3 % of GDP), and Bulgaria (30.7 % of GDP) (Eurostat 2023).

Despite these differences in percentages, it is obvious that the tax revenues form the basis of governments' budgets. Therefore, the issue of achieving

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appropriate tax compliance levels is a universal challenge and a basic prerequisite for a stable society and its economy. Ensuring an adequate amount of public revenues through taxes cannot be simplified and observed as fighting the tax evasion and tax avoidance. Governments can surely increase their necessary revenues by achieving better tax compliance, without raising tax rates (D'attoma, Volintiru, and Malézieux 2020). Given its importance, taxpayers' behaviour should be analysed and the results of this should be an important guideline for policy makers.

Taxpayers' motivation to behave as compliant differs in many ways. Some are motivated by purely economic factors, others are influenced mostly by social or psychological determinants while in many situations there are various combinations of these motivational postures that play a role in taxpayers' behaviour (Alm 2019). While there is still no consent regarding the crucial tax compliance determinants, the debate is quite active on the role of sociodemographic categories such as age, gender, income, and education level as well. There is a vast amount of literature demonstrating that sociodemographic variables play a significant role in tax compliance levels (Eriksen and Fallan 1996; Hasseldine 1999; Chung and Trivedi 2003; Bobek, Roberts, and Sweeney 2007; Kastlunger et al. 2010; Doerrenberg and Peichl 2013; Hofmann et al. 2017; Bruner, D'Attoma, and Steinmo 2017). However, there are also studies that found no evidence of the relationship between sociodemographics and tax compliance (Wenzel 2002; Ashby, Webley, and Haslam 2009; Richardson 2006). Even though the research has not yet resulted in consensus, in their meta-analysis Hofmann et al. (2017) conclude that these variables are an indispensable component of the tax compliance models and might even interact with other tax compliance variables.

After evaluating the effect that age, gender, education level, and income level have on the tax compliance, this study highlights the importance of including sociodemographics when analysing taxpayers' behaviour. It also points to the fact that taxation authorities need to employ different strategies that take into account the fact that taxpayers are a dynamic and heterogenous group.

The paper is organised as follows. After exposing a brief framework of the topic through the introductory section, a summary of theoretical background and presentation of the hypotheses is given. Section 3 describes the methodological part, while section 4 elaborates empirical results. Finally, concluding remarks are given in the last section.

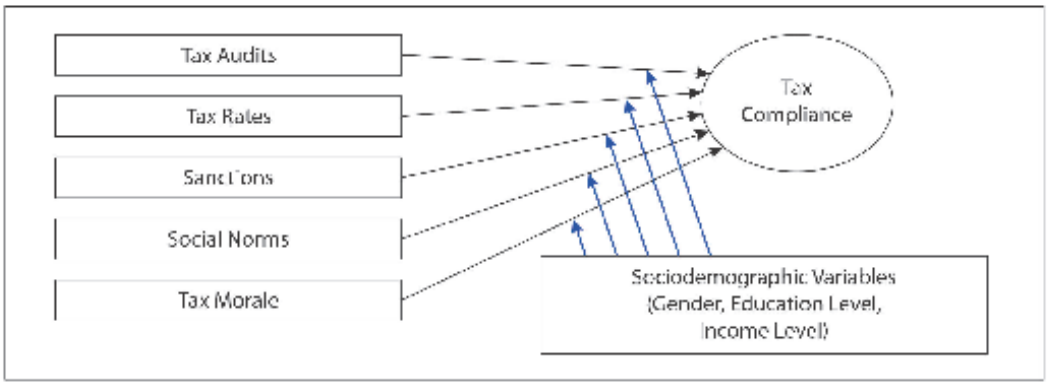
2. Literature Review and Hypothesis Development

Prior research reveals two main approaches towards the issue of taxpayers' behaviour. Conventional ones are based mostly on enforcement mechanisms (Allingham and Sandmo 1972; Andreoni, Erard, and Feinstein 1998; Slemrod and Yitzhaki 2002; Devos 2007; Bruno 2019). In the core of these models is the idea that, to ensure tax compliance, fiscal authorities should use deterrence and punishment as their key tools. According to these, more traditional and mainly economic models, determinants of compliance behaviour are factors such as tax audits, penalties, tax rates and evasion opportunity. Even though these models still form a basis regarding tax compliance research and have evolved through the years, they faced a significant amount of criticism. Main arguments emphasize the fact that economic approach ignores the human element in the complex process of tax compliance decision (Cullis and Lewis 1997; Alm 2012).

As a response to this criticism, behavioural approach emerged in the tax compliance research. A large number of studies have demonstrated that taxpayers' behaviour is determined by a combination of a different sociological and psychological factors such as tax morale, norms, fairness, or tax knowledge (Jackson and Milliron 1986; Torgler and Schneider 2007; Kirchler, Hoelzl, and Wahl 2008; Richardson 2008; Braithwaite 2009; Olsen et al. 2018; Hartmann et al. 2022; Levenko and Staehr 2022).

