UNIVERSITAT ROVIRA I VIRGILI

TAX COMPLIANCE & THE WELFARE STATE: THE ROLE OF EDUCATION, IDEOLOGY AND IMMIGRATION IN TAX MORALE.

David Rodriguez Justicia

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TESI DOCTORAL – TESIS DOCTORAL- DOCTORAL THESIS
2019

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UNIVERSITAT ROVIRA I VIRGILI

Department of Economics

Ph.D. Dissertation

TAX COMPLIANCE & THE WELFARE STATE: THE ROLE OF EDUCATION, IDEOLOGY AND IMMIGRATION IN TAX MORALE

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Submitted to the Department of Economics of Universitat Rovira i Virgili
in the fulfillment of the requirements for the degree of
Doctor of Philosophy in Economics

Reus

2019

David Rodriguez-Justicia

Tax compliance & the welfare state: the role of education, ideology and immigration in tax morale

PH.D. DISSERTATION

Directed by   Bernd Theilen

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UNIVERSITAT ROVIRA i VIRGILI

Reus

2019

I STATE that the present study, entitled *Tax compliance & the welfare state: the role of education, ideology and immigration in tax morale*, presented by David Rodriguez Justicia for the award of the degree of Doctor, has been carried out under my supervision at the Department of Economics of this university.

Reus, June 26th, 2019

The Doctoral Thesis Supervisor

Bernd Theilen

Acknowledgments

First and foremost I would like to express my sincere gratitude to my supervisor Dr. Bernd Theilen. I could not have imagined having a better mentor for my Ph.D thesis. Studying under his guidance has been a great privilege for which I feel extremely grateful. His knowledge, generosity and patience have inspired me throughout this project. Under his supervision I have learned much more than just doing research. Without him, this thesis would not have been possible.

Besides my supervisor, I would like to thank the thesis committee for accepting my invitation. I feel fortunate to have committe members Jorge Martinez-Vazquez, Alejandro Esteller-Moré and Susana Iranzo whose work I regard so highly.

Furthermore, I would like to express my gratitude to all members of the Doctoral Program in Economics and Business at the Universitat Rovira i Virgili (URV), specially to the members of the Economics Department, the Center for Research in Industrial and Public Economics (CREIP) and the Research Group on Organization and Decision (GRODE) for their valuable advice and support. I would particularly like to thank Raffaele Fiocco, Susana Iranzo, Carolina Manzano, Óscar Martínez and Jordi Sardà for their helpful comments and suggestions, and the administrative staff, Eulàlia Torner, Lourdes Rofín, Mª Dolores Siles and Verònica Gombau for the assistance received.

I appreciate the feedback offered by many people in the conferences, workshops, seminars and courses I participated in Aix-en-Provence, Barcelona, Berlin, Exeter, Madrid, Oviedo, Reus, Strasbourg, Toledo and Valencia. Thank you for your comments, suggestions and the good times shared.

I am also grateful to Dr. Jürgen Schupp, Dr. Markus M. Grabka, Dr. Carsten Schröder and Ms. Christine Kurka for giving me the opportunity to do my research stay at the German Institute for Economic Research (DIW).

Through these years at the University I have met many colleagues with whom I share common interests and experiences. It is a pleasure to have met Ali Barakat, Marina Baninkova, Carlos Cercós, Eva Coll, Giuseppe D'Amico, Elisenda Jové, Carles Méndez, Karen Miranda, Anna Moskalenko, Frank Sackey, Patricia Sanz, Mª José Solís, Françeska Tomori, Judit Turrión, Mimi Zhang and Yitagesu Zewdu.

I would also like to thank my personal friends Ruben, Marta, Sebas, Eva, Edu and Bàrbara for the encouragement received and their interest in my work.

Finally, I owe my deepest gratitude to my family for making the most valuable contribution with their patience and understanding. To my parents Fernando and Mari, my brother Victor, and my beloved Cristina for all the support given throughout this project. This thesis is yours too.

David Rodriguez-Justicia
June 2019, Reus

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FOREWORD

After the 2008 financial crisis and the subsequent sovereign debt crisis, many developed economies had to deal with decreasing revenues and rising expenditures forcing many governments to retrench the welfare state. At the same time, it was revealed that cuts in welfare benefits could have been avoided by reducing tax evasion. In this context, understanding the determinants of tax evasion became a major objective for public fiscal policy.

Tax evasion was first modeled by Allingham and Sandmo (1972). This model analyzes tax evasion as an expected-utility maximization problem where the decision to evade taxes depends on the benefits from tax evasion (the evaded tax payments by under-declaration), and on tax enforcement (the probability of detection and fines and sanctions). However, as this model has failed to yield good predictions of the observed taxpayers' behavior, the recent literature has focused on other factors that contribute to *voluntary tax compliance* (or tax morale) as opposed to *enforced tax compliance* on which the traditional tax evasion model relies. This thesis contributes to the literature with three studies organized as chapters identifying new determinants of tax morale.

Chapter 1 analyzes the role of education in shaping tax morale, a fundamental question that has been totally ignored by the existing literature. Given the insights from the psychological and political science literature, two hypotheses regarding the influence of formal education on tax morale are derived. The first hypothesis states that individuals who obtain higher direct benefits from the state exhibit higher levels of tax morale and that this effect is more pronounced for the more highly educated because they are more aware of the connection between tax payments and benefits received from the state. The results indicate that education, indeed, has an important impact on tax morale for those individuals that are net beneficiaries of the welfare state. The second hypothesis states that, as the more highly educated are better informed, the educational level positively (negatively) affects tax morale when citizens' indirect welfare state benefits are large (small). The results confirm this hypothesis. Thus, the more highly educated exhibit higher levels of tax morale in countries with better quality services, a fairer tax system and more transparent institutions. These results indicate that increasing the information about direct and indirect benefits is particularly important in the case of the less well educated, and that increasing the educational level of the population will help to increase tax morale only when what citizens receive from the state in exchange for their tax payments is of high quality. Otherwise, promoting policies that increase the

educational level of the population could have a negative impact on tax morale.

Chapter 2 analyzes the impact of ideological differences between citizens and governments on tax morale. In democracy the tax system and the composition of public expenditure is determined through the election of the programs of political parties. Accordingly, the extent to which citizens agree with the implemented policies depends on their political and social stances. Based on the predictions from a theoretical model in which voters' tax compliance behavior is driven by fairness concerns, the chapter empirically analyzes the channels through which ideological stances influence citizens' willingness to pay taxes. A causal link between ideology and tax morale is established by using instrumental variables estimation with heteroskedasticity-based instruments. The results indicate that tax morale decreases with ideological differences between citizens and their governments. Citizens ideologically to the right of the government exhibit a lower willingness to pay taxes than those to the left. Therefore, an electoral change from a right-wing to a left-wing government reduces tax morale. This effect is more than twice as large in countries with a public sector size that lies ten percentage point above the average. By contrast, in countries with a public sector size that is five percentage points below the average, the difference in the impact of ideological difference to the government on tax morale between moderate leftists and rightists vanishes completely. These results suggest a new perspective on tax evasion. Citizens do not only evade for individual pecuniary motives but also to correct governmental public expenditure toward what they consider from their ideological perspective as the optimal level. This 'voting with tax compliance' gives a rather pessimistic view on the extent to which income redistribution can be effectively achieved in modern welfare states as citizens who consider that taxes are too high move part of their income underground or abroad.

Chapter 3 analyzes the impact of citizens' stances towards immigration on tax morale. Noticing that the aforementioned welfare retrenchment has coincided with increased immigration since the 2000s, European policy makers have become increasingly concerned regarding the belief that immigration is harmful to welfare state sustainability. This has led to the inclusion of a question on this regard into the fourth wave of the EVS in 2008. Based on this question the third chapter of the thesis analyzes whether the belief that immigrants are a strain on the welfare system has an impact on their willingness to pay taxes. While these perceptions are fairly unrelated to existing levels and flows of immigration and its real economic impact, the results indicate that perceptions of immigration are relevant as regards voluntary tax compliance and therefore, most likely, to real tax compliance. Specifically, lower levels of tax morale are found among citizens who believe that immigrants are a strain on their country's welfare system. Consequently, the false belief that immigration erodes the welfare system could turn into a self-fulfilling prophecy.

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Chapter 1

Education and Tax Morale

Overview. While the determinants of tax morale have been widely studied in the literature, surprisingly, the fundamental influence of education on tax morale has yet to be investigated. Given the insights from the psychological and political science literature about the role of education in the formation of social values, in this paper, we analyze two channels through which education shapes tax morale. We find that education has a positive impact on tax morale for those individuals that are net beneficiaries of the welfare state, and a negative impact for those that are net contributors. Furthermore, our results indicate that the more highly educated because of their better knowledge on public affairs exhibit higher levels of tax morale in countries that have better quality public services, a fairer tax system and higher quality institutions.

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1.1 Introduction

After the financial crisis in 2008 and the following sovereign debt crisis, many countries have experienced a substantial fall in their tax revenues and have been obliged to reduce the size of the public sector and to cut welfare benefits. In such a context, reducing tax evasion and increasing the tax morale of citizens has become a major objective of public fiscal policy. In a report for the European Parliament, Murphy (2012) estimates that in 2009 the tax revenue loss due to tax evasion in the European Union (EU) exceeded €860 billion. This quantity is similar to total healthcare expenditure in the EU. Unsurprisingly, the fight against tax evasion has become one of the EU's principle concerns (European Commission, 2017).

The literature agrees that tax evasion is a complex phenomenon which, beyond the traditional cost-benefit analysis, is influenced by several other factors that together make up so-called tax morale and which consists of personal values, social norms and attitudes towards public institutions. While the relationship between an individual's tax morale and some of its determinants is already well understood (e.g., tax behavior of the individual's reference groups, age, gender, religion), the fundamental influence of education on tax morale has to date been ignored. This is all the more surprising as the psychology and political sciences literature tells us that education is an important factor in channeling individual behavior regarding social values, political attitudes and the general assessment of public affairs. On the basis of these insights, in this article we use data from the European Values Study (EVS) to explore the role of education as an indirect channel in shaping individuals' tax morale.

The results in the aforementioned literature indicate that there are two main reasons why educational level should influence tax morale. First, it is an indicator of the higher cognitive abilities that are necessary to understand the relationship between tax payments and many of the indirect benefits obtained individually in modern welfare states. Therefore, we expect individuals who are the main beneficiaries of welfare state benefits to exhibit higher tax morale. Moreover, this effect should be more pronounced among the more highly educated because they are more aware of the connection between tax payments and the benefits received from the state. Indeed, our result indicate that for unemployed and retired individuals tax morale and the educational level are positively related. By contrast, for the self-employed, who obtain comparatively lower benefits in exchange for their tax payments, tax morale and the educational level are negatively related. The second reason why we expect education to have an influence on tax morale is that more highly educated citizens are better informed and enabled to process information from the media. This affects their relationship with public institutions and, consequently, their tax morale. Our results confirm this conjecture. We find that the more highly educated

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exhibit higher levels of tax morale in countries that have better services, a fairer tax system and higher quality institutions.

The remainder of this paper is organized as follows. Section 1.2 relates our study to the literature. In Section 1.3 we put forward two hypotheses regarding the role of education in determining tax morale. Section 1.4 describes the data and the empirical model. In Section 1.5 we discuss the results of our empirical model and provide some robustness checks. Section 1.6 concludes.

1.2   Literature review

As tax compliance is an important topic with a vast amount of literature devoted to it, this section gives only a brief review of the literature most related to our study.[1] We distinguish between the economic literature based on the traditional tax evasion model and the multi-discipline literature on tax morale. Furthermore, we comment more specifically on the literature that has analyzed the impact of education on tax morale.

1.2.1   The traditional tax evasion model

The individual motives or incentives for tax evasion have been studied in the framework of the classical tax evasion model developed by Allingham and Sandmo (1972). This model analyzes a tax payer's decision to evade taxes as an expected-utility maximization problem where effective tax evasion depends on *tax enforcement*, and on the *benefits from tax evasion* (the evaded tax payments by under-declaration). However, as this model has failed to yield good predictions of the observed tax payers' behavior, the recent literature has focused on other factors that contribute to voluntary tax compliance and to the concept of *tax morale* as opposed to enforced tax compliance on which the traditional tax evasion model relies.

1.2.2   Tax morale

The concept of tax morale was developed during the 1960s and 1970s by Günter Schmölders and his colleagues, known as the 'Cologne school of tax psychology'.

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[1]For more extensive literature reviews on tax evasion see, for example, Andreoni et al. (1998), Alm (1999), Kirchler (2007), Hofmann et al. (2008), Kirchler et al. (2008), Alm (2012), Hashimzade et al. (2013) and Pickhardt and Prinz (2014); on tax morale see, Torgler (2007). For surveys on tax compliance and tax morale experiments see Torgler (2002b) and Mascagni (2014). Finally, Torgler (2016) reviews the data sources that have been used in the literature so far.

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It was then taken up by economists and psychologists in the 1990s and received considerable attention since the 2000s. In line with the most recent literature we categorize the associated studies into three branches: personal and social norms, trust in authorities and further socio-demographic controls.

Personal and social norms. The literature has stressed the importance of personal and social norms for tax compliance (Hofmann et al., 2008; Wenzel, 2004). Personal norms comprise personal values, ethical reasoning, inequality aversion and religious beliefs and deal with what is generally perceived as good or bad. For example, the religious convictions of individuals have been proved to be an important factor for voluntary tax compliance (Grasmick et al., 1991; Stack and Kposowa, 2006; Torgler, 2006). Social norms are socially shared beliefs about how members of a group should behave and, according to Sigala et al. (1999), are one of the most important predictors of tax compliance. They find that a taxpayer's compliance crucially depends on the perceived tax evasion in her reference group (friends, neighbours, or colleagues). Finally, Konrad and Qari (2012) find that patriotic persons exhibit higher levels of tax morale.

Trust in public institutions. As another important factor for tax morale the literature has identified citizens' trust in public sector institutions where perceptions regarding the fairness and efficiency of the welfare state play a prominant role. According to Feld and Frey (2002), the relationship between taxpayers and authorities can be understood as an implicit or 'psychological' contract. Taxpayers expect that the government provides goods and services in exchange for their tax payments. As a result, tax compliance is higher (lower) in situations in which citizens are satisfied (discontent) with the *indirect benefits* they receive through the quality and quantity of public provision (e.g., Alm et al., 1993; Barone and Mocetti, 2011). Regarding the general quality of public provision it has been shown that 'trust' in political leadership and in the public administration leads to more voluntary tax compliance (e.g., Alm et al., 2006; Torgler, 2004b, 2005b).[2]
In the literature, the quality of public institutions and of service provision has been measured by the effectiveness of tax deterrence, the treatment of taxpayers by the tax authority, ethnic fractionalization, institutional transparency (corruption), and income inequality. Regarding the effectiveness of tax evasion deterrence, a clear relationship between the intensity of control and the severity of sanctions, on the one hand, and tax compliance, on the other hand, cannot be established. Following Feld and Frey (2007), these ambiguous effects of tax deterrence can be explained by the

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[2]Different measures of trust based on individual perceptions have been used in these studies (e.g., trust in government, trust in the president, trust in the legal system, trust in officials), showing a positive relationship with tax morale

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fact that while more audits reduce tax evasion they can also create an atmosphere of mistrust that reduces tax compliance (Pommerehne and Frey, 1992). With respect to the treatment of taxpayers by tax authorities, Frey and Feld (2002) and Feld and Frey (2002) show for Switzerland that an increased dialogue between tax payers and tax authorities contributes to raising tax morale. This is particularly the case in cantons that use referendums and initiatives in political decision making, whereas in cantons with a predilection for representative decision making a more authoritarian approach is found to be more effective.[3] Ethnic fractionalization is shown to have a negative impact on tax compliance by Lago-Peñas and Lago-Peñas (2010). Moreover, Torgler (2006) finds that a higher level of perceived corruption (less institutional transparency) lowers tax morale.[4] Finally, Doerrenberg and Peichl (2013) find that individuals in countries with a more progressive tax rate system are more likely to exhibit a higher general tax morale whereas, however, this effect decreases with the individual income level.

