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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

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.

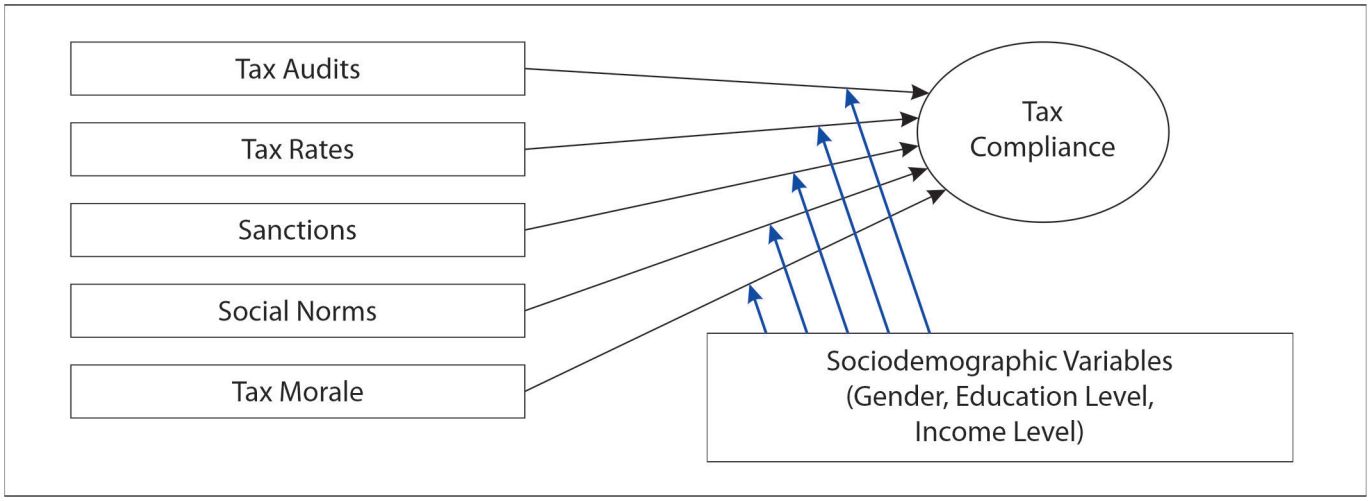
2. Literature Review and Hypothesis Development

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:

$$Tax\ compl = i_Y + b_1 Age + b_2 Age^2 + b_3 Sanc + b_4 Male + b_5 Rates + b_6 Morale + b_7 Inc_{below} + b_8 Inc_{above} + b_9 Audit + b_{10} Edu_{BS} + b_{11} Edu_{MS} + b_{12} Edu_{postg} + b_{13} SocNorm + e_Y$$

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:

$$Tax\ compl = i_Y + b_1 Age + b_2 Age^2 + b_3 Sanc + b_4 Male + b_5 Rates + b_6 Rates \cdot Male + b_7 Morale + b_8 Morale \cdot Male + b_9 Inc_{below} + b_{10} Inc_{above} + b_{11} Audit + b_{12} Audit \cdot Inc_{below} + b_{13} Audit \cdot Inc_{above} + b_{14} Sanc \cdot Inc_{below} + b_{15} Sanc \cdot Inc_{above} + b_{16} Edu_{BS} + b_{17} Edu_{MS} + b_{18} Edu_{postg} + b_{19} SocNorm + b_{20} SocNorm \cdot Edu_{BS} + b_{21} SocNorm \cdot Edu_{MS} + b_{22} SocNorm \cdot Edu_{postg} + e_Y$$

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 $\alpha=0.10$ 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