Among these new ideas about involving the behavioural component into tax compliance model, the idea of including the sociodemographic variables also became a hot topic. Studies provide mixed evidence (positive, negative and no influence) of age, gender, income, and education level and tax compliance relationship (Warneryd and Walerud 1982; Christian and Gupta 1993; Hite 1997; Park and Hyun 2003; Loo 2006; Torgler 2007; Bobek et al. 2007; Richardson 2008). In further sections more thorough literature review on the impact of sociodemographic variables on tax compliance is given. Jackson and Milliron (1986) pointed out that sociodemographics should be included in tax compliance research. According to Fischer, Wartick, and Mark (1992), the above-mentioned variables do not directly influence taxpayers' compliance. However, in their study they claim there is a significant indirect impact, evident through evasion opportunity as well as attitudes. The proposed research model is shown in Figure 1.

Figure 1. Proposed research model



2.1. Age and Tax Compliance

Results of previous studies indicated that the profile of compliant taxpayers could be described as: younger individuals (versus older), who describe their marital status as unmarried (versus married), and who are self-employed (versus employed) (Wahlund 1992; Beron, Tauchen, and Witte 1992; Erard 1993; Erard and Ho 2001; Alm, Bloomquist, and McKee 2017). However, there are also studies providing evidence that older taxpayers are significantly more compliant (Eriksen and Fallan 1996; Andreoni, Erard, and Feinstein 1998; Orviska and Hudson 2002; Cummings et al. 2009). In addition to this, Muehlbacher, Kirchler, and Schwarzenberger (2011) noted that voluntary tax compliance was positively related to age, while there is no relationship between enforced tax compliance and age. McKerchar (2002) and Kirchler, Niemirowski, and Wearing (2006) offer the explanation that younger taxpayers possess less knowledge about taxation, and they consider this as an obstacle to more compliant behaviour. Some studies have found a connection between a less developed sense of moral obligation and the tax compliance of younger taxpayers (Orviska and Hudson 2002). In their meta-analysis, Hofmann et al. (2017) confirmed that older taxpayers have a disposition to comply more. We, therefore, hypothesise that:

H1. There is a relationship between taxpayers' tax compliance and their age structure.

2.2. Gender and Tax Compliance

Literature offers strong evidence that women are less likely to involve in any kind of risky situation (Seid and Fissha 2020; Clarke 2021). Research on tax compliance behaviour and gender further emphasizes their risk aversity by suggesting that women are more willing to cooperate and less prone to tax evasion than men (Hasseldine 1999; Hasseldine and Hite 2003; Gërxhani 2007; Torgler and Schneider 2007; Kastlunger et al. 2010). Kastlunger et al. (2010) based their explanation on socialization context and biological differences. Furthermore, Bruner, D'Attoma, and Steinmo (2017) analysed tax compliance and gender differences in the United States of America, Sweden, the United Kingdom, and Italy. Authors concluded that women are less likely to cheat on taxes than men are, despite regional and cultural differences. Sunardi et al. (2022) empirically examined implications of female top managers' presence regarding corporate tax compliance. Their results suggested that female presence in the above-mentioned firm levels is a significant factor that stimulates tax compliance. In their meta-analysis, Hofmann et al. (2017) concluded that women are prone to comply with tax liabilities more than men, but the impact of gender was defined as rather small.

However, Jackson and Milliron (1986) presented mixed results on gender as a predictor of compliance. Chung and Trivedi (2003) concluded that women are more compliant only after being offered a plausible explanation to pay taxes. Wenzel (2002) reported no gender differences regarding the process of reporting extra income. The author only found women to be more compliant about reported income and deduction claims.

Despite the fact that there is a significant number of studies showing the differences between women and men in tax compliance behaviour, the OECD (2019) emphasizes the need for more detailed research and actual data on tax and gender topics. Following this, we hypothesise that:

H2. There is a relationship between taxpayers' tax compliance and their gender structure.

2.3. Education Level and Tax Compliance

Education plays an important role in the decision process of complying with tax laws or not (Jackson and Milliron 1986). More precisely, it is the level of education that contributes towards the taxpayers' greater understanding of taxation laws and regulations (Eriksen and Fallan 1996).

Empirical results regarding this topic are ambiguous. Chan, Troutman, and O'Bryan (2000) suggest that educated taxpayers are more aware of their responsibility and the sanctions in the case of noncompliance with tax laws. Although it is often implied that higher educated people possess a better comprehension of the law and are less prone to making mistakes regarding tax declaration, this is also related to better access to information. Such information surely includes opportunities regarding tax evasion and avoidance (Torgler and Murphy 2004; Torgler and Schneider 2005; Torgler 2006). In a study by Hofmann et al. (2017), a small but significant negative correlation was identified between education and tax compliance.