Socio-demographic control variables.   In addition to the two aforementioned groups of variables, most studies include a large number of socio-demographic variables such as age, gender, occupational status, marital status, income level, and educational level. Regarding the impact of these variables on tax morale it has been found that elder (e.g., Martinez-Vazquez and Torgler, 2009; Torgler, 2005b), women (e.g., Alm and Torgler, 2006; Torgler and Murphy, 2004; Torgler and Valev, 2010), retired persons (e.g., Konrad and Qari, 2012; Torgler, 2005a, 2006) and married individuals (e.g., Alm and Torgler, 2006; Torgler, 2005b) exhibit higher levels of tax morale, while the self-employed (e.g., Alm and Torgler, 2006; Torgler, 2004b) manifest lower levels of tax morale. Finally, with respect to the effect of income on tax morale, the results are less clear.[5] For example, Torgler (2006), Alm et al. (2006) and Doerrenberg and Peichl (2013) find a negative relationship between income and tax morale, while Konrad and Qari (2012) and Torgler et al. (2008) do not find that income has a significant impact on tax morale.

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[3]Regarding trust in tax authorities (i.e., the relationship between taxpayers and the tax office), Kirchler et al. (2008) suggest the 'slippery slope' framework for tax compliance in which both the power of tax authorities (tax enforcement) and trust in the tax authorities are relevant dimensions for understanding enforced and voluntary compliance.

[4]Friedman et al. (2000) show empirically in a cross-country study that corruption and the size of the shadow economy are positively correlated.

[5]Notice, that from the theoretical tax evasion models by Allingham and Sandmo (1972) and Yitzhaki (1974) the predicted influence of income on tax compliance is also ambiguous.

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1.2.3   Education and tax compliance

Despite the large number of studies that analyze the determinants of tax compliance and tax morale, none of them has comprehensively focused on the role of education in shaping tax morale. The relationship between education and tax compliance has been discussed by Lewis (1982). He conjectures that better educated taxpayers are better able to understand tax law and would be better aware of opportunities to avoid paying taxes. Regarding the empirical evidence, what is known about the influence of education on tax compliance stems from student questionnaires, country survey data or studies that include education as a further control. The limitations of these studies are that they have either been based on a limited number of student questionnaires or on surveys for specific countries. Furthermore, the studies that have included education merely as a further socio-economic control have obtained no unanimous result for its impact on tax morale.

Regarding the results obtained from studies based on student questionnaires, Chan et al. (2000) analyze responses from 157 students from two universities, one in the U.S. and the other in Hong Kong. They observe a negative relationship between educational level and tax compliance. McGee and Ross (2012) compare student surveys form six countries and obtain mixed results regarding the relationship between education and tax compliance. In Brazil, Russia and China the most opposed to tax evasion are individuals with a low level of education, and in India and the U.S. the more highly educated exhibit higher tax morale. In contrast, in Germany, it is those with a medium level of education who exhibit the lowest levels of tax compliance. Finally, Ahmed and Braithwaite (2005) and Braithwaite and Ahmed (2005) survey 447 Australian graduates and find that the form of financing tertiary education and the degree of satisfaction with university quality influence the tax compliance behavior of the more highly educated.

The influence of education on tax compliance has also been analyzed using country survey data. For the Netherlands, Groot and van den Brink (2010) examine a survey data set from 1996 on criminal behaviour to analyse the effects of education on offences and crimes committed. Among other results, they obtain that among the 2951 respondents of the survey the probability of committing tax fraud increases with years of education. The opposite result is obtained by Alarcón-García et al. (2012) who use Spanish data from a 2007 survey based on 1329 observations to analyze the relationship between gender and tax morale. They find that the level of education in general and knowledge of fiscal norms in particular are important determinants of the individual's declared attitude towards fraud. In the case of education, they obtain that the individual attitude against fraud increases with the educational level.

The relationship between education and tax morale has been discussed by

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Torgler (2007). He expects that education affects the tax compliance behavior of the more highly educated citizens because they might be better aware of welfare state benefits and government wastes. In empirical studies on tax morale, education has been used as a socio-economic control. However, many studies cannot find a significant influence of education on tax morale and, when it is significant, the sign of the relationship varies across studies and is often not robust throughout specifications. Studies that identify a positive relationship between education and tax morale are, for example: Torgler (2005a), who analyzes the relationship between direct democracy and tax morale for Switzerland; Torgler (2005b), who analyzes the determinants of tax morale in Latin American countries; Konrad and Qari (2012), who explores the relationship between patriotism and tax morale; and Torgler (2012), who explores differences in tax morale in 10 eastern European countries. Examples of studies that find a negative relationship are: Torgler (2006), who analyzes the role of religiosity on tax morale; Frey and Torgler (2007), who study how perceptions of other taxpayers' behaviour influence an individual's tax morale; Lago-Peñas and Lago-Peñas (2010), who explore the determinants of tax morale in European countries; and Doerrenberg and Peichl (2013), who investigate the effect of tax progressivity on tax morale. A comprehensive overview of the empirical literature on tax morale and education (with a significant influence of the education variable) can be found in Table 1.1.

Finally, while the focus in this paper is on *formal* education, some studies have also reported an effect of *informal* education on tax morale. Torgler and Valev (2010), for example, include the respondents' interest in politics. However, they cannot find a significant influence of this variable on tax morale. Torgler (2012), appart from formal education, uses information on whether the respondents discuss politics with friends and their tendency to follow politics in the media as indicators of informal education. While the relationship between tax morale and the variable indicating whether the respondents follow politics in the media is positive, it is negative for the other variable. Interestingly also, Torgler and García-Valiñas (2007) find a positive relationship between environmental morality and a set of indicators of informal education (discussing politics, having interest in politics and giving importance to politics).

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Table 1.1: Education and tax morale in the literature.

Reference	Database (Years)	Sample	Operationalization	Finding
Torgler (2002a)	World Values Survey (WVS) (1990-1996)	Switzerland, Belgium and Spain	Age at which full time education was completed	Positive only for Spain in 1990
Torgler (2003c)	Taxpayer Opinion Survey (TOS) (1987)	United States	Last grade of school completed (9-point scale)	Negative
Torgler (2003a)	WVS (1990, 1997)	Germany (Western and Eastern)	For the 1990 specifications, age at which full time education was completed. For the 1999 specifications, highest educational level attained (9-point scale).	Negative in 1997 for Western and Eastern Germany but not significant in 1990
Torgler (2003b)	WVS (1996) and International Social Survey Programme (ISSP) (1999)	Switzerland	Highest educational level attained (9-point and 6-point scale in the WVS and the ISSP, respectively)	Positive for the ISSP sample. Not significant for the WVS sample
Torgler (2004b)	WVS (1990-1997)	7 Asian countries: Bangladesh, China, India, Japan, Philippines, South Korea and Taiwan	Highest educational level attained (9-point scale, 5-point scale for India)	Negative when pooling all countries in 1995-1997. Positive for India (when pooling years 1990 and 1995/1996)
Torgler (2005a)	ISSP (1998)	Switzerland	Highest educational level attained (6-point scale)	Positive
Torgler (2005b)	WVS (1995-1997) and Latinobarometro (1998)	The WVS and the Latinobarometro cover 10 and 17 Latin American countries respectively (ARG, BOL, BRA, COL, COS, CHI, ECU, EL, GUA, HON, MEX, NIC, PAN, PAR, PER, URU, VEN, PRI and DOM)	Highest educational level attained in the WVS (9-point scale) and age at which education was completed in the Latinobarometro	Negative in 2 out of 4 specifications in the WVS sample; positive in 2 out of 4 specifications in the Latinobarometro
Torgler (2006)	WVS (1995-1997)	32 countries: W-GER E-GER, SPA, USA, AUT, NOR, ARG, FIN, POL, SWI, BRA, CHL, BLR, IND, SVN, BUL, LIT, LAT, EST, UKR, RUS, PER, VEN, URU, MDA, AZE, DOM, SRB, MNE, MKD and BOS	Highest educational level attained (9-point scale)	Negative

(*continued*)

Reference	Database (Years)	Sample	Operationalization	Finding
Frey and Torgler (2007)	EVS (1999-2000)	30 European countries: AUT, BEL, UK, DEN, FIN, FRA, GER, ICE, IRE, ITA, MAL, NLD, IRE, POR, SPA, SWE, BEL, BUL, CRO, CZE, EST, GRE, HUN, LTV, LIT, POL, ROM, RUS, SLO and UKR	Age at which full time education was completed	Negative (not significant when clustering standard errors by country)
Feld and Torgler (2007)	WVS and EVS (1990, 1997, 1999)	Germany (Eastern, Western and pooled)	Age at which full time education was completed	Negative
Torgler and Valev (2010)	WVS and EVS (1981, 1990, 1999)	8 European countries: FRA, GB, ITA, NLD, DEN, BEL, IRE, and SPA	Age at which full time education was completed	Negative (only significant in a sub-sample with women)
Lago-Peñas and Lago-Peñas (2010)	European Social Survey (ESS) (2004-2005)	17 European countries: AUT, BEL, CZE, DEN, EST, FIN, GER, GRE, LUX, NOR, POL, POR, SPA, SVN, SWE, SWI, and the UK	Number of years of completed full-time education	Negative
Barone and Mocetti (2011)	Survey on Household Income and Wealth (SHIW) (2001–2004)	ITA (1,458 municipalities)	Educational level attained (3-point scale)	Positive
Torgler (2012)	EVS (1999-2000, 2008)	10 east European countries: BUL, CZE, EST, HUN, LAT, LIT, POL, ROM, SLK, SLO	Age at which full time education was completed	Positive
Konrad and Qari (2012)	'Citizenship' module of the ISSP (2004)	8 countries: AUT, CAN, IRE, NLD, POL, POR, URU and USA	Educational level attained (6-point scale)	Positive
Doerrenberg and Peichl (2013)	WVS and EVS (1981–1984, 1989–1993, 1994–1998, 1999–2004)	19 countries: AUT, BEL, CAN, DEN, FIN, FRA, GER, HUN, ICE, IRE, ITA, JAP, MEX, NLD, NOR, SPA, SWE, UK and USA	Years of education	Negative

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1.3   Hypotheses: Education and tax morale

The previous literature review shows that while educational level has been included in different studies as an explanatory control variable, its fundamental influence on tax compliance behaviour has been completely ignored. This is all the more surprising as we know from numerous studies in the fields of psychological and political sciences that the level of education is an important factor that channels individuals' behaviour regarding social values, political attitudes and the general assessment of public affairs. There are two main reasons why educational level should have a substantial influence on tax compliance behaviour. First, a higher educational level is an indicator of higher cognitive abilities (Arrow, 1973) which are essential for understanding the functioning of modern welfare states and the relationship between its general (indirect) benefits and individual tax compliance. For example, Lewis (1978, 1982) and Niemirowski et al. (2003) find that having obtained a certain educational level is a necessary condition for understanding tax laws, which in turn is important for generating trust in authorities. Second, information from media is a key factor in shaping citizens' valuation of government performance (e.g., Keohane and Nye, 1998; Newton and Norris, 2000; Norris, 2000) and education is paramount for processing this information. As formulated by Sniderman et al. (1993), "Citizens acquired through formal schooling not simply relevant information they required to reason about political choices, but more fundamentally the ability to manipulate information efficiently and to gather it effectively after they had left school". Thus, the knowledge gap theory proposed by Tichenor et al. (1970) states that a higher educational level leads to a greater acquisition of knowledge from news, which entails that more highly educated citizens are better informed even when all citizens are exposed to exactly the same information. Eveland and Scheufele (2000) show that this knowledge gap between the low and high educated becomes even bigger among light media users. In the same vein, Price and Zaller (1993) argued that prior knowledge is a key factor for assessing new information. Furthermore, it has been shown that the more highly educated pay more attention to political mass media (e.g., Freedman and Goldstein, 1999; McCombs and Shaw, 1972) and are generally less inclined towards holding a passive attitude to mass media. For example, Johnson and Kaye (2003) use survey data gathered in the context of the US presidential elections in 1996 and 2000 and find that the amount of time in seeking political information online is positively associated with the educational level. Finally, education also motivates general interest in public affairs and civic engagement to the extent that the more highly educated are more prone to be politically active (Dalton, 2005).

Summarizing both arguments, more highly educated citizens are better able to understand the functioning of modern welfare states and are more informed about the performance of governments and public administrations. Both aspects are es-

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sential for shaping individuals' tax compliance decisions. The decision to voluntarily comply with tax obligations is a complex and multifaceted issue where individuals, when assessing the performance of the public sector, have to consider both the personal (direct) benefits from public service delivery and general (indirect) benefits from a well-organized welfare state (general quality of public provision, effective deterrence, transparency of public institutions, income redistribution, etc.). Therefore, educational level should influence an individual's tax compliance behavior because it affects both the quality of information obtained about government and public sector performance, and the understanding of the relationship between individual compliance and the quality of general public services. In the following we formulate two hypotheses regarding the influence of educational level on tax morale.

Our first hypothesis regarding the influence of education on tax morale considers the link between tax morale and individual *direct benefits* from tax compliance. According to the definition by Feld and Frey (2007), tax morale can be understood as the individual's intrinsic motivation to pay taxes which is the result of a 'psychological tax contract' between citizens and the state where citizens receive goods and services in exchange for their tax payments. However, the amount of goods and services that an individual receives from the state is not the same for all. Thus, individuals with children benefit from public education, the retired from public pensions, and the unemployed from public unemployment benefits. Therefore, tax morale should vary across individuals according to their personal situation. Moreover, these considerations should lead us to expect that education is an important channel that makes citizens conscious of the link between tax payments and individual (direct) benefits from the tax system. Accordingly, the first hypothesis we formulate is:

Hypothesis 1: Larger *direct benefits* from the welfare state positively affect an individual's tax morale and the effect increases with the educational level.

The second hypothesis considers the more complex relationship between tax payments and the general benefits that citizens obtain from a well-organized welfare state. Examples of these *indirect benefits* are the general quality of public services, the fairness of the tax system and the transparency of public institutions. Again, education plays a crucial role in assessing these indirect benefits which ultimately affect an individual's intrinsic motivation to pay taxes. For example, given that assessing public sector performance requires individuals to pay attention to political mass media and to process the information received, more highly educated citizens will be better able to make a less-biased evaluation. Furthermore, given that evaluating the *indirect* benefits from tax payments requires higher cognitive abilities and that these are correlated with educational level, we also expect this to be a key factor in shaping tax morale. On the basis of these considerations, the second hypothesis we formulate is:

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Hypothesis 2: The educational level positively (negatively) affects tax morale when the *indirect benefits* from the welfare state are large (small).

Figure 1.1 displays the general structure of the determinants of tax compliance, as discussed in Section 1.2, and summarizes our hypotheses regarding the channels through which education shapes individuals' tax morale.

Figure 1.1: Education and tax compliance.

