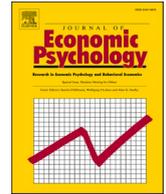




ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Journal of Economic Psychology

journal homepage: www.elsevier.com/locate/joep

Brief Report

The economic crisis during the COVID-19 pandemic has a negative effect on tax compliance: Results from a scenario study in Austria[☆]

Andre J. Hartmann^{a,*}, Katharina Gangl^b, Matthias Kasper^a, Erich Kirchler^{a,b},
Martin G. Kocher^c, Martin Mueller^a, Axel Sonntag^b

^a University of Vienna, Faculty of Psychology, Department of Occupational, Economic and Social Psychology, Universitaetsstrasse 7, 1010 Vienna, Austria

^b Institute for Advanced Studies, Josefstaedter Strasse 39, 1080 Vienna, Austria

^c University of Vienna, Faculty of Business, Economics, and Statistics, Department of Economics, Oskar-Morgenstern-Platz 1, 1090 Vienna, Austria

ARTICLE INFO

Keywords:

COVID-19 pandemic
Tax compliance
Economic crisis
Scenario study

ABSTRACT

In a scenario study with 1200 Austrian taxpayers, we examined how tax compliance is affected by the economic crisis related to the COVID-19 pandemic. Moreover, we investigated the potential of trust in government, attitude towards taxes, and justice perceptions in mitigating potential effects. The results suggest a strong effect of the economic environment on tax compliance. Specifically, tax compliance was lower in scenarios where the pandemic had a negative effect on the economy than in scenarios with no negative effect. However, for individuals with a positive attitude towards taxes, compliance was not lower in a negative economic environment than in pre-COVID-19 times. Moreover, we found that taxpayers who were not affected economically, taxpayers with a positive attitude towards taxes, and taxpayers with a low propensity to take risks generally indicated higher levels of tax compliance. Exploratory analyses indicate that taxpayers who change their compliance behavior in response to the economic environment are, on average, younger, less educated, more strongly affected economically, and more uncertain about their current economic situation than taxpayers with stable compliance levels. Policy interventions should target these groups to strengthen tax compliance in times of crisis.

1. Introduction

The COVID-19 pandemic has had a substantial effect on the global economy. In an effort to mitigate this effect, governments worldwide have taken extraordinary measures and spent unprecedented amounts on health care, economic stabilization, and economic stimuli, such as direct payments and short-time work support. Taxpayers will ultimately have to foot the bill, yet it remains unclear to what extent such dramatic changes in the economic environment affect taxpayers' willingness to comply. In particular, the COVID-19 pandemic likely influenced important behavioral and psychological determinants of tax compliance, such as trust in tax authorities or perceived fairness of the tax system (Alm et al., 2020), which in turn might reduce the willingness to pay taxes. The present paper investigates whether and how the economic environment, psychological determinants of compliance, as well as taxpayer demographics affect tax compliance during the COVID-19 pandemic. To this end, we conducted a preregistered scenario study with

[☆] This study was preregistered. All materials, data, and code are available at: <https://osf.io/7exmu/>.

* Corresponding author.

E-mail address: andre.hartmann@univie.ac.at (A.J. Hartmann).

<https://doi.org/10.1016/j.joep.2022.102572>

Received 15 November 2021; Received in revised form 30 September 2022; Accepted 1 October 2022

Available online 9 October 2022

0167-4870/© 2022 Elsevier B.V. All rights reserved.

1200 Austrian taxpayers.

Experiencing the pandemic and its economic consequences might have several effects on taxpayers who increase or decrease their propensity to comply with their tax obligations (Alm et al., 2020). For example, the crisis might have a positive effect on the compliance of taxpayers who believe that the policy response to the pandemic is appropriate and effective. Similarly, the pandemic might have emphasized the importance of a welfare state that provides health care, job security even in dire economic situations, and a stable environment for businesses. On the other hand, the crisis might have exacerbated non-compliance among taxpayers who believe the policy response to the pandemic is inappropriate or insufficient. As a result, these taxpayers might take the opportunity to wrongly claim stimulus payments and tax deductions or underreport income altogether. Likewise, taxpayers affected strongly by the pandemic might reduce their compliance to make up for past losses or because they fear future losses through unemployment or bankruptcy. Brondolo (2009) assumes that the lingering risk of bankruptcy during a financial crisis could outweigh the risks of tax evasion for some self-employed taxpayers and, thus, increase their propensity for non-compliance. Karpoff (2021) predicts that the COVID-19 pandemic and the resulting economic turmoil will increase the prevalence of tax evasion and fraud in the upcoming years. He argues that lockdowns create situations for businesses where the short-term benefits of fraud exceed the potentially negative long-term consequences. Similarly, Alm et al. (2020) suggest that the COVID-19 pandemic might have a negative effect on compliance when taxpayers believe that it reduces the risk and effectiveness of audits. However, the potential effect of the economic consequences of the COVID-19 pandemic and economic crises on tax compliance remains unclear empirically.