After conducting a study in 45 countries worldwide, Richardson (2006) concluded that education in general has a negative influence on tax evasion. The author found evidence that the tendency to evade taxes reduces with the level of education. Bobek, Roberts, and Sweeney (2007) suggest that there might be a correlation between a low level of education and low tax compliance. As for gender, future studies with more reliable information about the impact of the level of informal and formal education on tax compliance could be very useful. According to this, we hypothesise as follows:

H3. There is a relationship between taxpayers' tax compliance and their educational structure.

2.4. Income Level and Tax Compliance

Although Allignham and Sandmo's (1972) model found ambiguous results regarding the tax compliance and income relationship, a broad scope of the literature has examined its effects.

Some studies have researched income levels, while a significant number has also focused on income sources. Jackson and Milliron (1986) made the first significant contribution to this topic by including both income level and source into a model of tax evasion. Their results suggested that both determinants are significant for tax evasion.

Mason and Lowry (1981) as well as Witte and Woodbury (1983) concluded that income level is a significant factor affecting tax compliance. They pointed out that middle-income taxpayers are the most compliant group, while low-income taxpayers and high-income taxpayers are significantly less compliant. Efebera et al. (2004) analysed tax compliance intentions of low-income taxpayers, claiming that earlier research had largely ignored this group of taxpayers. Empirical data from this study suggests that the motivation for tax non-compliance increases with income level. This is consistent with the Hofmann et al. (2017) meta-analysis, suggesting that income and self-reported tax compliance are negatively correlated. The study also revealed spatial differences, since the negative correlation was of greater significance in Eastern Europe and Central Asia, than in any other area.

Despite the importance of this topic, social science remains uncommonly quiet on this matter. The majority of the research in this field concentrates on compliance by average taxpayers, with only a limited number of studies specifically aimed at comparing the compliance behaviour between the wealthy and the middle or lower classes (Gangl and Torgler 2020). Therefore, we hypothesise that:

H4. There is a relationship between taxpayers' tax compliance and their income level.

3. METHODOLOGY

This is research with a quantitative approach that was carried out through a survey applied to Croatian income taxpayers. To validate the data, a structural questionnaire in Croatian language was piloted and pretested. Although it was designed according to measuring instruments and scales from the relevant literature (Kirchler, Niemirowski, and Wearing 2006; Hauptman, Gürarda, and Korez-Vide 2015; Tenidou et al. 2015; Onu, Oats, and Kirchler 2019; van Dijke, Gobena, and Verboon 2019), certain specificities of the Croatian tax system indicated the need for a moderate adjustment.

In the questionnaire (see Appendix 1), 27 items were used. Those were divided into: economic determinants (9 items), psychological determinants (15 items), and tax compliance (3 items). Sanctions (Appendix 1 – statements 1-3 in section number 2), tax audits (Appendix 1 – statements 4-6 in section number 2), and tax rates (Appendix 1 – statements 7-9 in section number 2), were chosen as economic determinants and each measured with 3 items. Regarding the psychological determinants, questionnaire comprised tax system complexity (Appendix 1 – statements 1-3 in section number 3), tax morale (Appendix 1 – statements 4-9 in section number 3), fairness perceptions (Appendix 1 – statements 10-12 in section number 3), and social norms (Appendix 1 – statements 13-15 in section number 3). However, for the purpose of this analysis, only

tax morale (6 items) and social norms (3 items) were included in the model of tax compliance. The dependent variable, tax compliance (Appendix 1 – statements 1-3 in section number 4), was measured with 3 items.

First question in the survey was eliminating, respondents were asked whether they were earning any income in Croatia. For all those participants who answered no, survey ended. As in prior studies, the respondents were asked to indicate their answers on a five-point Likert scale, from "I completely disagree" (1) to "I completely agree" (5) (Hauptman, Gürarda, and Korez-Vide 2015; Tenidou et al. 2015). To collect data regarding sociodemographic characteristics (gender, education level, employment status, monthly income, seniority), multiple-choice questions were employed.

Data collection was carried out between October 2021 and January 2022. Research was conducted in the Republic of Croatia on a random sample of Croatian individual taxpayers (income tax). Since the data was not officially available regarding the number of Croatian taxpayers, it was decided to take into consideration the available data about the Croatian citizens older than 18 years. According to the latest census data from the Croatian Bureau of Statistics (2022), Croatia has 3,210,287 citizens older than 18 years. After the elimination of all partly fulfiled questionnaires, the final sample comprised 862 valid cases. The sample size is adequate for this kind of research since the sample is bigger than 384 as suggested by Meyer (1979) and Fox, Hunn, and Mathers (2007), for populations above 500,000.