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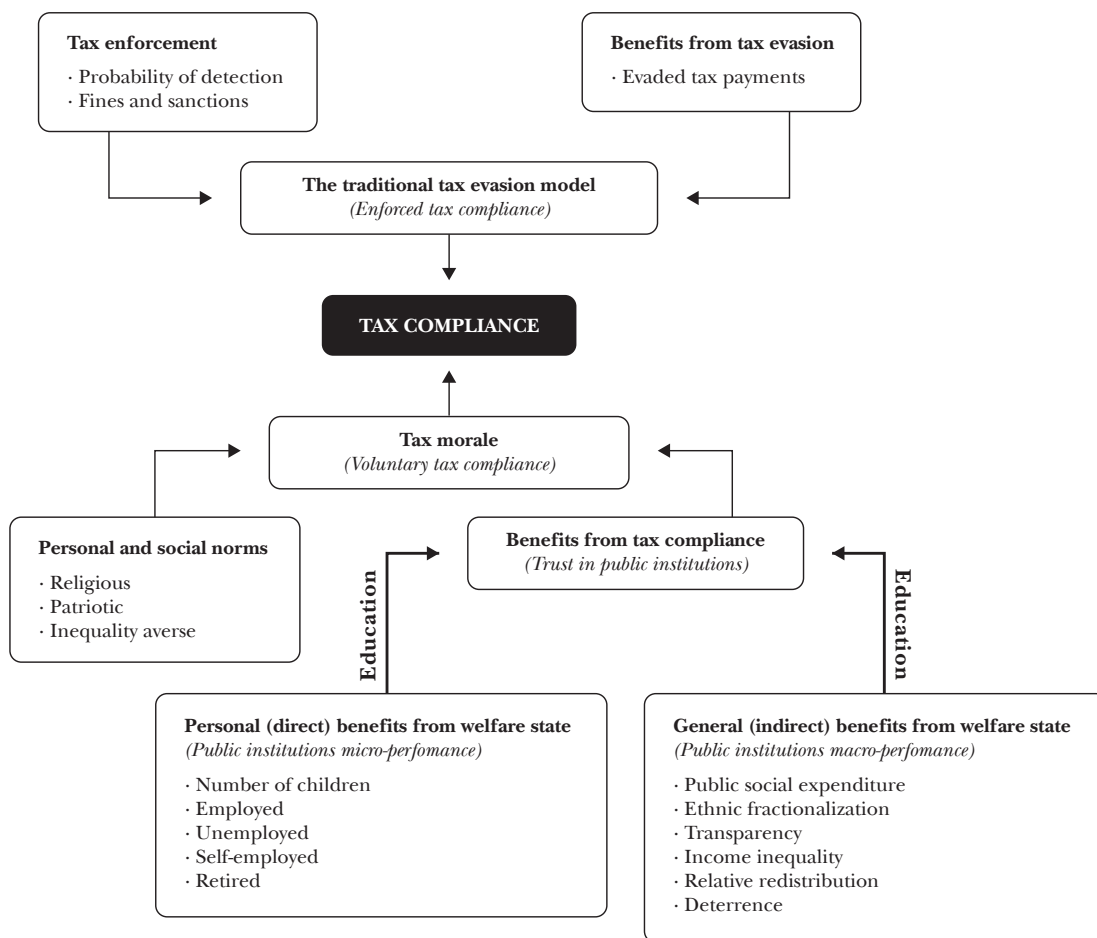
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1.4   Empirical approach

1.4.1   Data

The micro-level data is from the 2008 wave of the EVS, which is a commonly used database in the tax morale literature. We limit the analysis to the 2008 wave and do not integrate the WVS as some of our variables are only available for this year and the countries of the EVS. Furthermore, the EVS particularly suits our aims as it enables the study of a representative group of individuals for a large set of relatively homogeneous countries. Out of 47 European countries included in the survey, 29 were finally included in the analysis, namely, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.[6] Our macro-level data stems from different sources which can be consulted in Table A1.1. Table A1.2 and Table A1.3 display the descriptive statistics for our dichotomous and continuous variables, and for our categorical variables, respectively.

Dependent variable: tax morale

Our dependent variable (*tax morale*) stems from the EVS and has been constructed on the basis of the respondents' answers to the following question:

Please tell me for each of the following whether you think it can always be justified, never be justified, or something in between, using this card: 'Cheating on tax if you have the chance'

Respondents were asked to assess this issue on a ten-point scale, from 1 (never) to 10 (always). As is common in the literature, the answers were recoded into a four-point scale where we used the following criterion: responses 7 through 10 were combined into a value 0 (low tax morale), while the remaining responses were combined in groups of two (1 and 2 into 3; 3 and 4 into 2; and 5 and 6 into 1). However, to check the robustness of our results from the chosen categorization, in Section 1.5.2 we also use the original ten-point scale.

The question of whether the responses to this question really provide unbiased

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[6]The country selection criterion responds to data availability. Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kosovo, Macedonia, Moldova, Montenegro, the Netherlands, Northern Ireland, the Russian Federation, Serbia and Ukraine have not been included because of either lack of observations (in most of the cases) or missing data for some of our country-level variables (this is the case of the Netherlands and Malta).

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data has been widely discussed in the literature. Following Doerrenberg and Peichl (2013), the general conclusions of the literature are that such a bias exists (Elffers et al., 1987); that this bias, however, is lower if one asks about tax morale instead of tax compliance (Frey and Torgler, 2007); and that for developed countries tax morale (as obtained from the EVS) and actual tax compliance are highly correlated (Richardson, 2006; Torgler et al., 2008). Consequently, we consider that this question allows us to obtain an appropriate measure of tax morale.

Explanatory variables

Our main explanatory variable is *education* which is separated into three categories: low, medium and high.[7] Low education indicates that an individual has completed (compulsory) elementary education or has inadequately completed it. Medium education indicates that an individual has some sort of secondary school education. Finally, high education captures those individuals with university studies (completed or uncompleted). The remaining variables are grouped into four classes: personal and social norms, direct benefits, indirect benefits and control variables.

Personal and social norms. As variables that indicate personal and social norms we consider whether an individual is *religious*, whether she is *patriotic*, and whether she is *inequality averse*. All these variables are defined as dummy variables were 1 indicates a positive attitude (religious, patriotic, inequality averse) and 0 a negative attitude (non-religious, non-patriotic, inequality non-averse). As discussed in Section 1.2.2, we expect these variables to be positively related to tax morale.

Direct benefits. As mentioned before, an individual's intrinsic motivation for voluntary tax compliance stems from a psychological tax contract between citizens and the state where citizens counterbalance their tax obligations with the goods received in exchange. As formulated in Hypothesis 1, we expect that an individual that directly benefits more from public goods provision will have a stronger belief in a moral obligation for tax compliance. To test this hypothesis, as direct benefits we consider the following variables: the *number of children*, *employed*, *unemployed*, *self-employed*, *retired*, and *other*. As public goods and transfers benefit individuals with children, unemployed individuals, and retired individuals more than proportionally, we expect both variables to have a positive relationship with tax morale. In contrast, employed and self-employed individuals are expected to exhibit lower tax morale as

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[7]The details on the measurement and definition of the variables and the sources from which the data has been retrieved are in Table A1.1.

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they obtain comparatively lower benefits from the state in exchange for their tax payments.

Indirect benefits.   To test Hypothesis 2, we consider the 'indirect benefits' that modern welfare states offer and that are expected to influence an individual's tax morale. As indicators of these indirect benefits we consider *public social expenditure, ethnic fractionalization, transparency, income inequality, relative redistribution,* and *deterrence. Public social expenditure* is measured as the share of the sum of public health, education and social benefits expenditure in GDP.[8] *Ethnic fractionalization* (from Alesina et al., 2003) is used as an indicator of the match of public goods provided by the state and the preferences for public goods of citizens (Alesina et al., 1999). Thus, a higher fractionalization indicates a larger mismatch which should lower tax morale. *Transparency* measures "the perceived levels of public-sector corruption in a given country on a scale from zero (highly corrupt) to ten (highly clean)" (Transparency International, 2017). *Income inequality* is measured as the pre-tax Gini index of inequality in equivalized household market income, which has been found, as mentioned before, to be negatively related to tax morale in some studies. *Relative redistribution* is the percentage reduction in market-income inequality due to taxes and transfers and, therefore, indicates the effectiveness of the public sector in reducing income inequality. Finally, *Deterrence* measures the effort and effectiveness of tax authorities in fighting tax evasion. According to Hypothesis 2 we expect that the more highly educated, who are supposed to be better informed about government performance, to exhibit higher tax morale as a response to positive performance (more social expenditure, low income inequality, high relative redistribution, low fractionalization, high transparency, effective deterrence) and vice versa.

Controls.   Finally, as further control variables we include variables commonly used in the literature, namely *Income, Age, Gender, Marital status,* and *Natural-born citizen.* The expected impact of these variables on tax morale has already been extensively commented in Section 1.2.

1.4.2   Empirical model

As is common in the literature, we use an ordered probit model to account for the ranking information of our four-point scale dependent variable (tax morale). Due to

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[8]Missing 2008 values on public education expenditure for Greece, Luxembourg, Romania, and Turkey are imputed with data from 2005, 2007, 2007 and 2006, respectively. The missing 2008 value on public health expenditure for Croatia is imputed with the 2012 value.

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the non-linear form of the ordered probit estimation the size of the coefficients should not be directly interpreted, but the focus should be on the sign and the significance of the estimates. In all specifications the model includes individual and country level variables (with Germany as the reference country). Clustered standard errors by country are reported to avoid an underestimation of standard errors because of intra-group error correlation. Accordingly, our estimation model is:

$$y_{i,c}^* = \boldsymbol{\beta}' \boldsymbol{x_{i,c}} + \boldsymbol{\varepsilon_{i,c}} \tag{1.1}$$

where y^* is a latent variable (tax morale of individual i in country c), and x is a vector of explanatory variables. The latent variable $y_{i,c}^*$ is only observable when it crosses thresholds:

$$y_{i,c}^* = j \qquad \text{if} \qquad \alpha_j < j \le \alpha_{j+1}, \quad j = 0, 1, 2, 3,$$

and the probability that $y_{i,c}^* = j$ is:

$$P(y_{i,c}^* = j) = F(\alpha_{j+1} - \beta' x_{i,c}) - F(\alpha_j - \beta' x_{i,c})$$

where F denotes the standard normal cumulative distribution function. The four categories for our tax morale variable y^* are: low ($j = 0$), medium low ($j = 1$), medium high ($j = 2$), and high ($j = 3$).

To test our first hypothesis, we include interactions between the educational level and the *direct benefits* variables. Country dummies are used to account for unobserved country effects. More specifically, our first hypothesis is estimated with the following model (Models I and II):

$$\boldsymbol{\beta}' \boldsymbol{x_{i,c}} = Edu_{i,c} + PS_{i,c} + DB_{i,c} + DB_{i,c} \times Edu_{i,c} + CL_{i,c} + \nu_c + \eta_j + \varepsilon_{i,c} \tag{1.2}$$

where Edu indicates educational level dummies (medium, high) with their corresponding coefficients; PS is a vector of personal and social norms dummies (Religious, Patriotic, Inequality averse) with their corresponding coefficients; DB is a vector of direct benefits dummies (Number of children, Unemployed, Self-employed, Retired, Other) with their corresponding coefficients; CL is a vector of control variables (two income dummies (medium, high), Age, Gender, Married, Widowed, Divorced, Natural-born citizen); ν_c is a vector of country dummies; and η_j is a vector of three intercepts for each tax morale category (middle low, middle high, high as compared to the base category of low). The individual-level variables used in our empirical models can be considered as uncorrelated. Notice, that this is also case for education and income whose correlation coefficient is 0.30.[9]

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[9] As can be expected this is not the case for the correlation coefficients of some of control variables *Age* with *Retired* (0.70), or *Age* with *Widowed* (0.43). The exclusion of one of these variables, however, does not change our results qualitatively. More details on correlations can be found in the correlation matrix (Table A1.12).

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To test the second hypothesis of whether the educational level acts as an indirect channel in shaping tax morale when individuals assess the indirect benefits of the welfare state, we substitute the country-fixed effects in equation 1.2 with different country-level variables which we interact with the educational level. That is, we estimate the following models (Models III-VIII):

$$\boldsymbol{\beta' x_{i,c}} = Edu_{i,c} + PS_{i,c} + DB_{i,c} + DB_{i,c} \times Edu_{i,c} + CL_{i,c} + IB_{i,c} + IB_{i,c} \times Edu_{i,c} + \eta_j + \varepsilon_{i,c} \tag{1.3}$$

where IB are the indirect benefit variables (Public social expenditure (Model III), Ethnic fractionalization (Model IV), Transparency (Model V), Income inequality (Model VI), Relative redistribution (Model VII), and Deterrence (Model VIII)). The reason for including these country-specific variables in alternative model specifications is that some them are highly correlated with each other.

As mentioned before, we test our first hypothesis by including interactions between the variables that account for the direct benefits from tax compliance (*Number of children*, *Unemployed*, *Self-employed* and *Retired*) and dummies indicating the respondents' educational levels. Thus, hypothesis 1 is tested with 12 (9) different estimates in Specification I (II).[10] The problem of testing hypothesis 1 is that with 12 independent variables the chance of finding at least one significative effect is around 72%.[11] There are different methodologies to adjust the p-values allowing to reduce the chance of Type I errors due to multiple hypothesis testing (see Newson (2003) for a thorough description of these methods). Following Elkins et al. (2017), we use a variety of these methods and consider the impact of a variable as statistically significant if it remains significant for the majority of the employed adjustment methods whose results are reported in the Appendix. For our main results, variable estimates that are significant after adjusting the p-value for multiple hypothesis testing are highlighted in bold (Table 1.2).

1.5 Results

1.5.1 Regression results

The estimation results are displayed in Table 1.2. As the interpretation of the estimated coefficients in the ordered probit estimation model is not straight forward, in the discussion of the results we concentrate on the significance and the sign of the

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[10]Notice, that multiple hypothesis testing in case of hypothesis 2 is a minor problem as there are only three interactions in each specification.

[11]The probability of having at least one significant effect with a significance level of $\alpha = 0.10$ and $m = 12$ variables is $1 - (1 - \alpha)^m$.

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estimated coefficients. We also provide marginal effects of the highest tax morale score (i.e., *Tax morale = High*) in Table A1.5. Specifications I and II contain country fixed effects while specifications III-VIII include different country contextual-level variables that allow us to test Hypothesis 2. By contrast, as cross-country differences are best accounted for in specifications I and II we consider these to be most suitable for testing Hypothesis 1 which is related to the individual characteristics of the respondents.

Specifications I and II differ with respect to the inclusion of education interaction terms with the variable *Number of children*. As can be seen from Table 1.2, in specification I these interactions turn out to be non-significant. However, in specification II without these interactions, the *number of children* has a significant positive impact on tax morale. The direct (non-interacted) effect of *education* on tax morale turns out to be non-linear. Thus, while individuals with a medium level of education exhibit lower levels of tax morale, there is no significant difference between individuals with a low level of education and those with a high level of education. With respect to the influence of personal and social norms, our results are in line with what has been found in the literature. Thus, the probability of *Religious*, *Patriotic* and *Inequality averse* individuals to manifest the highest level of tax morale is by 5%, 8.5%, and 3%, respectively, more larger than with respect to the reference individual (see Table A1.5).

We check our first hypothesis by examining the interaction between educational levels and the variables indicating the direct benefits from tax compliance. As mentioned before, with regard to the *number of children* education shows no distinguishable influence on tax morale. In contrast, for the *Unemployed*, *Self-employed*, and *Retired* variables, educational level is an important channel for assessing the individual beneficiary status in the context of the psychological tax contract. Thus, unemployed individuals with a medium or a high educational level are 10% more likely to exhibit a high tax morale than those with a low educational level. We take this as evidence for the fact that the more highly educated are more conscious of the benefits they receive from general tax compliance. The same is true for retired individuals. In line with this argument, self-employed individuals, who generally obtain comparably fewer benefits from the state, exhibit lower tax morale when their educational level is medium or high, i.e., the probability that they exhibit a high level of tax morale is 10% and 13% lower than that of the low educated self-employed. Considering these results together, we accept Hypothesis 1 that education plays an important role in shaping individuals' tax morale according to their beneficiary status in the welfare state.

With respect to the controls used in models I and II, generally, the sign and significance of the estimates are in line with the previous empirical studies which are summarized in Section 1.2. For the income level dummies, as in Konrad and

Table 1.2: Estimation results.