The COVID-19 pandemic does not only affect compliance through its effect on the economy. It also affects taxpayers' propensity to evade through its effect on psychological determinants of tax compliance. For example, taxpayers who trust the authorities are more likely to comply than taxpayers who do not (Kasper et al., 2015; Kirchler et al., 2008; Kogler et al., 2015). Trust appears to be particularly relevant in times of crisis because the unprecedented nature of the COVID-19 pandemic makes it difficult for taxpayers to anticipate the consequences of political efforts to mitigate it. Various measures taken by governments to combat the crisis might directly affect taxpayers' trust and thus affect compliance (Alm et al., 2020). Similarly, justice perceptions (Tyler et al., 2015) appear to be important because taxpayers who believe that the handling of the pandemic is unjust might be less likely to comply.

Taxpayers' attitudes towards paying taxes, often summarized as tax morale, are another important determinant of tax compliance. Tax morale is affected by the individual's economic environment, such as individual wealth (Gangl & Torgler, 2020). A laboratory experiment found a negative relationship between income and tax morale (Grundmann & Graf Lambsdorff, 2017). In contrast, an analysis of World Value Survey data revealed a negative effect of an economic crisis on tax morale. The author argues that in times of decreasing income, "less morale is affordable" (Heinemann, 2011, p. 46). Moral balancing, or the compensation of moral behavior in the past (e.g., by adhering to various COVID restrictions) with non-moral behavior in the present, has been proposed as another channel through which the pandemic might reduce tax compliance (Alm et al., 2020).

Conversely, the COVID-19 pandemic might positively affect tax morale because it emphasizes the need for public goods, such as health care and social security. Indeed, data from the European Social Survey revealed a positive relationship between tax morale and attitudes towards redistribution. However, it was also found that both self-employment and education are negatively correlated with tax morale (Lago-Peñas & Lago-Peñas, 2010). As self-employed taxpayers have the greatest opportunity to evade, and these taxpayers have been affected particularly strongly by the economic turmoil in recent years, the COVID-19 pandemic might have a stronger effect on the compliance of self-employed taxpayers.

In sum, prior research indicates that the experience of an economic crisis might affect various determinants of tax compliance. However, despite a large body of recent work on the behavioral determinants of tax compliance (e.g., Engel, Mittone, & Morreale, 2020; Fatas, Nosenzo, Sefton, & Zizzo, 2021; Fochmann, Müller, & Overesch, 2021; Gangl, van Dijk, van Dijk, & Hofmann, 2020; Garcia, Opromolla, Vezzulli, & Marques, 2020; Kasper & Alm, 2022; Olsen, Kasper, Kogler, Muehlbacher, & Kirchler, 2019; Kasper and Rablen, in press) no prior study empirically investigated this effect and the underlying mechanisms. To address these gaps in the existing literature, our first research question (RQ1) was: *Is tax compliance affected by the economic consequences of the COVID-19 pandemic?* Specifically, we hypothesized that the effect of experiencing the crisis (i.e., "Present") on tax compliance is negative compared to pre-COVID-19 times (i.e., "Past"). Moreover, we assumed that a deteriorating crisis would result in lower tax compliance compared to a recovered economic environment (i.e., compliance will be lower in a "Negative Outlook" scenario than in a "Positive Outlook" scenario).

Our study also investigated psychological variables' role in mitigating the pandemic's effect on tax compliance. Specifically, our second research question (RQ2) was: *Do higher trust in government, a positive attitude towards taxes, and justice perceptions moderate the effect of the COVID-19 pandemic on tax compliance?* In particular, we hypothesized that high trust in government, a generally positive attitude towards paying taxes, and high perceived justice mitigate the negative effect of an unfavorable economic environment on tax compliance.

2. Method

2.1. Participants and procedure

A stratified sample in terms of age and education from the Austrian population ($N = 1200$) was surveyed by a research agency. The data was collected online in August 2020 amid the COVID-19 pandemic. The sample consisted of 50.3 % women with a mean age of $M = 40.49$ ($SD = 15.72$). A detailed sample description can be found in Table A1 of the Online Appendix.

2.2. Material

The study comprised two parts: Scenario questions and a survey. The first part consisted of four scenarios to investigate how the *Economic environment* (the individual experience at different potential time points throughout the pandemic) affects *Tax compliance*. To investigate this relationship, participants were asked to imagine earning €1000 for a one-time activity in each of the scenarios (i.e., four times in total) and to indicate on an 11-point Likert-type scale (1 = €0 to 11 = €1000) how much of this amount they would find justified to report in their tax declaration.¹ Each study participant thus provided four measures of *Tax compliance*, the dependent variable in our analyses.