To maximize representativeness of the sample and in the circumstances of COVID-19, it was decided to employ a mixed sampling design according to Rinken et al. (2020). For that reason, participants from the first subsample were invited to the research through SMS invitations to a mobile phone, in a way that mobile phone numbers were obtained by a digit randomisation. After checking the validity of a mobile phone number through phone book online available (to avoid sending the invitation to inactive numbers), SMS invitations were sent to 699 respondents. Out of this number of invitations, 327 questionnaires were fully completed. The first subsample comprises 37.9% of the total sample.

After detecting some minor discrepancy in respondents' age structure regarding a sample representativeness, participants from the second subsample were invited through social network invitations. These networks nowadays offer possibility to target advertisements to preferentially reach people based on demographics, location, interests, and behaviours (Shaver et al. 2019). This subsample, gathered through Facebook and Instagram advertisements, had a higher representation of younger population. Out of 716 invitations to a Croatian Facebook and Instagram user older than 18, 535 fully completed questionnaires were obtained. The second subsample comprises 62.1% of the total sample. In total, 1415 respondents were invited, and 862 responded, which represents a response rate of 60.9%. The summary of the respondents' characteristics is shown in Table 1.

Table 1. Sociodemographic characteristics of respondents

Category		Frequency	Percentage
Age	18 – 34	131	15,2
	35 – 44	289	33,5
	45 – 54	148	17,2
	> 55	294	34,1
	Total	862	100
Gender	Male	372	43,2
	Female	490	56,8
	Total	862	100
Education level	High school or less	251	29,1
	Diploma / Bachelor's	121	14,1
	Master	363	42,1
	Postgraduate	127	14,7
	Total	862	100,0
Income level	< 5.000 HRK (0-664€)	209	24,2
	5.001 – 8.000 HRK (665-1.062€)	305	35,4
	> 8.001 HRK (>1.063€)	348	40,4
	Total	862	100,0

Source: Authors' compilation

To estimate the direct effects of economic, psychological and sociodemographic variables on tax compliance, following model is framed as shown in regression equation:

$$Tax\ compl = i_Y + b_1Age + b_2Age^2 + b_3Sanc + b_4Male + b_5Rates + b_6Morale + b_7Inc_{below} + b_8Inc_{above} + b_9Audit + b_{10}Edu_{BS} + b_{11}Edu_{MS} + b_{12}Edu_{postg} + b_{13}SocNorm + e_Y$$

In the mentioned model, we have tested sociodemographic and economic, as well as psychological variables. Where, Age represents participants' age with which we examined the effect of ages on taxpayers' compliance. Rates is latent variable related with the taxpayers' attitude toward tax rates. Morale variable is latent variable that we used to measure tax morale, Sanc is latent variable with which we examined taxpayers' relationship towards sanctions, while SocNorm is latent variables that deals with taxpayers' Social Norms, and Audit is a latent variable used to measure taxpayers' audit perceptions. We have measured the influence of all these latent variables towards the tax (non)compliance. Variable Male is a gender variable used to examine gender differences on tax compliance behaviour. Variable Inc represents household monthly income. We have categorized variable Inc in three classes: below average (0-5.001 HRK, approximately 0-664€), average (5.001-8.000 HRK, approximately 665-1.062€), and above average, (above 8.001 HRK, approximately >1.063€). Average monthly income (664€-1.062€) is chosen as the base category. We would like to highlight that survey included participants from developed and less developed country regions, so the base category for the monthly average income represents average income from all parts of the country. Variable Edu represents participants' education level used to examine the influence of education level towards tax (non)compliance. The education variable was divided into four categories: the base category was elementary to high school degree, second was Edu_BS - bachelor's degree, Edu_MS - master's degree and Edu_postg - postgraduate degree that included population with Master of Science, specialists, and PhD degrees.

To estimate the moderating effect of gender, education and income level on the relationship between economic and psychological determinants and tax compliance, the following regression model is used as shown in equation:

$$Tax\ compl = i_Y + b_1Age + b_2Age^2 + b_3Sanc + b_4Male + b_5Rates + b_6Rates \cdot Male + b_7Morale + b_8Morale \cdot Male + b_9Inc_{below} + b_{10}Inc_{above} + b_{11}Audit + b_{12}Audit \cdot Inc_{below} + b_{13}Audit \cdot Inc_{above} + b_{14}Sanc \cdot Inc_{below} + b_{15}Sanc \cdot Inc_{above} + b_{16}Edu_{BS} + b_{17}Edu_{MS} + b_{18}Edu_{postg} + b_{19}SocNorm + b_{20}SocNorm \cdot Edu_{BS} + b_{21}SocNorm \cdot Edu_{MS} + b_{22}SocNorm \cdot Edu_{postg} + e_Y$$