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium education	-0.135*	-0.112*	-1.052**	-0.054	-0.656	-1.171	-0.666***	-0.126
(Ref.: Low)	(0.055)	(0.048)	(0.361)	(0.104)	(0.427)	(0.781)	(0.143)	(0.079)
High education	0.002	0.012	-1.285**	0.219+	-0.904*	-0.879	-0.785***	-0.031
(Ref.: Low)	(0.064)	(0.051)	(0.410)	(0.113)	(0.450)	(0.780)	(0.216)	(0.098)
Personal and social norms								
Religious	0.157***	0.158***	0.106**	0.117*	0.120**	0.118**	0.080*	0.097*
(Ref.: Non religious)	(0.031)	(0.031)	(0.033)	(0.048)	(0.041)	(0.044)	(0.036)	(0.044)
Patriotic	0.259***	0.259***	0.280***	0.259***	0.276***	0.271***	0.288***	0.286***
(Ref.: Non patriotic)	(0.037)	(0.037)	(0.051)	(0.048)	(0.049)	(0.042)	(0.052)	(0.050)
Inequality averse	0.095**	0.095**	0.126**	0.112*	0.128**	0.121**	0.129**	0.119*
	(0.034)	(0.034)	(0.048)	(0.046)	(0.047)	(0.045)	(0.047)	(0.049)
Direct benefits								
Number of children	0.009	0.023***	0.023***	0.027***	0.027***	0.026***	0.023***	0.029***
	(0.013)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
x Medium education	0.020							
	(0.017)							
x High education	0.007							
	(0.022)							
Unemployed	**-0.282***	**-0.287****	-0.093	0.028	-0.011	-0.069	-0.191	-0.001
(Ref.: Employed)	(0.111)	(0.107)	(0.147)	(0.187)	(0.166)	(0.157)	(0.127)	(0.169)
x Medium education	**0.312****	**0.317****	0.201	0.083	0.124	0.182	0.275*	0.098
	(0.113)	(0.109)	(0.125)	(0.146)	(0.131)	(0.129)	(0.117)	(0.130)
x High education	0.319*	**0.327***	0.200	0.067	0.133	0.172	0.278+	0.091
	(0.142)	(0.139)	(0.151)	(0.158)	(0.153)	(0.153)	(0.149)	(0.151)
Self-employed	0.145	0.141	0.227*	0.333*	0.275*	0.248+	0.135	0.294+
(Ref.: Employed)	(0.100)	(0.110)	(0.110)	(0.169)	(0.133)	(0.134)	(0.104)	(0.161)
x Medium education	**-0.320****	**-0.315****	-0.353***	-0.476**	-0.400***	-0.380**	-0.276*	-0.431**
	(0.108)	(0.110)	(0.099)	(0.148)	(0.116)	(0.120)	(0.107)	(0.149)
x High education	**-0.427****	**-0.424****	-0.458***	-0.604***	-0.487***	-0.474***	-0.367**	-0.551**
	(0.130)	(0.132)	(0.126)	(0.169)	(0.143)	(0.137)	(0.131)	(0.169)
Retired	-0.067	-0.059	-0.096	-0.116	-0.125	-0.134	-0.104	-0.132
(Ref.: Employed)	(0.063)	(0.061)	(0.098)	(0.090)	(0.087)	(0.088)	(0.089)	(0.088)
x Medium education	**0.218****	**0.205****	0.269*	0.313**	0.323**	0.307**	0.252**	0.313**
	(0.073)	(0.070)	(0.108)	(0.113)	(0.113)	(0.103)	(0.092)	(0.107)
x High education	0.182+	0.177+	0.277*	0.320*	0.331*	0.331*	0.266*	0.318*
	(0.096)	(0.094)	(0.134)	(0.136)	(0.135)	(0.129)	(0.118)	(0.126)
Other	-0.063	-0.064	0.091	0.222	0.184	0.108	-0.008	0.194
(Ref.: Employed)	(0.069)	(0.069)	(0.073)	(0.151)	(0.119)	(0.104)	(0.068)	(0.145)
x Medium education	0.138+	0.139+	-0.007	-0.142	-0.101	-0.026	0.086	-0.114
	(0.075)	(0.075)	(0.065)	(0.127)	(0.096)	(0.093)	(0.075)	(0.122)
x High education	-0.011	-0.008	-0.107	-0.255*	-0.202*	-0.148	-0.031	-0.238*
	(0.087)	(0.087)	(0.092)	(0.120)	(0.093)	(0.094)	(0.094)	(0.116)
Controls								
Medium income	-0.003	-0.002	0.008	0.022	0.013	0.011	0.000	0.020
(Ref.: Low)	(0.030)	(0.030)	(0.039)	(0.036)	(0.041)	(0.040)	(0.037)	(0.040)
High income	-0.035	-0.036	-0.037	-0.028	-0.031	-0.037	-0.047	-0.030
(Ref.: Low)	(0.050)	(0.050)	(0.052)	(0.052)	(0.054)	(0.056)	(0.051)	(0.054)
Age	0.009***	0.009***	0.008***	0.007**	0.007***	0.007***	0.009***	0.008***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Gender (Ref.: male)	0.185***	0.185***	0.165***	0.165***	0.162***	0.167***	0.170***	0.163***
	(0.027)	(0.027)	(0.033)	(0.037)	(0.036)	(0.031)	(0.028)	(0.035)
Married	0.017	0.020	0.018	0.035	0.027	0.019	-0.001	0.015
(Ref.: Never married)	(0.022)	(0.023)	(0.025)	(0.029)	(0.027)	(0.027)	(0.028)	(0.031)
Widowed	-0.046	-0.044	-0.079*	-0.035	-0.061	-0.067	-0.104*	-0.069
(Ref.: Never married)	(0.037)	(0.038)	(0.033)	(0.047)	(0.041)	(0.047)	(0.043)	(0.054)
Divorced	-0.119***	-0.118***	-0.131**	-0.113**	-0.125**	-0.118**	-0.139***	-0.130**
(Ref.: Never married)	(0.034)	(0.034)	(0.040)	(0.037)	(0.042)	(0.037)	(0.042)	(0.044)
Natural-born citizen	-0.158***	-0.158***	-0.124*	-0.138*	-0.116*	-0.122*	-0.144**	-0.147**
	(0.047)	(0.047)	(0.055)	(0.058)	(0.051)	(0.053)	(0.054)	(0.054)

(continued on next page)

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(*continued*)

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Indirect benefits								
Public social expend.			-0.027*					
			(0.014)					
x Medium education			0.026*					
			-0.011					
x High education			0.036**					
			(0.013)					
Ethnic fractionaliz.				0.166				
				(0.503)				
x Medium education				-0.673^{+}				
				(0.406)				
x High education				-1.298**				
				(0.434)				
Transparency					-0.064			
					(0.073)			
x Medium education					0.071			
					(0.060)			
x High education					0.123^{+}			
					(0.066)			
Income inequality						-0.035^{+}		
						(0.019)		
x Medium education						0.019		
						(0.016)		
x High education						0.016		
						(0.016)		
Relative redistribution							-0.025***	
							(0.005)	
x Medium education							0.015***	
							(0.004)	
x High education							0.021***	
							(0.006)	
Deterrence								0.238^{+}
								(0.144)
x Medium education								-0.129
								(0.129)
x High education								-0.091
								(0.131)
Country FE	YES	YES	NO	NO	NO	NO	NO	NO
Constant cut1	-1.200***	-1.180***	-1.908***	-1.060***	-1.449**	-2.735**	-1.856***	-0.888***
	(0.114)	(0.107)	(0.497)	(0.154)	(0.526)	(0.943)	(0.212)	(0.110)
Constant cut2	-0.639***	-0.618***	-1.371**	-0.520***	-0.912^{+}	-2.197*	-1.318***	-0.350**
	(0.113)	(0.106)	(0.498)	(0.153)	(0.528)	(0.945)	(0.211)	(0.112)
Constant cut3	-0.121	-0.100	-0.877^{+}	-0.024	-0.418	-1.702^{+}	-0.822***	0.145
	(0.117)	(0.110)	(0.502)	(0.161)	(0.534)	(0.947)	(0.212)	(0.119)
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999
Pseudo R2	0.0594	0.0593	0.0278	0.0304	0.0269	0.0291	0.0313	0.0285

Estimation results. Ordered probit with clustered standard errors by country (29 clusters). Robust standard errors in parentheses where +, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively. Estimates in bold denote significant effects after adjusting the p-value for multiple hypothesis testing by different methods using 0.1 level as false discovery rate (see Table A1.13).

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Qari (2012), we find no significant influence on tax morale.[12] Notice, that *Natural-born citizen*, which to our knowledge has not been used in previous studies as a determinant of tax morale, is negatively related to tax morale. According to the 'psychological tax contract', one reason for this may be that citizens who are nationals by birth expect to receive more and better goods and services from the state in exchange for their tax payments than citizens who are not nationals by birth.

As mentioned before, we use specifications III-VIII to test the validity of Hypothesis 2. We expect that the individuals with a higher level of education, who are supposed to be better informed about general public sector performance and the indirect benefits from the welfare state, will increase (lessen) their tax compliance in response to good (bad) performance. We use *Public social expenditure* to carry out our first measurement of this performance in Specification III. We find that higher public social expenditure leads to higher tax morale among the medium and highly educated in comparison to the low educated (with a marginal effect of 0.8% and 1.1%, respectively). *Ethnic fractionalization*, as a measure of the mismatch between the public goods received and desired by citizens, causes tax morale to fall as level of education increases. Thus, the marginal impact of a change of 0.10 in the fractionalization index reduces the probability of exhibiting high tax morale for the most highly educated by 4.2% more than for the low educated. For the impact of our third and fourth measure, *Transparency* and *Income inequality*, respectively, we find no significant differences between the various educational levels. Our fifth measure of general public sector performance, *Relative redistribution*, has a generally negative impact on tax morale where, as in line with Hypothesis 2, tax morale increases with educational level. The marginal impact of a change of 10 percentage points in *Relative redistribution* increases the probability of exhibiting high tax morale for the most highly educated by 6.6% more than for the low educated. Finally, for the impact of *Deterrence* on tax morale we find no significant differences between the various educational levels. Taken together these results, we cannot reject that the influence of individuals' indirect welfare state benefits on their tax morale depends is channeled through their educational level. Good performance (more social expenditure, higher transparency, better relative income redistribution) increases the tax morale of individuals with a high level of education more than that of individuals with a low level of education, while bad performance (more fractionalization) decreases the tax morale of individuals with a high level of education more than that of individuals with a low level of education.

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[12]See also Section 1.5.2, where the relationship between income and tax morale is further discussed.

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1.5.2   Robustness checks

To check the robustness of our results we perform five alternative estimations. Firstly, to test whether the results are sensitive to the categorization of our dependent variable tax morale, we estimate models I-VIII with the original ten-point scale from the questionnaire. The results are displayed in Table A1.6, which shows that the results do not change qualitatively.

Secondly, we use the generalized linear model (GLM) as an alternative estimation method. For this purpose, we rescale our dependent variable from the four-point scale to take values between 0 and 1. As shown in Table A1.7, this also does not lead to any substantial changes to the results we obtained before.

Thirdly, even if income and education are only weakly correlated (0.3), one might argue that some of the effects of education on tax morale described in Section 1.5 stem from income and not from education.[13] To analyze this question, we perform two additional robustness checks in which income level dummies replace our educational level dummies as interaction terms. In the first one, we replace all education interactions with income interaction, while in the second one, we substitute only education interactions with country-level variables. The results are displayed in Table A1.8 and Table A1.9, respectively. As can be observed, at the individual level, none of the interaction coefficients are significant. With respect to the interactions between income and the country-level variables, although some of the interaction coefficients are significant (*Ethnic fractionalization* with high income, and *Relative redistribution* with medium income), we observe that the explanatory power of these models is below that of the corresponding models in Section 1.5. In conclusion, we take these results as evidence that the aforementioned impacts on the relationship between direct and indirect benefits and tax morale are mainly channeled through education and not income.

Fourthly, to test the sensitivity of our results with respect to the scaling of the education variable, we replace our three-point scale by a four-point scale (Low, Medium-low, Medium-high, High).[14] As it turns out from the estimates displayed in Table A1.10, our results discussed in Section 1.5 are rather robust against this alternative categorization of the educational variable.

Finally, we replace our indirect benefits by different indicators of institutional

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[13]The income level variable has been introduced as the harmonized household income level categorized into 3 intervals where the data is directly provided by the EVS. Alternatively, we have used the original twelve-point scale variable for two additional robustness checks in which *Income* has been measured either by dummy variables or as a continuous variable. The results obtained from these two robustness checks (not reported) do not differ from those obtained using the harmonized variable provided by the EVS.

[14]See Table A1.4 for the descriptive statistics of different categorizations of the education variable.

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quality from the World Bank (2016b), namely, the Worldwide Governance Indicators (WGI). As can be seen in Table A1.11, we observe that in countries with a strong institutional performance (*Voice and accountability*, *Political stability*, *Regulatory quality*, *Rule of law*, and *Control of corruption*) the more highly educated exhibit higher tax morale. These results increase the support for Hypothesis 2.

1.6   Conclusions

This study analyzes the role of education in shaping tax morale, a fundamental question that has been totally ignored by the existing literature. Given the insights from the psychological and political science literature we derive two hypotheses. First, we state that individuals who obtain higher direct benefits from the state exhibit higher tax morale and that this effect is more pronounced for the more highly educated because they are more aware of the connection between tax payments and benefits received from the state. Our results indicate that education, indeed, has an important impact on tax morale for those individuals that are beneficiaries of the welfare state (i.e., the unemployed, the retired, etc.). Second, as the more highly educated are better informed, in Hypothesis 2 we state that the educational level positively (negatively) affects tax morale when the indirect benefits that citizens obtain from the welfare state are large (small). Our results confirm this hypothesis. We find that the more highly educated exhibit higher levels of tax morale in countries with better quality services, a fairer tax system and more transparent institutions.

Some important policy implications can be derived from these findings. First, as some of the influence of education on tax morale is channeled through better information about public affairs, it is particularly important to increase information about direct and indirect benefits of a tax-financed welfare state, especially in the case of the less well educated. This gives a rationale for recent discussions in different countries and in the OECD to use education campaigns to increase tax morale (see, for example, OECD 2013). Second, increasing the educational level of the population would be a good instrument for increasing tax morale and reducing tax evasion. Therefore, a byproduct of the EU 'Education and Training for 2020' program (ET 2020) that aims to increase the educational level of the population could be an increase in tax morale. However, this is only the case when individuals perceive that what they receive in exchange for their tax payments from the state is of high quality. Otherwise, increasing the educational level of the population would have just the contrary effect and reduce tax morale. Therefore, the impact on tax morale of the observed tendency of a steadily increasing mean educational level among the populations of many European countries should be assessed in the light of the cuts in social benefits introduced in many of these countries since the financial

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crisis of 2008. The next EVS wave might allow us to assess how both tendencies have affected overall tax morale in European countries.

Acknowledgements

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1.7   Appendix

This appendix contains details on variables definitions, data sources and descriptive statistics (Tables A1.1, A1.2, A1.3 and A1.4), marginal effects (Table A1.5), robustness checks (Tables A1.6, A1.7, A1.8, A1.9, A1.10, A1.11), the correlation matrix (Table A1.12) and the results of alpha adjustment methods for multiple hypotheses testing (Table A1.13).

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Table A1.1: Data definitions and sources.