Economic environment. The scenarios asked participants about their tax compliance in a fictional income tax declaration in the “*Present*” (i.e., amid the COVID-19 pandemic) and the “*Past*” (i.e., before the COVID-19 pandemic). Moreover, to examine how a positive or negative development of the pandemic and its economic consequences affect tax compliance, participants were presented with a “*Positive Outlook*” scenario (i.e., one year from the time the study was conducted, when the COVID-19 pandemic has been overcome and the economy has recovered) and a “*Negative Outlook*” scenario (i.e., one year from the time the study was conducted, when the pandemic is still ongoing and the economic situation has deteriorated further). Participants were presented with the outlook scenarios in random order, and no order effects were detected.²

In the second part of the study a survey was presented that comprised questions on various explanatory and moderator variables (trust in government, attitude towards taxes, and justice perceptions), as well as control variables on personal attitudes (optimism, political orientation, and risk propensity), and affectedness by the COVID-19 pandemic (economic affectedness, economic uncertainty, and perceived abuse of the system by others). Most survey questions were adapted from prior research. The remaining questions were developed by the authors. All materials are available via the Open Science Framework (<https://osf.io/7exmu/>).

2.2.1. Explanatory variables

Trust in government. Trust in the Austrian government was measured with a 5-point Likert-type item (“*How much do you trust the current Austrian government in general?*”), adapted from Kogler et al., 2015).

Attitude towards taxes. Attitude towards taxes was measured with a bipolar 5-point Likert-type item (“*In your opinion, are taxes something that ...is taken away from you.; ...you contribute to society.*”), adapted from Erard et al., 2018).

Justice perceptions. Justice perceptions were measured with four 5-point Likert-type items (e.g., “*Overall, the relationship between government services and the level of taxes is fair in Austria.*”, $\alpha = 0.86$, adapted from Kogler et al., 2015; Verboon & van Dijke, 2011).

2.2.2. Control variables

Optimism. General optimism was measured with a 5-point Likert-type item (“*I am always optimistic about the future.*”), retrieved from Glaesmer et al., 2008).

Political orientation. Political orientation was measured with a bipolar 7-point Likert-type item (“*Where would you place yourself on the political spectrum from left to right?*”).

Risk propensity. Risk propensity was measured with a bipolar 5-point Likert-type item (“*When it comes to financial decisions, do you prefer to be on the safe side or do you take a risk once in a while?*”), adapted from Dohmen et al. 2011).

2.2.3. Affectedness by the COVID-19 pandemic.

Economic affectedness. The extent to which participants were economically affected by the COVID-19 pandemic was measured with four 5-point Likert-type items (e.g., “*How much do you personally feel affected by the economic consequences of the COVID-19 pandemic (e.g., unemployment, loss of salaries or sales, bankruptcies)?*”, $\alpha = 0.79$).

Economic uncertainty. The perceived extent of economic uncertainty was surveyed with a 5-point Likert-type item (“*How uncertain do you feel about your current economic situation?*”).

Abuse of the system by others. The perceived extent of abuse of COVID-19 assistance programs was measured with one 5-point Likert-type item (“*In your opinion, how much do others unfairly take advantage of COVID-19 support assistance (e.g., reduced hours, financial assistance)?*”).

Sociodemographic variables. Participants were also asked to provide information on their gender, age, the highest level of education, place of residence, current employment status, and whether their employment status has changed due to the COVID-19 pandemic (short-time work, unemployment, early retirement).

¹ This approach, which is frequently used in the literature on tax compliance (e.g., Henderson & Kaplan, 2005), reflects the idea that behavior results from a causal sequence of beliefs, attitudes, social norms, and behavioral intentions. (Ajzen, 1985).

² We chose a within-subject design, rather than a between-subject design, to assess how taxpayers respond to changes in the economic environment. Within-subject designs have two main advantages over between-subject designs. They do not need random assignment to different experimental treatments for establishing internal validity, and they provide higher statistical power. The main disadvantages are confounds that result from presenting the same decision – though slightly different – multiple times such as order-, demand-, or reflection effects (Charness et al., 2012). However, we do not find that the order in which participants faced the different outlook scenarios had an effect on compliance.

3. Results

This section is organized into three parts. We first present results on our first research question on the effect of the economic consequences of the COVID-19 pandemic on tax compliance. Second, we present results on our second research question on the potentially mitigating effect of psychological factors. Finally, we present additional exploratory analyses.

3.1. Effects of the COVID-19 pandemic on tax compliance (RQ1)

Our first research question addressed the effect of the economic consequences of the COVID-19 pandemic on tax compliance. Fig. 1 displays relative tax compliance for the four economic environments. Compliance levels are lower in the *Present* and in the *Negative Outlook*, which suggests that the negative economic effects of the COVID-19 pandemic have the potential to reduce tax compliance. We used regression analyses to investigate this relationship further.