The regression moderation model has been used to explore the influence of sociodemographic variables on tax compliance. Hayes defined moderation (2018, p.220): "The effect of X on some variable Y is moderated by W if its size, sign, or strength depends on or can be predicted by W. In that case, W is said to be a moderator of X's effect on Y, or that W and X interact in their influence on Y." Basically, identifying moderator could help us to determine influence of moderator on direct effects (variables) and to explain the impact that they have regarding the observed effects. It enables the analysis of not only the direct effect of those variables on tax compliance, but also discovers the influence they have by modifying effect of different psychological (tax morale, social norms) and economic (tax audits, tax rates, sanctions) variables of tax compliance called the moderation effect.

The model was built as a path model of various psychological and economic latent constructs as explanatory variables, together with sociodemographic variables and interaction of sociodemographic and psychological/economic variables, and latent construct of tax compliance as response variable. Results for sociodemographic variables represent the direct effect, while results of interaction variables show the moderation effect of sociodemographic variables on tax compliance.

4. Results

The focus of this analysis is to examine the direct effects of sociodemographic variables, latent economic and psychological variables on taxpayers' compliance. In other words, whether variables such as age, gender, income, education level, sanctions, rates, tax morale, social norms, and audits impact taxpayers' compliance. The results of the tested model with only direct effects are presented in Table 2.

Table 2. Results of the tested model – direct effects

Variables	Lat_TaxCompliance
Age	0.025**
	(0.010)
Age^2	-0.000*
	(9.68e-05)
Sanctions	0.037
	(0.025)
Gender (Male)	0.064
	(0.040)
Rates	-0.056**
	(0.027)
Morale	0.556***
	(0.030)
Income below	-0.032
	(0.056)
Income above	-0.012
	(0.048)
Audit	-0.007
	(0.028)
Education bachelor	0.009
	(0.065)
Education master	0.056
	(0.051)
Education postgraduate	0.056
	(0.070)
Social Norms	0.097**
	(0.027)
Constant	0.547*
	(0.296)
Observations	844

Notification: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations

As it can be seen from the Table 2, taxpayers' age is statistically significant for their tax compliance (-0.000*). Other sociodemographic variables of gender, income and education level do not appear to be associated with the tax compliance. Regarding the economic determinants of tax compliance, results confirm that tax audits are negatively related to tax compliance (-0.056**), while we did not find a significant effect of sanctions and tax rates on tax compliance. On the other hand, psychological determinants seem to be positively related to tax compliance (tax morale 0.556***, social norms 0.097**).

Additionally, the focus of this study was to investigate interactions (moderating effects) of these sociodemographic variables between psychological/economic determinants and tax compliance. For that reason, regression moderation model with moderating effects was employed (see methodology part). The results of the tested model are presented in Table 3.

The results are divided into two parts: a) direct effects, and b) interactions/moderators' effects. Tested direct effects suggested following results associated to the sociodemographic variables. Regarding the age variable, it has polynomial second order (quadratic) impact. The impact on latent variable tax compliance increases between 20 and 70 years, while after these years it is decreasing. Compared to the previous results (Table 2), it can be seen that gender variable in this model has a significant impact (-0.722**) on the taxpayers' compliance behaviour. The obtained result suggests that male taxpayers are less prone towards tax compliance, and they care less on tax compliance than women. The sociodemographic variable education has a significant negative effect (-0.614**), but just for category of taxpayers with bachelor's degree compared to basic category (those with elementary and high school). The result for the last sociodemographic variable, income, was not significant. Income categories are not significantly different than the base category (665€-1.062€).

Direct effects of the tested latent economic and psychological variables are as follows. Sanctions have a negative impact (-0.013) on tax compliance; however, the result is not significant. Rates have a significant negative impact (-0.100***) on tax compliance in this model, which implies that higher tax rates lead to noncompliance behaviour. Although, the results are consistent with previous research (Clotfelter 1983; Slemrod 1985) we must highlight that there are evident opposite studies (Allingham and Sandmo 1972; Gorecki and Letki 2020). Variable Audit and its direct effect were tested but results indicated that it was insignificant (0.057). Latent variables Social Norms (0.081*) and Tax Morale (0.507***) have positive significant impact on the tax compliance and this points out the fact that taxpayers with higher tax morale level and those who value social norms have higher tendency towards tax compliance. The findings are in line with previous results (Frey 1997; Franić 2020; Paleka, Karanović, and Badulescu 2023).