Variable	Measurement	Source
Tax morale	Respondents' tax morale rescaled into a four-point scale. Responses 7 through 10 were combined into a value 0 (low tax morale), while the remaining responses were combined in groups of two (5 and 6 into 1; 3 and 4 into 2; 1 and 2 into 3).	EVS (2016)
Education	Three dummy variables (low, medium and high) accounting for whether the respondent has adequately or inadequately completed primary (compulsory), secondary or tertiary education respectively.	EVS (2016)
Religious	Dichotomous variable taking value 1 if the respondent declares to be a religious person and 0 if otherwise (not religious or convinced atheist).	EVS (2016)
Patriotic	Dichotomous variable taking vale 1 if the respondent declares to be very or quite proud of being a citizen of the country and 0 otherwise (not very or not at all proud).	EVS (2016)
Inequality averse	Dummy variable taking value 1 for the first two points in a ten-point scaled answer in which the respondents indicate their views on income equality (where value 1 stands for 'incomes should be made more equal', and 10 'there should be greater incentives for individual effort').	EVS (2016)
Number of children	Continuous variable accounting for the individuals' number of children at home.	EVS (2016)
Unemployed	Dichotomous variable taking value 1 if the respondent is currently unemployed and 0 if otherwise.	EVS (2016)
Self-employed	Dichotomous variable taking value 1 if the respondent is currently self-employed and 0 if otherwise.	EVS (2016)
Retired	Dichotomous variable taking value 1 if the respondent is retired/pensioned and 0 if otherwise.	EVS (2016)
Other	Dichotomous variable taking value 1 if the respondent is (military service, housewife not otherwise employed, student, not working because of disability, other reasons) and 0 if otherwise.	EVS (2016)
Income	Three dummy variables (Low, Medium and High) accounting for the respondent's income level.	EVS (2016)

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(*continued*)

Variable	Measurement	Source
Age	Respondent's age calculated using the year of birth.	EVS (2016)
Gender	Dichotomous variable taking value 1 for female and 0 for male.	EVS (2016)
Married	Dichotomous variable taking value 1 if the respondent is currently married or in a partnership and 0 if otherwise.	EVS (2016)
Widowed	Dichotomous variable taking value 1 if the respondent is currently widowed and 0 if otherwise.	EVS (2016)
Divorced	Dichotomous variable taking value 1 if the respondent is currently divorced or separated and 0 if otherwise.	EVS (2016)
Natural-born citizen	Dichotomous variable taking value 1 if the respondent obtained the country citizenship by birth and 0 if otherwise.	EVS (2016)
Public social expenditure	Measured as the share of public health, education and social benefits expenditure in GDP.	EUROSTAT (2016). Health expenditure data for AUT, GRE, IRE, ITA, TUR, UK are from OECD (2016)
Ethnic fractionalization	Fractionalization index of ethnic groups by country. $Fractionalization_j = 1 - \Sigma_{i=1}^{n} s_{ij}^2$ with s_{ij} being the share of group i in country j.	Alesina et al. (2003)
Transparency	The Corruption Perceptions Index measures the perceived levels of public-sector corruption in a given country on a scale from zero (highly corrupt) to ten (highly clean).	Transparency International (2017)
Income inequality	Estimate of Gini index of inequality in equivalized (square root scale) household market (pre-tax and pre-transfer) income.	Solt (2014)
Relative redistribution	The percentage reduction in market-income inequality due to taxes and transfers calculated as the difference between the post-tax gini and pre tax gini, divided by pre-tax gini, multiplied by 100.	Own construction using data from Solt (2014)

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(*continued*)

Variable	Measurement	Source
Deterrence	Deterrence power of the administration calculated as the number of tax administration staff as a proportion of the total labor force multiplied by the value of completed audits as a proportion of total net collections.	Own construction using data from OECD (2009, 2011). Total labor force is from the World Bank (2016a)
Voice and accountability	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Ranges from -2.5(weak) to 2.5(strong).	World Bank (2016b)
Political stability	Measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Ranges from -2.5(weak) to 2.5(strong).	World Bank (2016b)
Government effectiveness	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Ranges from -2.5(weak) to 2.5(strong).	World Bank (2016b)
Regulatory quality	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Ranges from -2.5(weak) to 2.5(strong).	World Bank (2016b)
Rule of law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Ranges from -2.5(weak) to 2.5(strong).	World Bank (2016b)
Control of corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Ranges from -2.5(weak) to 2.5(strong).	World Bank (2016b)

Table A1.2: Descriptive statistics of categorical and dummy variables.

Variable	Value		Frequency	Percent
Tax morale	Low		1,717	5.92
	Medium low		2,585	8.91
	Medium high		3,958	13.65
	High		20,739	71.52
		Total	28,999	100
Educational level	Low		4,366	15.06
	Medium		18,138	62.55
	High		6,495	22.40
		Total	28,999	100
Religious	Religious		10,058	34.68
	Non religious		18,941	65.32
		Total	28,999	100
Patriotic	Patriotic		3,280	11.31
	Non patriotic		25,719	88.69
		Total	28,999	100
Inequality averse	Inequality averse		22,282	76.84
	Non inequality averse		6,717	23.16
		Total	28,999	100
Occupational status	Employed		13,786	47.54
	Unemployed		1,766	6.09
	Self-employed		1,524	5.26
	Retired		7,433	25.63
	Other		4,490	15.48
		Total	28,999	100
Income level	Low		9,592	33.08
	Medium		10,775	37.16
	High		8,632	29.77
		Total	28,999	100
Gender	Male		13,095	45.16
	Female		15,904	54.84
		Total	28,999	100
Marital status	Never married		6,744	23.26
	Married / Partnership		16,300	56.21
	Widowed		3,157	10.89
	Divorced / Separated		2,798	9.65
		Total	28,999	100
Natural-born citizen	No		1,232	4.25
	Yes		27,767	95.75
		Total	28,999	100

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Table A1.3: Descriptive statistics of continuous variables

Variable	Mean	SD	Min		Max	
Individual-level variables						
Number of children	0.93	1.35	0		13	
Age	48.53	17.56	16		108	
Country-level variables						
Public social expenditure	32.76	7.87	18.76	(TUR)	46.59	(DEN)
Ethnic fractionalization	0.25	0.16	0.47	(POR)	0.59	(LTV)
Transparency	6.27	1.72	3.60	(BUL)	9.30	(DEN)
Income inequality	46.75	5.12	33.75	(BUL)	58.39	(LTV)
Relative redistribution	35.38	11.64	3.63	(BUL)	48.86	(SWE)
Deterrence	0.84	0.73	0.0067	(SWI)	3.0453	(HUN)
Worldwide Governance Indicators						
Voice and accountability	1.04	0.44	-0.08	(TUR)	1.598	(DEN)
Political stability	0.65	0.56	-0.84	(TUR)	1.51	(LUX)
Government effectiveness	1.07	0.66	-0.32	(ROM)	2.25	(DEN)
Regulatory quality	1.18	0.43	0.27	(TUR)	1.92	(IRE)
Rule of law	1.05	0.66	-0.16	(BUL)	1.96	(NOR)
Control of corruption	0.94	0.85	-0.30	(BUL)	2.47	(DEN)

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Table A1.4: Educational level categorizations.

Highest educational level attained in 8 categories (v336_4)	Educational level (three-point scale)			Educational level (four-point scale)			
	Low	Medium	High	Low	Medium-low	Medium-high	High
Inadequately completed elementary education	1,098	-	-	1,098	-	-	-
Completed (compulsory) elementary education	3,268	-	-	3,268	-	-	-
Incomplete secondary school: technical/vocational type	-	4,891	-	-	4,891	-	-
Complete secondary school: technical/vocational type	-	3,014	-	-	3,014	-	-
Incomplete secondary: university-preparatory type	-	3,425	-	-	-	3,425	-
Complete secondary: university-preparatory type	-	6,808	-	-	-	6,808	-
Some university without degree/higher education	-	-	4,207	-	-	-	4,207
University with degree/higher education	-	-	2,288	-	-	-	2,288
Total	4,366	18,138	6,495	4,366	7,905	10,233	6,495
Total			28,999				28,999

Number of observations for two alternative categorizations of the respondents' educational levels. The three-point (four-point) scale is employed in the estimations whose results are shown in Table 1.2 (Table A1.10).

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Table A1.5: Marginal effects.

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium education (Ref.: Low)	-0.0425	-0.0350	-0.2426	-0.0173	-0.1914	-0.1069	-0.1327	-0.0444
High education (Ref.: Low)	0.0007	0.0036	-0.3265	0.0636	-0.2834	-0.0601	-0.1668	-0.0108
Personal and social norms								
Religious (Ref.: Non religious)	0.0496	0.0497	0.0350	0.0384	0.0396	0.0390	0.0262	0.0319
Patriotic (Ref.: Non patriotic)	0.0846	0.0846	0.0966	0.0885	0.0950	0.0930	0.0989	0.0985
Inequality averse	0.0292	0.0291	0.0402	0.0358	0.0409	0.0385	0.0410	0.0380
Direct benefits								
Number of children	0.0029	0.0070	0.0075	0.0086	0.0087	0.0084	0.0074	0.0095
x Medium education	0.0063							
x High education	0.0019							
Unemployed (Ref.: Employed)	-0.0917	-0.0935	-0.0119	0.0086	-0.0025	-0.0019	-0.0282	-0.0003
x Medium education	0.1011	0.1029	0.0478	0.0262	0.0416	0.0222	0.0504	0.0345
x High education	0.1027	0.1055	0.0511	0.0156	0.0485	0.0144	0.0534	0.0309
Self-employed (Ref.: Employed)	0.0420	0.0410	0.0228	0.0928	0.0519	0.0048	0.0157	0.0920
x Medium education	-0.1005	-0.0992	-0.0671	-0.1409	-0.0971	-0.0320	-0.0565	-0.1429
x High education	-0.1333	-0.1326	-0.1114	-0.1729	-0.1339	-0.0395	-0.0907	-0.1858
Retired (Ref.: Employed)	-0.0206	-0.0183	-0.0123	-0.0378	-0.0293	-0.0040	-0.0144	-0.0464
x Medium education	0.0674	0.0636	0.0687	0.0979	0.0963	0.0338	0.0525	0.1092
x High education	0.0541	0.0527	0.0783	0.0874	0.1062	0.0263	0.0601	0.1080
Other (Ref.: Employed)	-0.0196	-0.0198	0.0101	0.0646	0.0365	0.0024	-0.0011	0.0629
x Medium education	0.0433	0.0434	0.0178	-0.0392	-0.0077	0.0125	0.0217	-0.0342
x High education	-0.0033	-0.0023	-0.0162	-0.0735	-0.0432	-0.0079	-0.0108	-0.0781
Controls								
Medium income (Ref.: Low)	-0.0009	-0.0007	0.0026	0.0072	0.0041	0.0035	0.0000	0.0066
High income (Ref.: Low)	-0.0111	-0.0111	-0.0122	-0.0090	-0.0103	-0.0122	-0.0154	-0.0098
Age	0.0027	0.0027	0.0025	0.0022	0.0022	0.0024	0.0029	0.0024
Gender (Ref.: Male)	0.0579	0.0581	0.0542	0.0541	0.0532	0.0546	0.0553	0.0533
Married (Ref.: Never married)	0.0053	0.0061	0.0058	0.0112	0.0086	0.0060	-0.0002	0.0047
Widowed (Ref.: Never married)	-0.0143	-0.0139	-0.0261	-0.0114	-0.0202	-0.0219	-0.0341	-0.0228
Divorced (Ref.: Never married)	-0.0381	-0.0376	-0.0437	-0.0378	-0.0419	-0.0395	-0.0461	-0.0435
Natural-born citizen	-0.0472	-0.0472	-0.0393	-0.0433	-0.0366	-0.0383	-0.0450	-0.0462
Indirect benefits								
Public social expenditure			-0.0083					
x Medium education			0.0080					
x High education			0.0113					
Ethnic fractionalization				0.0508				
x Medium education				-0.2266				
x High education				-0.4171				
Transparency					-0.0197			
x Medium education					0.0221			
x High education					0.0395			
Income inequality						-0.0103		
x Medium education						0.0049		
x High education						0.0040		
Relative redistribution							-0.0078	
x Medium education							0.0044	
x High education							0.0066	
Deterrence								0.0718
x Medium education								-0.0340
x High education								-0.0243
Countries FE	YES	YES	NO	NO	NO	NO	NO	NO
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999

Marginal effects of the ordered probit estimation for *Tax morale = High.*

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Table A1.6: Tax morale on a ten-point scale.

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium education	-0.075	-0.057	-1.061***	0.003	-0.618	-1.125	-0.567***	-0.122+
(Ref.: Low)	(0.059)	(0.055)	(0.301)	(0.090)	(0.399)	(0.701)	(0.130)	(0.070)
High education	0.038	0.044	-1.227***	0.200*	-0.813+	-0.962	-0.670**	-0.045
(Ref.: Low)	(0.067)	(0.058)	(0.351)	(0.095)	(0.417)	(0.705)	(0.211)	(0.089)
Personal and social norms								
Religious	0.149***	0.149***	0.117***	0.128**	0.129***	0.127**	0.092**	0.107*
(Ref.: Non religious)	(0.027)	(0.027)	(0.032)	(0.047)	(0.038)	(0.044)	(0.032)	(0.042)
Patriotic	0.243***	0.243***	0.267***	0.246***	0.263***	0.260***	0.275***	0.274***
(Ref.: Non patriotic)	(0.032)	(0.032)	(0.049)	(0.046)	(0.047)	(0.041)	(0.049)	(0.048)
Inequality averse	0.126***	0.126***	0.154***	0.142***	0.157***	0.152***	0.160***	0.148***
	(0.029)	(0.029)	(0.042)	(0.041)	(0.041)	(0.039)	(0.041)	(0.043)
Direct benefits								
Number of children	0.009	0.019**	0.019***	0.023***	0.023***	0.022***	0.019***	0.025***
	(0.013)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)
x Med. education	0.016							
	(0.016)							
x High education	0.004							
	(0.019)							
Unemployed	-0.180	-0.184	-0.023	0.102	0.066	0.016	-0.100	0.082
(Ref.: Employed)	(0.126)	(0.123)	(0.156)	(0.193)	(0.174)	(0.168)	(0.141)	(0.179)
x Med. education	0.198+	0.203+	0.120	-0.003	0.035	0.085	0.174	0.001
	(0.119)	(0.115)	(0.127)	(0.146)	(0.133)	(0.132)	(0.121)	(0.134)
x High education	0.229+	0.236+	0.144	0.015	0.064	0.102	0.201	0.023
	(0.137)	(0.134)	(0.146)	(0.157)	(0.148)	(0.150)	(0.141)	(0.147)
Self-employed	0.208*	0.205*	0.288*	0.393*	0.337*	0.317*	0.207+	0.358*
(Ref.: Employed)	(0.103)	(0.103)	(0.123)	(0.181)	(0.152)	(0.151)	(0.117)	(0.174)
x Med. education	-0.352***	-0.348***	-0.381***	-0.502**	-0.428***	-0.415**	-0.314**	-0.464**
	(0.103)	(0.104)	(0.100)	(0.158)	(0.129)	(0.131)	(0.108)	(0.159)
x High education	-0.471***	-0.469***	-0.496***	-0.631***	-0.528***	-0.523***	-0.419**	-0.594***
	(0.122)	(0.122)	(0.122)	(0.170)	(0.150)	(0.143)	(0.127)	(0.172)
Retired	0.015	0.021	-0.018	-0.041	-0.050	-0.055	-0.025	-0.057
(Ref.: Employed)	(0.065)	(0.063)	(0.092)	(0.077)	(0.072)	(0.080)	(0.086)	(0.072)
x Med. education	0.131+	0.121+	0.190*	0.239**	0.248**	0.231**	0.173*	0.237**
	(0.067)	(0.066)	(0.093)	(0.092)	(0.090)	(0.086)	(0.081)	(0.085)
x High education	0.125	0.122	0.224+	0.272*	0.281*	0.275*	0.210*	0.268*
	(0.091)	(0.090)	(0.119)	(0.115)	(0.114)	(0.112)	(0.107)	(0.104)
Other	-0.040	-0.041	0.112+	0.246+	0.212*	0.150	0.027	0.223+
(Ref.: Employed)	(0.059)	(0.059)	(0.066)	(0.134)	(0.104)	(0.097)	(0.063)	(0.126)
x Med. education	0.101	0.101	-0.034	-0.172	-0.135+	-0.073	0.045	-0.150
	(0.062)	(0.062)	(0.056)	(0.109)	(0.077)	(0.082)	(0.064)	(0.100)
x High education	-0.010	-0.007	-0.103	-0.250*	-0.204*	-0.162+	-0.042	-0.240*
	(0.086)	(0.085)	(0.092)	(0.114)	(0.088)	(0.096)	(0.093)	(0.108)
Controls								
Medium income	-0.028	-0.028	-0.012	0.002	-0.008	-0.009	-0.021	0.001
(Ref.: Low)	(0.028)	(0.028)	(0.035)	(0.033)	(0.036)	(0.036)	(0.034)	(0.035)
High income	-0.072+	-0.073+	-0.068	-0.058	-0.062	-0.067	-0.078+	-0.059
(Ref.: Low)	(0.044)	(0.044)	(0.045)	(0.047)	(0.048)	(0.049)	(0.045)	(0.047)
Age	0.008***	0.008***	0.007***	0.006*	0.006**	0.007**	0.008***	0.007**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Gender	0.174***	0.174***	0.154***	0.153***	0.150***	0.154***	0.158***	0.151***
(Ref.: Male)	(0.024)	(0.024)	(0.031)	(0.036)	(0.035)	(0.031)	(0.026)	(0.034)
Married	0.034+	0.036+	0.036	0.052+	0.044+	0.036	0.018	0.033
(Ref.: Never married)	(0.019)	(0.020)	(0.025)	(0.027)	(0.026)	(0.027)	(0.028)	(0.030)
Widowed	-0.049	-0.048	-0.081*	-0.037	-0.063	-0.069	-0.106*	-0.070
(Ref.: Never married)	(0.035)	(0.035)	(0.035)	(0.046)	(0.040)	(0.044)	(0.043)	(0.052)
Divorced	-0.092**	-0.091**	-0.102**	-0.084*	-0.096*	-0.092**	-0.111**	-0.100*
(Ref.: Never married)	(0.029)	(0.029)	(0.037)	(0.034)	(0.039)	(0.035)	(0.039)	(0.042)
Natural-born citizen	-0.150***	-0.150***	-0.114*	-0.126*	-0.107*	-0.110*	-0.133**	-0.140**
	(0.045)	(0.045)	(0.051)	(0.055)	(0.047)	(0.050)	(0.051)	(0.050)