Model 1 (Table 1) shows results from linear mixed-effects regression with tax

compliance as dependent variable and economic environment as a fixed effect, dummy coded with the *Past* scenario ($M = 0.446$, $SD = 0.450$) as reference category. We included a random effect for participants to account for the repeated measures structure. We found significant effects of condition on tax compliance for the *Present* scenario ($B = -0.06$, $p < .001$, 95 % CI [-0.07, -0.05]; $M = 0.386$, $SD = 0.449$) and the *Negative Outlook* scenario ($B = -0.06$, $p < .001$, 95 % CI [-0.07, -0.04]; $M = 0.389$, $SD = 0.444$). No significant effect of condition on compliance was found for the *Positive Outlook* scenario ($B = 0.00$, $p = .990$, 95 % CI [-0.01, 0.01]; $M = 0.446$, $SD = 0.450$). In line with Fig. 1, these results indicate that in scenarios describing a negative economic environment during the COVID-19 pandemic tax compliance is lower compared to the *Past* scenario and the *Positive Outlook* scenario (see Table A2 of the Online Appendix for pairwise comparisons between conditions).

3.2. Role of psychological variables (RQ2)

Our second research question addressed whether higher trust in government, a positive attitude towards taxes, and perceived justice mitigate the negative effect of the economic environment on tax compliance. We ran a linear mixed-effects regression with tax compliance (reference category was again the *Past* scenario) as dependent variable and trust in government, attitude towards taxes, and justice perceptions as independent variables, plus the interaction of these three variables with our scenarios of the economic environment (Table 1, Model 2). We found positive effects of trust in government, $B = 0.14$, $p < .01$, 95 % CI [0.03, 0.24], and attitude towards taxes, $B = 0.38$, $p < .001$, 95 % CI [0.29, 0.47], on tax compliance, indicating that participants with higher trust and more positive attitude toward taxes reported higher tax compliance. Moreover, we found a significant interaction effect of attitude towards taxes and the *Negative Outlook* scenario, indicating that the compliance of individuals with a positive attitude towards taxes is largely unaffected by the *Negative Outlook* scenario, relative to the *Past* scenario, $B = 0.05$, $p < .05$, 95 % CI [0.00, 0.10].

We ran a third linear mixed-effects regression where we additionally controlled for optimism, political orientation, risk propensity, economic affectedness, economic uncertainty, perceived abuse of the system by others, and sociodemographic variables (Model 3, Table 1). We found a positive effect of attitude towards taxes, $B = 0.29$, $p < .001$, 95 % CI [0.19, 0.38], on tax compliance, while the effect of trust was not significant anymore in this model, $B = 0.06$, $p = .246$, 95 % CI [-0.04, 0.17]. The interaction effect of attitude towards taxes and the *Negative Outlook* scenario remains significant, $B = 0.06$, $p < .05$, 95 % CI [0.01, 0.10]. In addition, we found negative effects of risk propensity, $B = -0.15$, $p < .001$, 95 % CI [-0.25, -0.06], and economic affectedness, $B = -0.11$, $p < .05$, 95 % CI [-0.22, -0.00], indicating that higher levels of risk aversion and low economic affectedness was associated with higher tax compliance.

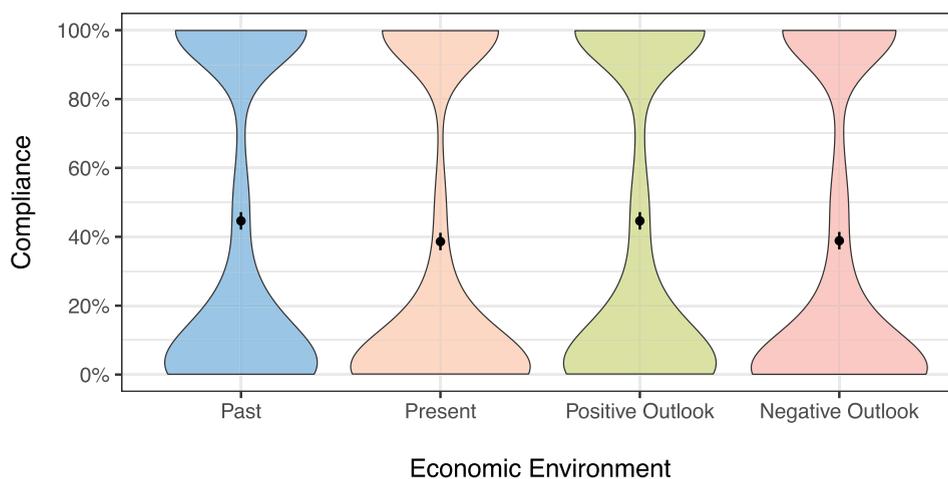


Fig. 1. Distribution of relative tax compliance in the four scenarios. *Notes.* Compliance is the relative share of an additional income of €1000 that participants would report in their tax declaration. Bars show 95 percent confidence levels.

Table 1

Three linear mixed-effects regression with tax compliance as dependent variable. Model 2 added trust in government, attitude towards taxes, and justice perceptions as independent variables. Model 3 added optimism, political orientation, risk propensity, economic affectedness, economic uncertainty, perceived abuse of the system by others and sociodemographic variables as control variables.