Additionally, in this study authors examined moderating effects of chosen sociodemographic variables on latent variables. The results regarding moderating effect analysis conducted in this study confirmed moderating effects of sociodemographic variables on relationship between latent variables and tax compliance. The model shows that gender positively moderates the correlation between both tax rates (0.094*), tax morale (0.108**) and tax compliance. Besides this,

Table 3. Results of the tested model – moderating effects

Variables	Lat_TaxCompliance
Age	0.024**
	(0.010)
Age^2	-0.000
	(9.77e-05)
Sanctions	-0.013
	(0.041)
Gender (Male)	-0.722**
	(0.295)
Rates	-0.100***
	(0.037)
Rates x Male	0.094*
	(0.052)
Morale	0.507***
	(0.040)
Morale x Male	0.108**
	(0.054)
Income below	-0.082
	(0.245)
Income above	0.020
	(0.192)
Audit	0.057
	(0.046)
Audit x Income below	-0.154**
	(0.077)
Audit x Income above	-0.068
	(0.062)
Sanctions x Income below	0.130**
	(0.066)
Sanctions x Income above	0.042
	(0.053)
Education bachelor	-0.614**
	(0.277)
Education master	0.148
	(0.194)
Education postgraduate	0.020
	(0.254)
Social Norms	0.081*
	(0.045)
Social Norms x Education bachelor	0.183**
	(0.081)
Social Norms x Education master	-0.027
	(0.058)
Social Norms x Education postgraduate	0.012
	(0.075)
Constant	0.974***
	(0.361)
Observations	844

Notification: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations

education level positively moderates (0.183**) the relationship between social norms and tax compliance. Specifically, this refers to the category of bachelor education level. The last sociodemographic variable with moderating effect was income, which exhibits a statistically significant negative moderating effect regarding the relationship between audits (-0.154**) and statistically significant positive moderating effect between sanctions (0.130**) and tax compliance.

Ramsey RESET test using powers of the independent variables is performed prior to the model testing. Here, the null hypothesis that the model has no omitted variables is not rejected ($F(47,775) = 1.30$, Prob > $F = 0.0871$). After establishing that there is no detectable non-linearity in the model, the model is tested.

The model is further evaluated, and all tests are performed at the α=0.10 significance level. The evaluation begins with an estimate of the overall significance of the model. The F-test suggests that the model is significant: $F(22,81) = 31.87$, $p < 0.01$. The coefficient of determination $R^2 = 0.461$ and $R_adjusted^2 = 0.446$ show a strong level of determination. The evaluation of the model continues with testing the assumptions of the model. The evaluation of the model continues with testing the assumptions of the model. Since the used sample is large, the central limit theorem applies, and there is no need to check normality assumption.

In moderation models there is high correlation between independent variables and interaction terms that could lead to misleading interpretation that because of multicollinearity it is not appropriate to build a model. In reality, multicollinearity is irrelevant for moderation testing (McClelland et al. 2017; Disatnik and Sivan 2016; Shiehm 2010).

The assumption of homoscedasticity is tested using Breusch-Pagan / Cook-Weisberg test for heteroskedasticity with the result χ^2 (1, N = 844) = 0.97, p = 0.326 that implies equality of variances.

5. Discussion and Conclusions

Because of its role in achieving economic sustainability, tax compliance is and will continue to be a hot topic for governments and policy makers, but for researchers as well. By using regression analysis, this research investigated how sociodemographic variables affect taxpayers' behaviour. Based on the relevant literature, age, gender, education level and income level were chosen and their direct impact on tax compliance was tested. Additionally, moderating role of gender, education level and income level were tested as well. Although numerous studies include and analyse effects of these variables on tax compliance, results

remain inconsistent.

The results suggest that taxpayers' characteristics such as age, gender, and education level are significantly associated with their compliance behaviour. The result regarding the impact of age variable on taxpayers' compliance is in line with previous results (McKerchar 2002; Kirchler, Niemirowski, and Wearing 2006). One of the reasons for the decreasing impact of this variable after 70 years may lie in the fact that most of the older population has low incomes (pensions) and attitude "nothing to lose" (associated with life expectancy). Similar to this, results point to a gender difference in tax compliance behaviours. These results are in line with the previous studies carried out (Hasseldine 1999, Hasseldine and Hite 2003; Gërxhani 2007; Kastlunger et al. 2010; Torgler and Schneider 2007, Bruner, D'Attoma, and Steinmo 2017).

Results regarding the education level and its impact on tax compliance confirm the findings of Hofmann et al. (2017). Population with a bachelor's degree has a lower tendency towards tax compliance than the base category (high school or less), while the impact of the categories with master's and postgraduate degree are not significantly different than base category. These results possibly arise from the differences in the wages between these categories.

Finally, although the results are insignificant regarding the income category, it should be mentioned that the lower income taxpayers' category has negative impact (-0.082) while category of higher income taxpayers has positive impact (0.020) towards tax compliance regarding base category. Allingham and Sandmo (1972) stated that under the pressure of the high tax rates taxpayers will be less wealthy, and that will eventually lead to lead to more risk-averse behavior. This is something that should be considered more in further research.