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Chapter 1. Education and Tax Morale

(*continued*)

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Indirect benefits								
Public social expenditure			-0.028*					
			(0.012)					
x Med. education			0.027**					
			(0.009)					
x High education			0.035**					
			(0.011)					
Ethnic fractionalization				0.245				
				(0.488)				
x Med. education				-0.781*				
				(0.386)				
x High education				-1.234**				
				(0.407)				
Transparency					-0.063			
					(0.069)			
x Med. education					0.070			
					(0.057)			
x High education					0.111^{+}			
					(0.061)			
Income inequality						-0.032^{+}		
						(0.017)		
x Med. education						0.019		
						(0.014)		
x High education						0.018		
						(0.015)		
Relative redistribution							-0.023***	
							(0.004)	
x Med. education							0.013***	
							(0.003)	
x High education							0.018***	
							(0.005)	
Deterrence								0.219^{+}
								(0.131)
x Med. education								-0.092
								(0.115)
x High education								-0.064
								(0.117)
Countries FE	YES	YES	NO	NO	NO	NO	NO	NO
Constant cut1	-1.753***	-1.737***	-2.521***	-1.643***	-2.042***	-3.183***	-2.376***	-1.503***
	(0.119)	(0.119)	(0.445)	(0.145)	(0.514)	(0.869)	(0.204)	(0.101)
Constant cut2	-1.619***	-1.603***	-2.390***	-1.511***	-1.911***	-3.053***	-2.246***	-1.372***
	(0.114)	(0.113)	(0.440)	(0.142)	(0.510)	(0.866)	(0.197)	(0.099)
Constant cut3	-1.365***	-1.349***	-2.144***	-1.264***	-1.665***	-2.808**	-2.001***	-1.125***
	(0.105)	(0.103)	(0.434)	(0.139)	(0.503)	(0.863)	(0.189)	(0.096)
Constant cut4	-1.144***	-1.128***	-1.931***	-1.050***	-1.452**	-2.594**	-1.787***	-0.912***
	(0.104)	(0.101)	(0.434)	(0.140)	(0.503)	(0.862)	(0.185)	(0.100)
Constant cut5	-0.940***	-0.924***	-1.735***	-0.853***	-1.256*	-2.398***	-1.591***	-0.715***
	(0.106)	(0.104)	(0.436)	(0.142)	(0.505)	(0.862)	(0.186)	(0.102)
Constant cut6	-0.585***	-0.569***	-1.395***	-0.510***	-0.916^{+}	-2.057**	-1.249***	-0.375***
	(0.102)	(0.100)	(0.434)	(0.139)	(0.504)	(0.864)	(0.184)	(0.102)
Constant cut7	-0.383***	-0.367***	-1.201**	-0.316*	-0.723	-1.863*	-1.055***	-0.181^{+}
	(0.105)	(0.102)	(0.435)	(0.142)	(0.507)	(0.864)	(0.184)	(0.104)
Constant cut8	-0.068	-0.052	-0.900*	-0.014	-0.422	-1.562^{+}	-0.753***	0.120
	(0.104)	(0.101)	(0.437)	(0.145)	(0.509)	(0.866)	(0.183)	(0.108)
Constant cut9	0.314**	0.330**	-0.535	0.353*	-0.057	-1.196	-0.385*	0.486***
	(0.107)	(0.103)	(0.434)	(0.149)	(0.507)	(0.863)	(0.180)	(0.109)
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999
Pseudo R2	0.0419	0.0419	0.0206	0.0221	0.0197	0.0209	0.0230	0.0215

Ordered probit with clustered standard errors by country (29 countries). Robust standard errors in parentheses where $^{+}$, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively. The independent variable is tax morale measured on a ten-point scale.

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Table A1.7: Tax morale using GLM.

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium education	-0.110*	-0.083+	-0.899**	-0.027	-0.545	-0.940	-0.592***	-0.095
(Ref.: Low)	(0.048)	(0.043)	(0.332)	(0.092)	(0.387)	(0.728)	(0.134)	(0.072)
High education	0.026	0.039	-1.120**	0.230*	-0.778+	-0.622	-0.682***	-0.000
(Ref.: Low)	(0.057)	(0.046)	(0.373)	(0.100)	(0.408)	(0.723)	(0.191)	(0.091)
Personal and social norms								
Religious	0.141***	0.141***	0.090**	0.100*	0.104**	0.100*	0.067*	0.081*
(Ref.: Non religious)	(0.028)	(0.028)	(0.030)	(0.045)	(0.037)	(0.041)	(0.033)	(0.041)
Patriotic	0.252***	0.252***	0.272***	0.252***	0.267***	0.263***	0.279***	0.278***
(Ref.: Non patriotic)	(0.035)	(0.035)	(0.048)	(0.045)	(0.046)	(0.040)	(0.049)	(0.047)
Inequality averse	0.062*	0.062*	0.090*	0.077+	0.093*	0.086*	0.093*	0.084+
	(0.030)	(0.030)	(0.045)	(0.042)	(0.044)	(0.042)	(0.044)	(0.046)
Direct benefits								
Number of children	0.004	0.020**	0.020***	0.023***	0.024***	0.023***	0.020***	0.026***
	(0.012)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
x Medium education	0.024							
	(0.016)							
x High education	0.009							
	(0.020)							
Unemployed	-0.251**	-0.257**	-0.077	0.036	0.000	-0.053	-0.167	0.005
(Ref.: Employed)	(0.092)	(0.088)	(0.126)	(0.159)	(0.142)	(0.133)	(0.109)	(0.144)
x Medium education	0.277**	0.283**	0.173	0.063	0.101	0.153	0.243*	0.080
	(0.094)	(0.090)	(0.109)	(0.123)	(0.111)	(0.108)	(0.101)	(0.109)
x High education	0.251*	0.261*	0.138	0.016	0.074	0.112	0.212	0.041
	(0.124)	(0.122)	(0.135)	(0.137)	(0.134)	(0.135)	(0.133)	(0.132)
Self-employed	0.132	0.127	0.210+	0.302+	0.256+	0.231+	0.128	0.265+
(Ref.: Employed)	(0.098)	(0.099)	(0.114)	(0.165)	(0.139)	(0.136)	(0.106)	(0.156)
x Medium education	-0.293**	-0.287**	-0.328***	-0.436***	-0.372***	-0.355**	-0.259**	-0.394**
	(0.100)	(0.101)	(0.096)	(0.141)	(0.117)	(0.117)	(0.100)	(0.139)
x High education	-0.400**	-0.397**	-0.436***	-0.565***	-0.462**	-0.453***	-0.355**	-0.514**
	(0.125)	(0.126)	(0.125)	(0.163)	(0.145)	(0.137)	(0.127)	(0.161)
Retired	-0.043	-0.034	-0.073	-0.091	-0.097	-0.106	-0.079	-0.105
(Ref.: Employed)	(0.060)	(0.057)	(0.090)	(0.083)	(0.081)	(0.082)	(0.083)	(0.081)
x Medium education	0.182**	0.167**	0.231*	0.270**	0.279**	0.264**	0.215*	0.270**
	(0.067)	(0.065)	(0.099)	(0.103)	(0.103)	(0.094)	(0.085)	(0.098)
x High education	0.143	0.138	0.235+	0.272*	0.282*	0.281*	0.223*	0.272*
	(0.091)	(0.088)	(0.124)	(0.125)	(0.125)	(0.120)	(0.111)	(0.117)
Other	-0.049	-0.050	0.079	0.195	0.162	0.097	-0.010	0.165
(Ref.: Employed)	(0.068)	(0.068)	(0.072)	(0.142)	(0.112)	(0.100)	(0.068)	(0.133)
x Medium education	0.117	0.117	-0.005	-0.125	-0.089	-0.025	0.079	-0.095
	(0.072)	(0.073)	(0.065)	(0.122)	(0.092)	(0.091)	(0.074)	(0.114)
x High education	-0.044	-0.041	-0.121	-0.251*	-0.205*	-0.165+	-0.053	-0.233*
	(0.079)	(0.080)	(0.083)	(0.112)	(0.084)	(0.088)	(0.088)	(0.105)
Controls								
Medium income	0.003	0.003	0.013	0.027	0.017	0.014	0.006	0.024
(Ref.: Low)	(0.028)	(0.028)	(0.037)	(0.034)	(0.039)	(0.038)	(0.036)	(0.038)
High income	-0.026	-0.026	-0.027	-0.017	-0.021	-0.027	-0.035	-0.020
(Ref.: Low)	(0.046)	(0.046)	(0.048)	(0.049)	(0.050)	(0.052)	(0.048)	(0.050)
Age	0.008***	0.008***	0.007***	0.006**	0.006***	0.007***	0.008***	0.007***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Gender	0.176***	0.176***	0.161***	0.161***	0.158***	0.162***	0.165***	0.159***
(Ref.: Male)	(0.026)	(0.026)	(0.030)	(0.034)	(0.033)	(0.029)	(0.026)	(0.032)
Married	0.013	0.017	0.013	0.029	0.022	0.014	-0.004	0.009
(Ref.: Never married)	(0.021)	(0.021)	(0.024)	(0.027)	(0.026)	(0.025)	(0.027)	(0.030)
Widowed	-0.043	-0.041	-0.074*	-0.033	-0.056	-0.063	-0.096*	-0.066
(Ref.: Never married)	(0.035)	(0.036)	(0.032)	(0.044)	(0.039)	(0.044)	(0.041)	(0.051)
Divorced	-0.120***	-0.118***	-0.129***	-0.112***	-0.124**	-0.118***	-0.137***	-0.129**
(Ref.: Never married)	(0.031)	(0.031)	(0.036)	(0.033)	(0.038)	(0.033)	(0.038)	(0.041)
Natural-born citizen	-0.137**	-0.137**	-0.107*	-0.120*	-0.097*	-0.105*	-0.124*	-0.128*
	(0.043)	(0.043)	(0.051)	(0.053)	(0.047)	(0.049)	(0.050)	(0.050)

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Chapter 1. Education and Tax Morale

(*continued*)

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Indirect benefits								
Public social expenditure			-0.024+					
			(0.013)					
x Medium education			0.023*					
			(0.010)					
x High education			0.032**					
			(0.011)					
Ethnic fractionalization				0.108				
				(0.456)				
x Medium education				-0.598+				
				(0.362)				
x High education				-1.170**				
				(0.390)				
Transparency					-0.051			
					(0.067)			
x Medium education					0.060			
					(0.055)			
x High education					0.110+			
					(0.060)			
Income inequality						-0.030+		
						(0.017)		
x Medium education						0.016		
						(0.015)		
x High education						0.011		
						(0.015)		
Relative redistribution							-0.022***	
							(0.005)	
x Medium education							0.014***	
							(0.003)	
x High education							0.019***	
							(0.005)	
Deterrence								0.213
								(0.135)
x Medium education								-0.113
								(0.118)
x High education								-0.081
								(0.123)
Constant	0.597***	0.572***	1.186**	0.454**	0.759	1.865*	1.154***	0.292**
	(0.107)	(0.102)	(0.456)	(0.148)	(0.479)	(0.876)	(0.205)	(0.107)
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999
Country FE	YES	YES	NO	NO	NO	NO	NO	NO
AIC	0.734676	0.734600	0.768232	0.765017	0.768986	0.76690	0.764975	0.767408
BIC	-281938	-281956.7	-280964.8	-281058.1	-280943	-281003.5	-281059.3	-280988.8

GLM with clustered standard errors by country (29 clusters). Robust standard errors in parentheses where +, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively.

Table A1.8: Tax morale and income (1).

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium income	-0.031	-0.017	0.099	0.076	0.115	0.503	0.175$^+$	-0.042
(Ref.: Low)	(0.044)	(0.040)	(0.196)	(0.060)	(0.149)	(0.309)	(0.091)	(0.056)
High income	-0.066	-0.056	-0.257	0.099	-0.118	0.385	0.057	-0.108
(Ref.: Low)	(0.069)	(0.058)	(0.226)	(0.103)	(0.180)	(0.475)	(0.098)	(0.068)
Personal and social norms								
Religious	0.159***	0.159***	0.107**	0.117*	0.124**	0.123**	0.078*	0.101*
(Ref.: Non religious)	(0.031)	(0.031)	(0.034)	(0.049)	(0.042)	(0.046)	(0.037)	(0.046)
Patriotic	0.260***	0.260***	0.286***	0.261***	0.279***	0.272***	0.295***	0.290***
(Ref.: Non patriotic)	(0.037)	(0.037)	(0.054)	(0.050)	(0.050)	(0.042)	(0.053)	(0.051)
Inequality averse	0.095**	0.096**	0.131**	0.115*	0.131**	0.124**	0.130**	0.120*
	(0.035)	(0.035)	(0.050)	(0.048)	(0.048)	(0.046)	(0.048)	(0.050)
Direct benefits								
Number of children	0.012	0.022***	0.030***	0.028***	0.031***	0.028***	0.029***	0.031***
	(0.013)	(0.006)	(0.006)	(0.008)	(0.007)	(0.007)	(0.006)	(0.007)
x Medium income	0.017							
	(0.015)							
x High income	0.013							
	(0.017)							
Unemployed	-0.009	-0.011	0.117	0.125	0.129	0.122	0.098	0.112
(Ref.: Employed)	(0.057)	(0.057)	(0.084)	(0.089)	(0.090)	(0.087)	(0.076)	(0.089)
x Medium income	0.012	0.015	-0.069	-0.066	-0.075	-0.061	-0.080	-0.064
	(0.096)	(0.096)	(0.092)	(0.085)	(0.094)	(0.090)	(0.087)	(0.086)
x High income	-0.093	-0.091	-0.085	-0.103	-0.087	-0.121	-0.135	-0.096
	(0.094)	(0.095)	(0.115)	(0.113)	(0.114)	(0.110)	(0.103)	(0.110)
Self-employed	-0.163$^+$	-0.166$^+$	-0.064	-0.071	-0.057	-0.068	-0.087	-0.082
(Ref.: Employed)	(0.090)	(0.089)	(0.106)	(0.115)	(0.110)	(0.107)	(0.092)	(0.116)
x Medium income	-0.038	-0.033	-0.077	-0.091	-0.085	-0.085	-0.081	-0.073
	(0.086)	(0.086)	(0.082)	(0.086)	(0.084)	(0.082)	(0.076)	(0.089)
x High income	0.005	0.008	-0.040	-0.054	-0.041	-0.045	-0.039	-0.045
	(0.109)	(0.110)	(0.109)	(0.115)	(0.111)	(0.113)	(0.103)	(0.114)
Retired	0.074$^+$	0.077$^+$	0.059	0.070	0.070	0.058	0.056	0.056
(Ref.: Employed)	(0.044)	(0.043)	(0.044)	(0.048)	(0.045)	(0.047)	(0.046)	(0.051)
x Medium income	0.061	0.054	0.091	0.084	0.083	0.088	0.079	0.083
	(0.068)	(0.067)	(0.073)	(0.074)	(0.073)	(0.075)	(0.072)	(0.074)
x High income	0.047	0.043	0.087	0.069	0.086	0.082	0.069	0.067
	(0.069)	(0.067)	(0.085)	(0.082)	(0.084)	(0.077)	(0.076)	(0.081)
Other	0.029	0.028	0.063	0.062	0.064	0.058	0.058	0.064
(Ref.: Employed)	(0.070)	(0.070)	(0.081)	(0.084)	(0.085)	(0.079)	(0.074)	(0.082)
x Medium income	-0.003	-0.000	0.033	0.056	0.043	0.040	0.008	0.039
	(0.085)	(0.084)	(0.092)	(0.094)	(0.093)	(0.087)	(0.086)	(0.090)
x High income	0.048	0.049	0.098	0.104	0.100	0.073	0.053	0.077
	(0.085)	(0.085)	(0.093)	(0.096)	(0.094)	(0.090)	(0.086)	(0.091)
Controls								
Medium education	0.020	0.021	-0.128	-0.136	-0.142	-0.138	-0.057	-0.137
(Ref.: Low)	(0.051)	(0.051)	(0.116)	(0.147)	(0.134)	(0.121)	(0.056)	(0.132)
High education	0.116*	0.117*	-0.031	-0.043	-0.053	-0.034	0.050	-0.032
(Ref.: Low)	(0.059)	(0.059)	(0.109)	(0.144)	(0.127)	(0.121)	(0.066)	(0.131)
Age	0.009***	0.009***	0.008***	0.007**	0.007***	0.008***	0.009***	0.008***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Gender	0.187***	0.187***	0.164***	0.166***	0.164***	0.169***	0.169***	0.167***
(Ref.: Male)	(0.027)	(0.027)	(0.033)	(0.036)	(0.035)	(0.031)	(0.028)	(0.034)
Married	0.021	0.022	0.030	0.045	0.042	0.033	0.015	0.027
(Ref.: Never married)	(0.023)	(0.023)	(0.027)	(0.034)	(0.031)	(0.031)	(0.027)	(0.036)
Widowed)	-0.043	-0.041	-0.067$^+$	-0.032	-0.043	-0.055	-0.091*	-0.060
(Ref.: Never married)	(0.037)	(0.037)	(0.034)	(0.049)	(0.043)	(0.049)	(0.043)	(0.055)
Divorced	-0.117***	-0.117***	-0.125**	-0.107**	-0.119**	-0.109**	-0.132**	-0.123**
(Ref.: Never married)	(0.034)	(0.034)	(0.040)	(0.039)	(0.043)	(0.039)	(0.041)	(0.045)
Natural-born citizen	-0.160***	-0.159***	-0.117*	-0.126*	-0.105*	-0.118*	-0.138*	-0.140*
	(0.047)	(0.047)	(0.056)	(0.060)	(0.054)	(0.054)	(0.056)	(0.055)