Compliance	Model 1			Model 2			Model 3		
(Intercept)	0.45	(0.01)	***	0.19	(0.03)	***	0.29	(0.08)	***
Present	-0.06	(0.01)	***	-0.07	(0.02)	***	-0.07	(0.02)	***
Positive Outlook	0.00	(0.01)		0.00	(0.02)		-0.00	(0.02)	
Negative Outlook	-0.06	(0.01)	***	-0.07	(0.02)	***	-0.07	(0.02)	***
Trust in Government (TIG)				0.14	(0.05)	**	0.06	(0.05)	
Attitude Towards Taxes (ATT)				0.38	(0.05)	***	0.29	(0.05)	***
Justice Perceptions (JP)				0.03	(0.07)		0.09	(0.07)	
Present × TIG				-0.01	(0.03)		-0.01	(0.03)	
Positive Outlook × TIG				-0.00	(0.03)		-0.00	(0.03)	
Negative Outlook × TIG				-0.04	(0.03)		-0.04	(0.03)	
Present × ATT				0.03	(0.03)		0.04	(0.03)	
Positive Outlook × ATT				0.01	(0.03)		0.02	(0.03)	
Negative Outlook × ATT				0.05	(0.03)	*	0.06	(0.03)	*
Present × JP				-0.01	(0.04)		-0.01	(0.04)	
Positive Outlook × JP				-0.02	(0.04)		-0.02	(0.04)	
Negative Outlook × JP				0.02	(0.04)		0.01	(0.04)	
Optimism							0.04	(0.05)	
Political Orientation: Right							0.00	(0.05)	
Risk Propensity							-0.15	(0.05)	***
Economic Affectedness							-0.11	(0.06)	*
Economic Uncertainty							-0.06	(0.04)	
Perceived Abuse							0.03	(0.04)	
Gender: Male							-0.08	(0.02)	***
Age							0.11	(0.06)	
Education							0.10	(0.03)	**
Blue Collar Worker							-0.07	(0.05)	
White Collar Worker							-0.01	(0.05)	
Self-employed							0.11	(0.06)	
In Training							0.10	(0.06)	
Retired							0.00	(0.05)	
Stay at Home							-0.05	(0.07)	
Job Other							-0.03	(0.07)	
<i>n</i> of observations	4800			4800			4776		
<i>N</i> of subjects	1200			1200			1194		
Marginal R^2	0.004			0.102			0.151		
Random effects (individual):									
Intercept <i>SD</i>	0.41			0.39			0.38		
Residual <i>SD</i>	0.17			0.17			0.17		

Notes. * $p < .05$; ** $p < .01$; *** $p < .001$. Standard errors in parentheses. Past (reference category), Present, Positive Outlook, and Negative Outlook refer to the four experimental scenarios. Six participants were excluded from the analysis in Model 3 because they identified as neither male nor female. Higher values indicate higher trust in government, a more positive attitude towards taxes, higher perceived justice, higher optimism, higher risk propensity, higher economic affectedness, higher economic uncertainty, higher perceived abuse of the system by others, and higher education. Job was dichotomized with unemployed as reference category. In all models, no significant order effects of outlook scenarios were detected.

We found a positive effect for educational level, $B = 0.10$, $p < .01$, 95 % CI [0.04 – 0.17], indicating that participants with a lower level of formal education were less compliant. In sum, when adding control variables and variables on economic affectedness to the model, we still find that a positive attitude towards paying taxes mitigates the negative effect of the *Negative Outlook* scenario on compliance.

3.3. Exploratory analyses

This section explores which taxpayer characteristics explain heterogeneity in compliance across the experimental scenarios. To this end, we divided the sample into three subgroups: (1) *Compliers*, i.e., individuals who would declare the full amount, independent of the economic environment; (2) *Noncompliers*, i.e., individuals who would declare no income, independent of the economic environment; and (3) *Conditional Compliers*, i.e., individuals who are neither *Compliers* nor *Noncompliers* (Fig. 2).

To explore the factors determining group affiliation, we ran three independent logistic mixed-effects regressions with dichotomized group affiliation as dependent variable (Table 2). *Noncompliers* are characterized by low trust in government, $OR = 0.41$, $p < .01$, 95 % CI [0.22, 0.78], a negative attitude towards taxes, $OR = 0.19$, $p < .001$, 95 % CI [0.11, 0.34], and high risk propensity, $OR = 1.95$, $p < .05$, 95 % CI [1.09, 3.52]. These participants are more likely to be male, $OR = 1.48$, $p < .05$, 95 % CI [1.09, 2.01], and less likely to be self-employed $OR = 0.40$, $p < .05$, 95 % CI [0.18, 0.88], or in training, $OR = 0.25$, $p < .01$, 95 % CI [0.10, 0.59].