This research also provides evidence on moderating effects of chosen sociodemographic variables on latent variables. Findings suggest that gender moderates the relationship between both tax rates, tax morale, and tax compliance. To be more precise, this effect is significant and positive for males. This moderating effect could be explained by higher income of the males over females, but it would certainly be interesting to address this issue in future. Regarding the interaction of education level and social norms towards tax compliance, the results point to a significant and positive moderation (for respondents with bachelor degree). It can be suggested that more educated people have more knowledge about the taxation system and can easily cope with its complexity. But they also care more about their social status, and therefore comply voluntarily with tax regulations. Moreover, a more educated population has higher income and "more to lose" attitude.

The model shows that income significantly moderates the effect of two economic determinants (sanctions and tax audits) on tax compliance, for the category of taxpayers with the monthly income below the average. In other words, the moderating effect of income shows a statistically negative significant impact when interacting with audits, and a statistically positive significant impact when interacting with sanctions. The results are in line with previous studies, and they can be related to findings of Cox (1984, p.286) "…on average, the most noncompliant taxpayers are those with either very high or very meagre incomes, with middle-income taxpayers being the most compliant". The main difference between these two groups according Slemrod (2007, p.30) is in the context of performing "the poor evade, the rich avoid". Regarding the moderating effect of income towards the relationship between sanctions and tax compliance, findings are in line with previous ones and as stated before – those taxpayers with higher income have wealth to lose (unlike the lowest income level taxpayers), and that can lead to risky behaviour.

These findings provide further evidence about the importance of including sociodemographic variables in tax compliance research (Hofmann et al. 2017), based on confirmation of their direct and moderating effect on taxpayers' compliance. Empirical results also fill a gap by helping to clarify the question of the indirect effect of variables such as gender, education, and income level on the tax compliance. Results of this study provide an opportunity for policy makers to employ different tools that take into account the fact that taxpayers are a dynamic and heterogenous group and need to be approached through diverse strategies. In the context of these findings, it should be highlighted that government policies and initiatives should acknowledge the paradigm shift towards the behavioral approach to the tax compliance concept, because tax morale and social norms are determinants that cannot be neglected in future viewpoints.

There are several research limitations that should be mentioned. The authors are aware of the fact that taxpayers are not necessarily honest about their tax compliance intentions (but also regarding the data such as income source and level) since the topic is quite sensitive and personal. This is the reason to combine different data source as well as methodology in future research. Additionally, this research examined taxpayers' attitudes, and not their actual behaviour. Although it has been acknowledged in the previous literature that attitudes can be predictors of the future behaviour (Bobek and Hatfield 2003; Onu 2016),

it would be interesting to specifically analyse the taxation data from the audited taxpayers and compare their attitudes and exact behaviour. In this research, the sample is limited only to income taxpayers. In future research framework, it would be useful to view a wider context and analyse the tax compliance related to the overall tax burden.

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APPENDIX 1 - Questionnaire

SURVEY OF ECONOMIC AND PSYCHOLOGICAL DETERMINANTS
OF TAX COMPLIANCE IN CROATIA

This research is carried out for the purposes of the doctoral dissertation and aims to investigate the behavior of taxpayers and determine what determinants affect the fulfilment or non-compliance of tax obligations in the Republic of Croatia. You are invited to participate in this research on the assumption that you are a Croatian taxpayer on any basis, which is explained in the first question of the questionnaire.

It takes approximately 10 minutes to complete the questionnaire. Your participation is voluntary, and the questionnaire is entirely anonymous, and data protection is guaranteed under the GDPR 2016/679 General Data Protection Regulation. The inability to connect the response with the data subject is ensured at all stages of the survey, both during the collection of data and during the processing of data and the analysis of the results.

The collected data will be used exclusively for scientific research purposes and will contribute to the creation of a functional and satisfactory tax system for the state, but also for taxpayers. I kindly ask you to take your time, contribute to this research by answering all questions honestly and objectively to ensure the relevance of the research. If you need more information or if you have any questions, feel free to contact me.

I thank you for your participation, help and effort!

Hana Paleka
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Note: The claims used in this questionnaire, regardless of whether used in male or female gender, cover male and female gender in the same way.

1. DO YOU EARN INCOME ON ANY BASIS IN THE REPUBLIC OF CROATIA?

SOURCES OF INCOME: A) income from independent work (salaries and pensions), B) income - self-employed, C) income from property and property rights, D) income from capital, E) other income.