(*continued on next page*)

Chapter 1. Education and Tax Morale

(*continued*)

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Indirect benefits								
Public social expenditure			-0.003					
			(0.010)					
x Medium income			-0.003					
			(0.005)					
x High income			0.005					
			(0.007)					
Ethnic fractionalization				-0.257				
				(0.330)				
x Medium income				-0.317^{+}				
				(0.181)				
x High income				-0.639*				
				(0.284)				
Transparency					0.019			
					(0.035)			
x Medium income					-0.020			
					(0.021)			
x High income					0.007			
					(0.026)			
Income inequality						-0.012		
						(0.011)		
x Medium income						-0.011^{+}		
						(0.007)		
x High income						-0.010		
						(0.010)		
Relative redistribution							-0.009	
							(0.008)	
x Medium income							-0.005*	
							(0.003)	
x High income							-0.004	
							(0.003)	
Deterrence								0.092
								(0.083)
x Medium income								0.049
								(0.053)
x High income								0.059
								(0.070)
Constant cut1	-1.075***	-1.066***	-1.061*	-1.077***	-0.850**	-1.550**	-1.209***	-0.901***
	(0.106)	(0.102)	(0.432)	(0.182)	(0.316)	(0.595)	(0.345)	(0.173)
Constant cut2	-0.514***	-0.505***	-0.526	-0.538**	-0.315	-1.013^{+}	-0.672^{+}	-0.364*
	(0.100)	(0.096)	(0.434)	(0.181)	(0.320)	(0.599)	(0.343)	(0.173)
Constant cut3	0.004	0.013	-0.034	-0.043	0.177	-0.518	-0.177	0.129
	(0.106)	(0.102)	(0.442)	(0.190)	(0.329)	(0.602)	(0.347)	(0.180)
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999
Countries FE	YES	YES	NO	NO	NO	NO	NO	NO
Pseudo R2	0.0587	0.0587	0.0244	0.0277	0.0243	0.0276	0.0289	0.0267

Ordered probit with clustered standard errors by country (29 clusters). Robust standard errors in parentheses where $^{+}$, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively.

Table A1.9: Tax morale and income (2).

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium education	-0.135*	-0.112*	-0.217*	-0.206	-0.226$^+$	-0.247*	-0.163*	-0.225*
(Ref.: Low)	(0.055)	(0.048)	(0.107)	(0.132)	(0.118)	(0.106)	(0.066)	(0.110)
High education	0.002	0.012	-0.105	-0.097	-0.122	-0.128	-0.038	-0.102
(Ref.: Low)	(0.064)	(0.051)	(0.106)	(0.132)	(0.118)	(0.109)	(0.077)	(0.113)
Personal and social norms								
Religious	0.157***	0.158***	0.106**	0.114*	0.121**	0.120**	0.077*	0.097*
(Ref.: Non religious)	(0.031)	(0.031)	(0.034)	(0.048)	(0.042)	(0.045)	(0.036)	(0.045)
Patriotic	0.259***	0.259***	0.282***	0.258***	0.275***	0.270***	0.292***	0.287***
(Ref.: Non patriotic)	(0.037)	(0.037)	(0.052)	(0.049)	(0.050)	(0.042)	(0.053)	(0.051)
Inequality averse	0.095**	0.095**	0.129**	0.112*	0.129**	0.123**	0.128**	0.118*
	(0.034)	(0.034)	(0.048)	(0.047)	(0.047)	(0.045)	(0.047)	(0.049)
Direct benefits								
Number of children	0.009	0.023***	0.030***	0.027***	0.030***	0.028***	0.029***	0.030***
	(0.013)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
x Medium education	0.020							
	(0.017)							
x High education	0.007							
	(0.022)							
Unemployed	-0.282*	-0.287**	0.022	0.055	0.038	-0.014	-0.043	0.018
(Ref.: Employed)	(0.111)	(0.107)	(0.179)	(0.182)	(0.191)	(0.188)	(0.158)	(0.187)
x Medium education	0.312**	0.317**	0.083	0.052	0.075	0.125	0.122	0.078
	(0.113)	(0.109)	(0.142)	(0.137)	(0.150)	(0.152)	(0.137)	(0.145)
x High education	0.319*	0.327*	0.080	0.051	0.069	0.112	0.106	0.074
	(0.142)	(0.139)	(0.162)	(0.151)	(0.166)	(0.174)	(0.159)	(0.161)
Self-employed	0.145	0.141	0.325*	0.347$^+$	0.343*	0.284$^+$	0.248*	0.315$^+$
(Ref.: Employed)	(0.100)	(0.103)	(0.152)	(0.183)	(0.162)	(0.156)	(0.118)	(0.172)
x Medium education	-0.320**	-0.315**	-0.451***	-0.491**	-0.466**	-0.418**	-0.392***	-0.454**
	(0.108)	(0.110)	(0.134)	(0.161)	(0.145)	(0.140)	(0.116)	(0.157)
x High education	-0.427**	-0.424**	-0.548***	-0.597***	-0.563***	-0.510**	-0.489***	-0.570**
	(0.130)	(0.132)	(0.154)	(0.180)	(0.166)	(0.157)	(0.135)	(0.178)
Retired	-0.067	-0.059	-0.114	-0.103	-0.108	-0.133	-0.114	-0.128
(Ref.: Employed)	(0.063)	(0.061)	(0.091)	(0.097)	(0.085)	(0.088)	(0.087)	(0.089)
x Medium education	0.218**	0.205**	0.305**	0.304*	0.310**	0.313**	0.276**	0.309**
	(0.073)	(0.070)	(0.111)	(0.121)	(0.113)	(0.104)	(0.094)	(0.109)
x High education	0.182$^+$	0.177$^+$	0.319*	0.310*	0.322*	0.334**	0.291*	0.314*
	(0.096)	(0.094)	(0.136)	(0.142)	(0.134)	(0.129)	(0.121)	(0.129)
Other	-0.063	-0.064	0.219	0.263	0.238	0.161	0.123	0.212
(Ref.: Employed)	(0.069)	(0.069)	(0.134)	(0.169)	(0.158)	(0.142)	(0.085)	(0.160)
x Medium education	0.138$^+$	0.139$^+$	-0.137	-0.181	-0.155	-0.081	-0.049	-0.132
	(0.075)	(0.075)	(0.109)	(0.141)	(0.132)	(0.125)	(0.080)	(0.137)
x High education	-0.011	-0.008	-0.257*	-0.294*	-0.274*	-0.201$^+$	-0.188$^+$	-0.257*
	(0.087)	(0.087)	(0.118)	(0.134)	(0.125)	(0.115)	(0.098)	(0.127)
Controls								
Medium income	-0.003	-0.002	0.145	0.089	0.134	0.568$^+$	0.183$^+$	-0.017
(Ref.: Low)	(0.030)	(0.030)	(0.187)	(0.063)	(0.143)	(0.322)	(0.098)	(0.047)
High income	-0.035	-0.036	-0.168	0.119	-0.067	0.472	0.090	-0.079
(Ref.: Low)	(0.050)	(0.050)	(0.227)	(0.101)	(0.176)	(0.472)	(0.101)	(0.066)
Age	0.009***	0.009***	0.007***	0.007**	0.007**	0.007**	0.008***	0.007**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Gender	0.185***	0.185***	0.159***	0.161***	0.158***	0.165***	0.165***	0.162***
(Ref.: Male)	(0.027)	(0.027)	(0.035)	(0.038)	(0.037)	(0.033)	(0.029)	(0.036)
Married	0.017	0.020	0.021	0.033	0.030	0.023	0.009	0.016
(Ref.: Never married)	(0.022)	(0.023)	(0.026)	(0.029)	(0.028)	(0.028)	(0.027)	(0.032)
Widowed	-0.046	-0.044	-0.072*	-0.039	-0.051	-0.064	-0.097*	-0.069
(Ref.: Never married)	(0.037)	(0.038)	(0.035)	(0.047)	(0.042)	(0.047)	(0.043)	(0.054)
Divorced	-0.119***	-0.118***	-0.130**	-0.113**	-0.125**	-0.116**	-0.136***	-0.130**
(Ref.: Never married)	(0.034)	(0.034)	(0.040)	(0.037)	(0.042)	(0.038)	(0.041)	(0.044)
Natural-born citizen	-0.158***	-0.158***	-0.122*	-0.134*	-0.111*	-0.122*	-0.141*	-0.146**
	(0.047)	(0.047)	(0.055)	(0.058)	(0.052)	(0.053)	(0.055)	(0.054)

Chapter 1. Education and Tax Morale

(continued)

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Indirect benefits								
Public social expenditure			-0.001					
			(0.009)					
x Medium income			-0.004					
			(0.005)					
x High income			0.004					
			(0.007)					
Ethnic fractionalization				-0.311				
				(0.315)				
x Medium income				-0.271				
				(0.179)				
x High income				-0.588*				
				(0.275)				
Transparency					0.021			
					(0.035)			
x Medium income					-0.020			
					(0.021)			
x High income					0.005			
					(0.026)			
Income inequality						-0.011		
						(0.011)		
x Medium income						-0.012^{+}		
						(0.007)		
x High income						-0.011		
						(0.010)		
Relative redistribution							-0.008	
							(0.007)	
x Medium income							-0.005^{+}	
							(0.003)	
x High income							-0.004	
							(0.003)	
Deterrence								0.093
								(0.082)
x Medium income								0.044
								(0.051)
x High income								0.059
								(0.069)
Constant cut1	-1.200***	-1.180***	-1.101**	-1.177***	-0.932***	-1.588**	-1.296***	-1.001***
	(0.114)	(0.107)	(0.385)	(0.179)	(0.283)	(0.562)	(0.323)	(0.159)
Constant cut2	-0.639***	-0.618***	-0.566	-0.637***	-0.396	-1.050^{+}	-0.759*	-0.463**
	(0.113)	(0.106)	(0.389)	(0.181)	(0.287)	(0.566)	(0.322)	(0.161)
Constant cut3	-0.121	-0.100	-0.073	-0.141	0.097	-0.554	-0.263	0.032
	(0.117)	(0.110)	(0.397)	(0.190)	(0.296)	(0.568)	(0.325)	(0.168)
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999
Countries FE	YES	YES	NO	NO	NO	NO	NO	NO
Pseudo R2	0.0594	0.0593	0.0260	0.0296	0.0260	0.0290	0.0300	0.0284

Ordered probit with clustered standard errors by country (29 clusters). Robust standard errors in parentheses where $^{+}$, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively.

UNIVERSITAT ROVIRA I VIRGILI
TAX COMPLIANCE & THE WELFARE STATE: THE ROLE OF EDUCATION, IDEOLOGY AND IMMIGRATION IN TAX MORALE.
David Rodriguez Justicia

Chapter 1. Education and Tax Morale

Table A1.10: Tax morale and education on a four-point scale.

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Medium-low education	-0.144*	-0.126*	-1.047*	-0.007	-0.666	-1.613$^+$	-0.650***	-0.146$^+$
	(0.063)	(0.054)	(0.431)	(0.109)	(0.477)	(0.843)	(0.156)	(0.085)
Medium-high education	-0.132*	-0.101*	-1.052**	-0.091	-0.645	-0.861	-0.675***	-0.112
	(0.055)	(0.050)	(0.343)	(0.111)	(0.412)	(0.767)	(0.168)	(0.087)
High education	0.004	0.014	-1.283**	0.219$^+$	-0.901*	-0.874	-0.784***	-0.030
	(0.064)	(0.051)	(0.409)	(0.113)	(0.449)	(0.778)	(0.216)	(0.098)
Personal and social norms								
Religious	0.158***	0.158***	0.107**	0.116*	0.120**	0.119**	0.080*	0.097*
(Ref.: Non religious)	(0.031)	(0.031)	(0.033)	(0.048)	(0.041)	(0.045)	(0.036)	(0.045)
Patriotic	0.259***	0.259***	0.281***	0.260***	0.276***	0.270***	0.289***	0.287***
(Ref.: Non patriotic)	(0.037)	(0.037)	(0.051)	(0.048)	(0.049)	(0.042)	(0.052)	(0.050)
Inequality averse	0.096**	0.096**	0.125**	0.113*	0.128**	0.122**	0.129**	0.118*
	(0.034)	(0.034)	(0.048)	(0.046)	(0.047)	(0.045)	(0.047)	(0.049)
Direct benefits								
Number of children	0.010	0.023***	0.024***	0.027***	0.027***	0.026***	0.023***	0.030***
	(0.013)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
x Medium-low edu.	0.015							
	(0.018)							
x Medium-high edu.	0.027							
	(0.019)							
x High edu.	0.007							
	(0.022)							
Unemployed	-0.284*	-0.289**	-0.094	0.027	-0.013	-0.071	-0.192	-0.002
(Ref.: Employed)	(0.111)	(0.107)	(0.147)	(0.187)	(0.166)	(0.157)	(0.128)	(0.169)
x Medium-low edu.	0.263*	0.269*	0.146	0.022	0.070	0.123	0.216$^+$	0.041
	(0.116)	(0.112)	(0.129)	(0.154)	(0.137)	(0.132)	(0.119)	(0.140)
x Medium-high edu.	0.378**	0.380**	0.267$^+$	0.151	0.191	0.251$^+$	0.339*	0.168
	(0.130)	(0.127)	(0.145)	(0.156)	(0.147)	(0.147)	(0.139)	(0.141)
x High edu.	0.319*	0.328*	0.200	0.068	0.134	0.173	0.279$^+$	0.092
	(0.141)	(0.139)	(0.152)	(0.159)	(0.154)	(0.153)	(0.149)	(0.151)
Self-employed	0.146	0.141	0.226*	0.333*	0.275*	0.247$^+$	0.135	0.293$^+$
(Ref.: Employed)	(0.100)	(0.103)	(0.110)	(0.168)	(0.133)	(0.134)	(0.104)	(0.161)
x Medium-low edu.	-0.353**	-0.348**	-0.376***	-0.514***	-0.422***	-0.400***	-0.308**	-0.452**
	(0.111)	(0.113)	(0.103)	(0.147)	(0.121)	(0.118)	(0.107)	(0.152)
x Medium-high edu.	-0.299**	-0.293*	-0.337**	-0.452**	-0.384**	-0.365**	-0.255*	-0.416**
	(0.113)	(0.116)	(0.108)	(0.156)	(0.122)	(0.132)	(0.117)	(0.156)
x High edu.	-0.428***	-0.424**	-0.458***	-0.604***	-0.487***	-0.474***	-0.367**	-0.550**
	(0.130)	(0.132)	(0.126)	(0.168)	(0.143)	(0.137)	(0.131)	(0.169)
Retired	-0.069	-0.061	-0.097	-0.116	-0.126	-0.135	-0.104	-0.133
(Ref.: Employed)	(0.063)	(0.060)	(0.097)	(0.089)	(0.087)	(0.088)	(0.089)	(0.087)
x Medium-low edu.	0.208*	0.199*	0.264*	0.306*	0.319**	0.306**	0.243*	0.310**
	(0.081)	(0.078)	(0.115)	(0.120)	(0.118)	(0.110)	(0.103)	(0.116)
x Medium-high edu.	0.238**	0.221**	0.277**	0.321**	0.331**	0.311**	0.258**	0.322**
	(0.076)	(0.073)	(0.107)	(0.116)	(0.117)	(0.106)	(0.092)	(0.108)
x High edu.	0.182$^+$	0.178$^+$	0.278*	0.320*	0.331*	0.332*	0.266*	0.318*
	(0.096)	(0.094)	(0.134)	(0.136)	(0.135)	(0.129)	(0.118)	(0.126)
Other	-0.063	-0.064	0.091	0.222	0.183	0.107	-0.009	0.194
(Ref.: Employed)	(0.069)	(0.069)	(0.072)	(0.151)	(0.119)	(0.103)	(0.067)	(0.144)
x Medium-low edu.	0.128	0.129	-0.020	-0.156	-0.111	-0.037	0.062	-0.126
	(0.090)	(0.090)	(0.076)	(0.131)	(0.101)	(0.093)	(0.081)	(0.128)
x Medium-high edu.	0.148$^+$	0.146$^+$	0.002	-0.134	-0.094	-0.019	0.102	-0.104
	(0.080)	(0.081)	(0.076)	(0.134)	(0.105)	(0.105)	(0.084)	(0.128)
x High edu.	-0.012	-0.008	-0.107	-0.255*	-0.201*	-0.148	-0.030	-0.237*
	(0.086)	(0.087)	(0.092)	(0.120)	(0.093)	(0.094)	(0.094)	(0.116)
Controls (*omitted*)	YES	YES	YES	YES	YES	YES	YES	YES