By contrast, *Compliers* are characterized by a positive attitude towards taxes, $OR = 5.17$, $p < .001$, 95 % CI [3.02, 8.92], low risk propensity, $OR = 0.36$, $p < .001$, 95 % CI [0.19, 0.65], and low economic affectedness, $OR = 0.36$, $p < .01$, 95 % CI [0.17, 0.75]. They

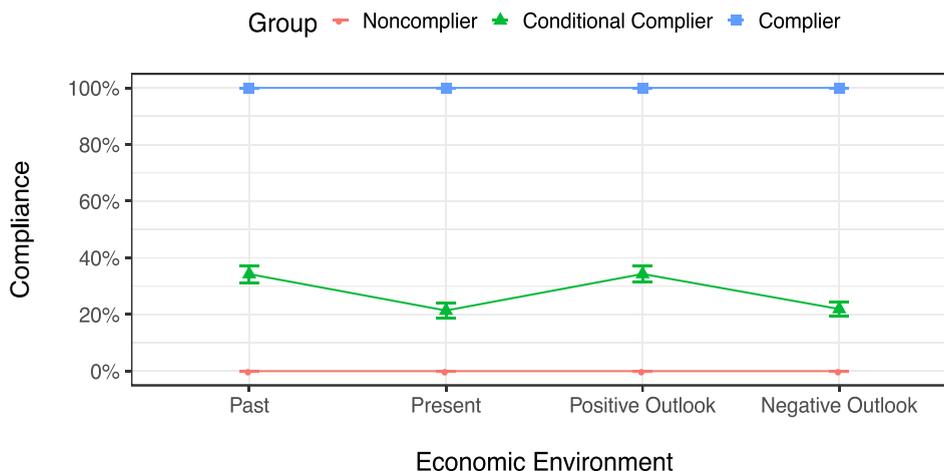


Fig. 2. Tax compliance per subgroup across experimental scenarios. Notes. Compliance is the relative share of an additional income of €1000 that participants would report in their tax declaration. Bars show 95 percent confidence levels. Noncomplier (n = 297), Complier (n = 344), Conditional Complier (n = 559). Means of independent variables per group are presented in Table A3 of the Online Appendix.

Table 2

Odds ratios of three independent logistic mixed-effects regression with dichotomized group affiliation to Noncomplier (NC), Complier (C), and Conditional Complier (CC) as dependent variable.

Predictors	Group Affiliation		
	NC (n = 297)	C (n = 344)	CC (n = 559)
(Intercept)	0.97	0.21*	0.55
Trust in Government	0.41**	1.33	1.61
Attitude Towards Taxes	0.19***	5.17***	0.87
Justice Perceptions	0.54	0.92	1.64
Optimism	0.73	1.30	1.05
Political Orientation: Right	1.60	1.35	0.55*
Risk Propensity	1.95*	0.36***	1.34
Economic Affectedness	1.07	0.36**	1.90*
Economic Uncertainty	0.70	0.73	1.61*
Perceived Abuse	0.81	1.07	1.09
Gender: Male	1.48*	0.65**	1.07
Age	1.72	2.12*	0.41**
Education	0.86	2.17***	0.59**
Blue Collar Worker	1.48	0.56	1.06
White Collar Worker	0.81	0.66	1.61
Self-employed	0.40*	1.30	1.45
In Training	0.25**	1.25	1.86*
Retired	0.89	0.83	1.11
Stay at Home	0.54	0.70	1.89
Job Other	0.98	0.83	1.17
COVID-19 Unemployed	1.08	0.75	1.13
COVID-19 Short time	0.94	1.23	0.93

Notes. *p <.05; **p <.01; ***p <.001. Six participants were excluded from the analysis because they identified as neither male nor female. Higher values indicated higher trust in government, a more positive attitude towards taxes, higher perceived justice, higher optimism, higher risk propensity, higher economic affectedness, higher economic uncertainty, higher perceived abuse of the system by others, and higher education. Job was dichotomized with unemployed as reference category.

are more likely to be female, OR = 0.65, p <.01, 95 % CI [0.48, 0.86], older, OR = 2.12, p <.05, 95 % CI [1.06, 4.27], and relatively highly educated, OR = 2.17, p <.001, 95 % CI [1.45, 3.25].

Conditional compliers are more likely to be politically left-leaning, OR = 0.55, p <.05, 95 % CI [0.32, 0.96], more affected by the economic consequences of the COVID-19 pandemic, OR = 1.90, p <.05, 95 % CI [1.02, 3.55], and report more economic uncertainty, OR = 1.61, p <.05, 95 % CI [1.01, 2.56]. However, while these effects are significant at the five percent level in our main analyses, the effect of economic uncertainty does not reach statistical significance in the robustness checks presented in the Online Appendix. Conditional compliers are also younger, OR = 0.41, p <.01, 95 % CI [0.23, 0.73], less educated, OR = 0.59, p <.01, 95 % CI [0.41, 0.85], and more likely to be in training OR = 1.86, p <.05, 95 % CI [1.01, 3.44].