☐ YES ☐ NO

2. These statements refer to the **economic determinants** of tax compliance. Choose only one answer for each statement: 1 – I strongly disagree; 2 - I disagree; 3 – I neither agree nor disagree; 4 - I agree; 5 - I strongly agree

STATEMENT	1	2	3	4	5
I fulfil my tax obligations because the penalties for tax evasion are very high.					
If a citizen of the Republic of Croatia withheld the entire and/or partial source of income from the tax authorities, he would be sanctioned.					
If a citizen of the Republic of Croatia gave tax authorities incorrect information about his income, he would be sanctioned.					
If a citizen of the Republic of Croatia did not declare income, the tax authorities would surely find out.					
Tax authorities in the Republic of Croatia carry out audits often and thoroughly.					
Thanks to their knowledge and expertise, tax authorities in the Republic of Croatia can detect almost any act of tax evasion.					
Income tax rates in the Republic of Croatia are too high.					
Higher income tax rates affect the shadow economy growth.					
I believe that the total tax burden on labour in the Republic of Croatia at rates of 56.5%, or 66.5% - is too high.					

3. These statements refer to the **psychological** determinants of tax compliance. Choose only one answer for each

statement: 1 – I strongly disagree; 2 - I disagree; 3 – I neither agree nor disagree; 4 - I agree; 5 - I strongly agree

STATEMENT	1	2	3	4	5
Tax laws are written in a simple language.					
Terms used in tax laws and tax authorities' publications are difficult to understand.					
I understand the current regulations regarding my tax liabilities.					
I believe I should declare my entire income and pay the appropriate income tax according to that.					
I find manipulating tax reliefs acceptable.					
I find 'envelope' wages acceptable way to avoid paying taxes.					
Cheating when fulfiling tax obligations is always justified.					
Sometimes there is a justification for non-payment of tax liabilities.					
Failure to meet tax obligations is never justified.					
Decision-making processes and tax audits are carried out fairly by the Croatian tax authorities.					
I find that the amount of tax I pay is generally fair.					
For the amount of tax I pay, I get proper public services.					
My family expects me to fulfil my tax obligations in accordance with the laws and regulations in the Republic of Croatia.					
My friends expect me to fulfil my tax obligations in accordance with the laws and regulations in the Republic of Croatia.					
If I didn't meet my tax obligations, the people in my surroundings would condemn me.					

4. These statements refer to the **tax compliance**. Choose only one answer for each statement: 1 – I strongly disagree; 2 - I disagree; 3 – I neither agree nor disagree; 4 - I agree; 5 - I strongly agree

STATEMENT	1	2	3	4	5
I think people who don't pay taxes do the right thing.					
I don't think people who pay taxes do the right thing, but I understand them.					
I believe that people who don't pay taxes don't do the right thing and should be sanctioned.					

SOCIODEMOGRAPHIC QUESTIONS:

1. PLEASE CHOOSE YOUR LOCATION (region):

- ☐ Bjelovarsko-bilogorska
- ☐ Brodsko-posavska
- ☐ Dubrovačko-neretvanska
- ☐ Grad Zagreb
- ☐ Istarska
- ☐ Karlovačka
- ☐ Koprivničko-križevačka
- ☐ Krapinsko-zagorska županija
- ☐ Ličko-senjska
- ☐ Međimurska
- ☐ Osječko-baranjska
- ☐ Požeško-slavonska
- ☐ Primorsko-goranska
- ☐ Sisačko-moslavačka
- ☐ Splitsko-dalmatinska
- ☐ Šibensko-kninska
- ☐ Varaždinska
- ☐ Virovitičko-podravska
- ☐ Vukovarsko-srijemska
- ☐ Zadarska
- ☐ Zagrebačka

2. YEAR OF BIRTH: _____

3. SEX:
   - ☐ Male
   - ☐ Female

4. LEVEL OF EDUCATION:
   - ☐ elementary education
   - ☐ secondary education
   - ☐ undergraduate study
   - ☐ graduate study
   - ☐ postgraduate study (specialist, scientific master's degree; doctoral)

5. WHAT IS YOUR MONTHLY INCOME?
   - ☐ up to 2 000 HRK
   - ☐ 2 001 – 5 000 HRK
   - ☐ 5 001 – 8 000 HRK
   - ☐ 8 001 – 11 000 HRK
   - ☐ 11 001 – 14 000 HRK
   - ☐ 14 001 HRK and more

APPENDIX 2 - Descriptive statistics of latent variables

Table 4. Descriptive statistics of latent variables

	Mean	Median	Mode	Standard Deviation
Lat_Compliance	3.59	3.67	4.00	0.75
Lat_Sanctions	3.50	3.67	4.00	0.95
Lat_Audits	2.66	2.67	2.00	0.79
Lat_Rates	4.25	4.33	5.00	0.74
Lat_Snormes	3.29	3.33	3.67	0.81
Lat_Morale	3.65	3.67	4.00	0.73

Source: Authors' calculations