To test the robustness of the results we ran additional analyses, where we included participants who indicated at least 90 %

compliance in all of the four scenarios to the group of *Compliers* and participants who indicated 10 % compliance or less in all of the four scenarios to the group of *Noncompliers*, while we excluded participants from the *Conditional Complier* group that showed no variance in behavior. The results remain largely unchanged. However, the effect of trust in government (for *Compliers*), as well as the effect of economic uncertainty (for *Conditional Compliers*), render insignificant in these robustness tests. All results can be found in Tables A4 - A6 of the Online Appendix.

4. Discussion and conclusion

This paper employed a scenario study on a sample of 1200 Austrian taxpayers to investigate the effect of the COVID-19 pandemic on tax compliance and the role of psychological factors in mitigating this effect. Moreover, the study explored the demographic variables that potentially explain the effect of the pandemic on compliance.

The present study is among the first to provide experimental evidence for a negative effect of an economic crisis on tax compliance. Specifically, the results show that tax compliance was lower in scenarios with a negative economic environment (*Present* and *Negative Outlook*) than in scenarios with a more positive economic environment (*Past* and *Positive Outlook*). We also found an interaction between attitude toward taxes and the *Negative Outlook* scenario, indicating that a positive attitude toward taxes has the potential to mitigate the negative effect of economic crises on compliance. Independent of the economic environment, taxpayers with a more positive attitude towards taxes, taxpayers with a lower risk propensity, and taxpayers who indicated that they were largely unaffected by the economic consequences of the crisis indicated higher willingness to pay taxes.

The results of the exploratory analyses reveal that taxpayers who change their compliance behavior in response to the economic environment (*Conditional Compliers*) are more strongly affected by the economic crisis and feel more uncertain about their economic situation, however, the significant effect of economic uncertainty is not corroborated in our robustness tests. Nevertheless, these results provide some indication that tax compliance is lower among taxpayers who are hit particularly hard by an economic crisis (Heinemann, 2011). *Conditional Compliers* are younger, less educated, and more likely to be in training than *Compliers* and *Noncompliers*. Moreover, these taxpayers feel more strongly affected by the crisis and consequently experience greater economic uncertainty. Policy interventions should target these individuals to reduce economic uncertainty and strengthen tax compliance in times of crisis. Moreover, our finding of low trust in government and negative attitude towards taxes among *Noncompliers* as well as a positive attitude towards taxes among *Compliers* suggests that building trust in government and strengthening a positive attitude toward taxes has overall positive effects on compliance.

Self-employed taxpayers are of particular relevance in tax compliance research. These taxpayers have the greatest opportunity to evade and have been affected particularly strongly by the pandemic. As a result, the COVID-19 pandemic might have a stronger effect on the compliance of self-employed taxpayers; hence, it seems likely that they might be part of the group of *Conditional Compliers*. However, logistic regression analyses reveal that self-employed taxpayers are not over-represented in any specific group of taxpayers. In contrast, we find that these taxpayers are less likely affiliated with the group of *Noncompliers*. Our sample comprised only a small number of self-employed taxpayers ($n = 91$) and does not allow for a detailed analysis of this group. Consequently, we consider a careful investigation of the COVID-19 pandemics' effect on self-employed taxpayers as an important avenue for future research.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

We have shared alle data and materials on OSF: <https://osf.io/7exmu/>.

Acknowledgments

The authors two to seven are listed in alphabetical order. The project was partly (concept, data collection) financed by the Austrian Ministry of Finance with the aim to examine the societal, social, and economic consequences of the COVID-19 pandemic. We thank the editor and two anonymous referees for their helpful comments and suggestions.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.joep.2022.102572>.

References

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In I. J. Kuhl, & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11–39). Berlin, Heidelberg, New York: Springer-Verlag.

- Alm, J., Blaufus, K., Fochmann, M., Kirchler, E., Mohr, N. C., Olsen, N. E., & Torgler, B. (2020). Tax Policy Measures to Combat the SARS-CoV-2 Pandemic and Considerations to Improve Tax Compliance: A Behavioral Perspective. *Finanzarchiv/Public Finance Analysis*, 76(4), 396–428. <https://doi.org/10.1628/fa-2020-0014>
- Brondolo, J. (2009). Collecting Taxes During an Economic Crisis: Challenges and Policy Options. *IMF Staff Position Notes*, 2009(17), 2. <https://doi.org/10.5089/9781462339440.004>
- Charness, G., Gneezy, U., & Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization*, 81(1), 1–8. <https://doi.org/10.1016/j.jebo.2011.08.009>
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences. *Journal of the European Economic Association*, 9(3), 522–550. <https://doi.org/10.1111/j.1542-4774.2011.01015.x>
- Engel, C., Mitton, L., & Morreale, A. (2020). Tax morale and fairness in conflict an experiment. *Journal of Economic Psychology*, 81, Article 102314. <https://doi.org/10.1016/j.joep.2020.102314>
- Erard, B., Kasper, M., Kirchler, E., & Olsen, J. (2018). What influence do IRS audits have on taxpayer attitudes and perceptions? Evidence from a national survey. *National Taxpayer Advocate Annual Report to Congress*, 2, 77–130.
- Fatas, E., Nosenzo, D., Sefton, M., & Zizzo, D. J. (2021). A self-funding reward mechanism for tax compliance. *Journal of Economic Psychology*, 86, Article 102421. <https://doi.org/10.1016/j.joep.2021.102421>
- Fochmann, M., Müller, N., & Overesch, M. (2021). Less cheating? The effects of prefilled forms on compliance behavior. *Journal of Economic Psychology*, 83, Article 102365. <https://doi.org/10.1016/j.joep.2021.102365>
- Gangl, K., & Torgler, B. (2020). How to Achieve Tax Compliance by the Wealthy: A Review of the Literature and Agenda for Policy. *Social Issues and Policy Review*, 14(1), 108–151. <https://doi.org/10.1111/sipr.12065>
- Gangl, K., van Dijk, W. W., van Dijk, E., & Hofmann, E. (2020). Building versus maintaining a perceived confidence-based tax climate: Experimental evidence. *Journal of Economic Psychology*, 81, Article 102310. <https://doi.org/10.1016/j.joep.2020.102310>
- García, F., Opromolla, L. D., Vezzulli, A., & Marques, R. (2020). The effects of official and unofficial information on tax compliance. *Journal of Economic Psychology*, 78, Article 102265. <https://doi.org/10.1016/j.joep.2020.102265>
- Glaesmer, H., Hoyer, J., Klotsche, J., & Herzberg, P. Y. (2008). Die deutsche Version des Life-Orientation-Tests (LOT-R) zum dispositionellen Optimismus und Pessimismus. *Zeitschrift Für Gesundheitspsychologie*, 16(1), 26–31. <https://doi.org/10.1026/0943-8149.16.1.26>
- Grundmann, S., & Graf Lambsdorff, J. (2017). How income and tax rates provoke cheating – An experimental investigation of tax morale. *Journal of Economic Psychology*, 63, 27–42. <https://doi.org/10.1016/j.joep.2017.10.003>
- Heinemann, F. (2011). Economic crisis and morale. *European Journal of Law and Economics*, 32(1), 35–49. <https://doi.org/10.1007/s10657-010-9165-z>
- Henderson, B. C., & Kaplan, S. E. (2005). An examination of the role of ethics in tax compliance decisions. *Journal of the American Taxation Association*, 27(1), 39–72.
- Karpoff, J. M. (2021). The future of financial fraud. *Journal of Corporate Finance*, 66, Article 101694. <https://doi.org/10.1016/j.jcorpfin.2020.101694>
- Kasper, M., Kogler, C., & Kirchler, E. (2015). Tax policy and the news: An empirical analysis of taxpayers' perceptions of tax-related media coverage and its impact on tax compliance. *Journal of Behavioral and Experimental Economics*, 54, 58–63. <https://doi.org/10.1016/j.socec.2014.11.001>
- Kasper, M., & Alm, J. (2022). Audits, audit effectiveness, and post-audit tax compliance. *Journal of Economic Behavior & Organization*, 195, 87–102. <https://doi.org/10.1016/j.jebo.2022.01.003>
- Kasper, M., & Rablen, M. (in press). Tax compliance after an audit: Higher or lower? *Journal of Economic Behavior & Organization*.
- Kirchler, E., Hoelzl, E., & Wahl, I. (2008). Enforced versus voluntary tax compliance: The “slippery slope” framework. *Journal of Economic Psychology*, 29(2), 210–225. <https://doi.org/10.1016/j.joep.2007.05.004>
- Kogler, C., Muehlbacher, S., & Kirchler, E. (2015). Testing the “slippery slope framework” among self-employed taxpayers. *Economics of Governance*, 16(2), 125–142. <https://doi.org/10.1007/s10101-015-0158-9>
- Lago-Peñas, I., & Lago-Peñas, S. (2010). The determinants of tax morale in comparative perspective: Evidence from European countries. *European Journal of Political Economy*, 26(4), 441–453. <https://doi.org/10.1016/j.ejpoleco.2010.06.003>
- Olsen, J., Kasper, M., Kogler, C., Muehlbacher, S., & Kirchler, E. (2019). Mental accounting of income tax and value added tax among self-employed business owners. *Journal of Economic Psychology*, 70, 125–139. <https://doi.org/10.1016/j.joep.2018.12.007>
- Tyler, T. R., Goff, P. A., & MacCoun, R. J. (2015). The Impact of Psychological Science on Policing in the United States: Procedural Justice, Legitimacy, and Effective Law Enforcement. *Psychological Science in the Public Interest*, 16(3), 75–109. <https://doi.org/10.1177/1529100615617791>
- Verboon, P., & van Dijke, M. (2011). When do severe sanctions enhance compliance? The role of procedural fairness. *Journal of Economic Psychology*, 32(1), 120–130. <https://doi.org/10.1016/j.joep.2010.09.007>