(*continued on next page*)

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(*continued*)

	I (H1)	II (H1)	III (H2)	IV (H2)	V (H2)	VI (H2)	VII (H2)	VIII (H2)
Indirect benefits								
Public social expenditure			-0.027*					
			(0.014)					
x Medium-low edu.			0.026*					
			(0.013)					
x Medium-high edu.			0.026**					
			(0.010)					
x High edu.			0.036**					
			(0.013)					
Ethnic fractionalization				0.166				
				(0.502)				
x Medium-low edu.				-0.837*				
				(0.413)				
x Medium-high edu.				-0.532				
				(0.439)				
x High edu.				-1.297**				
				(0.433)				
Transparency					-0.064			
					(0.073)			
x Medium-low edu.					0.072			
					(0.068)			
x Medium-high edu.					0.070			
					(0.057)			
x High edu.					0.123^+			
					(0.066)			
Income inequality						-0.035^+		
						(0.019)		
x Medium-low edu.						0.029^+		
						(0.017)		
x Medium-high edu.						0.013		
						(0.015)		
x High edu.						0.016		
						(0.016)		
Relative redistribution							-0.025***	
							(0.005)	
x Medium-low edu.							0.015**	
							(0.005)	
x Medium-high edu.							0.015***	
							(0.004)	
x High edu.							0.021***	
							(0.006)	
Deterrence								0.238^+
								(0.144)
x Medium-low edu.								-0.117
								(0.139)
x Medium-high edu.								-0.137
								(0.125)
x High edu.								-0.091
								(0.131)
Constant cut1	-1.191***	-1.167***	-1.907***	-1.064***	-1.447**	-2.735**	-1.856***	-0.887***
	(0.113)	(0.106)	(0.499)	(0.155)	(0.526)	(0.943)	(0.212)	(0.109)
Constant cut2	-0.629***	-0.606***	-1.370**	-0.524***	-0.910^+	-2.197*	-1.317***	-0.349**
	(0.111)	(0.105)	(0.499)	(0.155)	(0.528)	(0.945)	(0.210)	(0.111)
Constant cut3	-0.111	-0.088	-0.876^+	-0.027	-0.417	-1.701^+	-0.821***	0.145
	(0.116)	(0.110)	(0.503)	(0.162)	(0.533)	(0.948)	(0.211)	(0.118)
Observations	28,999	28,999	28,999	28,999	28,999	28,999	28,999	28,999
Countries FE	YES	YES	NO	NO	NO	NO	NO	NO
Pseudo R2	0.0595	0.0595	0.0279	0.0306	0.0270	0.0295	0.0314	0.0286

Ordered probit with clustered standard errors by country (29 clusters). Robust standard errors in parentheses where $^+$, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively.

Table A1.11: Tax morale and Worldwide Governance Indicators.

	I (H2)	II (H2)	III (H2)	IV (H2)	V (H2)	VI (H2)
Individual-level variables (*omitted*)	YES	YES	YES	YES	YES	YES
Indirect benefits						
Voice and accountability	-0.565***					
	(0.157)					
x Medium education	0.441***					
	(0.102)					
x High education	0.627***					
	(0.170)					
Political stability		-0.405***				
		(0.118)				
x Medium education		0.307***				
		(0.081)				
x High education		0.489***				
		(0.112)				
Government effectiveness			-0.155			
			(0.220)			
x Medium education			0.164			
			(0.170)			
x High education			0.312			
			(0.198)			
Regulatory quality				-0.503*		
				(0.221)		
x Medium education				0.459***		
				(0.119)		
x High education				0.609***		
				(0.164)		
Rule of law					-0.284	
					(0.202)	
x Medium education					0.265$^+$	
					(0.154)	
x High education					0.391*	
					(0.168)	
Control of corruption						-0.153
						(0.143)
x Medium education						0.172
						(0.118)
x High education						0.284*
						(0.126)
Constant cut1	-1.595***	-1.236***	-1.210***	-1.580***	-1.325***	-1.198***
	(0.201)	(0.147)	(0.299)	(0.291)	(0.271)	(0.225)
Constant cut2	-1.057***	-0.699***	-0.673*	-1.043***	-0.788**	-0.660**
	(0.201)	(0.151)	(0.301)	(0.294)	(0.273)	(0.229)
Constant cut3	-0.562**	-0.204	-0.179	-0.549$^+$	-0.294	-0.167
	(0.204)	(0.155)	(0.306)	(0.298)	(0.278)	(0.236)
Observations	28,999	28,999	28,999	28,999	28,999	28,999
Countries FE	NO	NO	NO	NO	NO	NO
Pseudo R2	0.0291	0.0292	0.0268	0.0279	0.0272	0.0272

Estimates for micro-level data are omitted. Ordered probit with clustered standard errors by country (29 clusters). Robust standard errors in parentheses where $^+$, *, **, *** indicate significance at the 10, 5, 1 and 0.1 percent level, respectively.

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Table A1.12: Correlation matrix.

		1	2	3	4	5	6	7	8	9	10	11	12
1	Tax morale	1.00											
2	Education	-0.05	1.00										
3	Religious	0.08	-0.15	1.00									
4	Patriotic	0.10	-0.07	0.11	1.00								
5	Inequality averse	0.04	-0.13	0.03	-0.02	1.00							
6	Number of children	0.03	-0.06	0.09	0.03	0.02	1.00						
7	Occupational status	0.08	-0.30	0.13	0.04	0.06	-0.09	1.00					
8	Income	-0.05	0.30	-0.08	0.00	-0.10	0.13	-0.28	1.00				
9	Age	0.13	-0.21	0.13	0.05	0.03	-0.08	0.33	-0.25	1.00			
10	Gender	0.08	-0.04	0.14	0.02	0.02	0.06	0.14	-0.08	0.02	1.00		
11	Marital status	0.04	-0.09	0.07	0.00	0.02	0.09	0.07	-0.17	0.44	0.14	1.00	
12	Natural-born citizen	-0.02	-0.03	-0.02	0.03	0.00	-0.03	0.00	0.02	-0.02	-0.02	-0.03	1.00
13	Public social expend.	-0.02	0.18	-0.19	0.01	-0.03	-0.10	-0.10	0.01	0.06	-0.05	-0.02	-0.04
14	Ethnic fractionaliz.	-0.09	0.00	0.01	-0.07	-0.06	-0.01	0.00	0.02	-0.02	0.03	0.03	-0.04
15	Transparency	0.01	0.20	-0.23	0.01	-0.05	-0.07	-0.11	0.03	0.04	-0.04	-0.01	-0.06
16	Income inequality	-0.08	0.06	0.01	-0.03	-0.03	-0.06	-0.05	0.00	0.02	0.02	0.04	-0.02
17	Relative redist.	-0.09	0.24	-0.17	-0.01	-0.03	-0.11	-0.13	0.01	0.06	-0.02	0.01	-0.05
18	Deterrence	0.06	-0.07	0.07	-0.01	0.05	0.03	0.05	-0.05	-0.02	-0.01	-0.01	0.06
19	Voice and accountab.	-0.06	0.26	-0.25	-0.01	-0.09	-0.13	-0.15	0.02	0.09	-0.04	0.02	-0.05
20	Political stability	-0.06	0.27	-0.16	-0.03	-0.06	-0.12	-0.15	0.01	0.08	-0.02	0.02	-0.04
21	Government effectiv.	0.00	0.21	-0.23	0.02	-0.06	-0.09	-0.11	0.04	0.05	-0.04	0.00	-0.06
22	Regulatory quality	-0.04	0.26	-0.24	-0.02	-0.10	-0.11	-0.14	0.02	0.08	-0.03	0.03	-0.05
23	Rule of law	-0.02	0.22	-0.25	0.00	-0.05	-0.10	-0.11	0.03	0.05	-0.04	0.01	-0.05
24	Control of corruption	0.01	0.19	-0.22	0.02	-0.04	-0.07	-0.11	0.03	0.04	-0.04	-0.01	-0.05

		13	14	15	16	17	18	19	20	21	22	23	24
1	Tax morale												
2	Education												
3	Religious												
4	Patriotic												
5	Inequality averse												
6	Number of children												
7	Occupational status												
8	Income												
9	Age												
10	Gender												
11	Marital status												
12	Natural-born citizen												
13	Public social expend.	1.00											
14	Ethnic fractionaliz.	-0.48	1.00										
15	Transparency	0.74	-0.25	1.00									
16	Income inequality	0.26	-0.20	0.18	1.00								
17	Relative redist.	0.66	-0.34	0.56	0.49	1.00							
18	Deterrence	-0.01	-0.23	-0.31	0.12	-0.01	1.00						
19	Voice and accountab.	0.81	-0.30	0.84	0.28	0.76	-0.22	1.00					
20	Political stability	0.52	-0.30	0.57	0.13	0.74	-0.19	0.78	1.00				
21	Government effectiv.	0.74	-0.31	0.96	0.22	0.66	-0.32	0.86	0.64	1.00			
22	Regulatory quality	0.71	-0.24	0.86	0.38	0.68	-0.20	0.93	0.68	0.87	1.00		
23	Rule of law	0.77	-0.32	0.95	0.32	0.68	-0.25	0.91	0.63	0.95	0.92	1.00	
24	Control of corruption	0.75	-0.32	0.99	0.18	0.55	-0.30	0.85	0.57	0.95	0.85	0.95	1.00

Table A1.13: Alpha adjustment method for multiple hypotheses testing.

	Specification I (# p-values: 12)		Specification II (# p-values: 9)		Specification III (# p-values: 3)		Specification IV (# p-values: 3)	
	# Reject	p-value	# Reject	p-value	# Reject	p-value	# Reject	p-value
Bonferroni (1)	4	0.0083	5	0.0111	2	0.0333	1	0.0333
Sidak (1)	4	0.0087	5	0.0116	2	0.0345	1	0.0345
Holm (2)	5	0.0143	6	0.0333	3	0.1	1	0.05
Holland (2)	5	0.0149	6	0.0345	3	0.1	1	0.0513
Liu 1 (2)	6	0.0365	9	0.9000	3	0.3	1	0.078
Liu 2 (2)	6	0.0333	9	0.9000	3	0.3	1	0.075
Hochberg (3)	5	0.0125	6	0.0250	3	0.1	1	0.0333
Rom (3)	5	0.0131	6	0.0259	3	0.1	1	0.0342
Simes (3)	6	0.05	7	0.0778	3	0.1	1	0.0333
Yekutieli (3)	5	0.0134	6	0.0236	3	0.0545	1	0.0182
Krieger (3)	7	0.1061	9	0.4091	3	0.0909	1	0.0455

	Specification V (# p-values: 3)		Specification VI (# p-values: 3)		Specification VII (# p-values: 3)		Specification VIII (# p-values: 3)	
	# Reject	p-value	# Reject	p-value	# Reject	p-value	# Reject	p-value
Bonferroni (1)	0	0.0333	0	0.0333	3	0.0333	0	0.0333
Sidak (1)	0	0.0345	0	0.0345	3	0.0345	0	0.0345
Holm (2)	0	0.0333	0	0.0333	3	0.1	0	0.0333
Holland (2)	0	0.0345	0	0.0345	3	0.1	0	0.0345
Liu 1 (2)	0	0.0345	0	0.0345	3	0.3	0	0.0345
Liu 2 (2)	0	0.0333	0	0.0333	3	0.3	0	0.0333
Hochberg (3)	0	0.0333	0	0.0333	3	0.1	0	0.0333
Rom (3)	0	0.0342	0	0.0342	3	0.1	0	0.0342
Simes (3)	0	0.0333	0	0.0333	3	0.1	0	0.0333
Yekutieli (3)	0	0.0182	0	0.0182	3	0.0545	0	0.0182
Krieger (3)	0	0.0303	0	0.0303	3	0.0909	0	0.0303

Robustness check for multiple hypotheses testing with 11 different methods of p-value adjustment. The numbers in the first column denote the existing three different approaches: (1) one-step (2) step-down and (3) step-up. The p-value adjusted for a False Discovery Rate or a Family Wise Error Rate is 0.1.

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UNIVERSITAT ROVIRA I VIRGILI
TAX COMPLIANCE & THE WELFARE STATE: THE ROLE OF EDUCATION, IDEOLOGY AND IMMIGRATION IN TAX MORALE.
David Rodriguez Justicia

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Chapter 2

Voting with tax compliance: ideological stances and tax morale

Overview. This paper analyzes the impact of ideological differences between citizens and governments on tax morale. Based on the predictions from a theoretical model in which voters' tax compliance behavior is driven by fairness concerns, we empirically analyze the channels through which ideological stances influence citizens willingness to pay taxes. Our data are from the WVS and the EVS and comprises nearly 48,000 observations from 23 OECD countries over the period 1995-2012. A causal link between ideology and tax morale is established by using instrumental variables estimation with heteroskedasticity-based instruments. Our results indicate that tax morale decreases with ideological differences between citizens and their governments. Citizens ideologically to the right of the government exhibit a lower willingness to pay taxes than those to the left. Therefore, an electoral change from a right-wing to a left-wing government reduces tax morale, an effect that becomes stronger with public sector size.

Chapter 2. Voting with tax compliance: ideological stances and tax morale

2.1   Introduction

In democracy the tax system and the composition of public expenditure is determined by political parties and through the election of their programs. Accordingly, the extent to which citizens agree with the implemented policies depends on their political and social stances. Therefore, we would expect that the disagreement with certain government policies affects peoples' willingness to pay taxes. Indeed, the prevalent view in the literature on the ethics of tax evasion is that tax evasion may be ethical under some circumstances and unethical under others circumstances (Gronbacher, 1998; Pennock, 1998; Schansberg, 1998). For example, tax evasion has been justified by citizens as ethical in cases of unjust war, corrupt government or an unfair tax system (Ballas and Tsoukas, 1998; McGee and Lingle, 2008; Pennock, 1998). Despite this evidence of ethical justification for tax non-compliance, ideological motives in tax morale have not been analyzed so far. In this paper we address this question and analyze in how far ideological differences to the implemented policies by the government affect citizens' intrinsic motivations to pay taxes.

Understanding the citizens' motivations to pay taxes is important as fighting tax evasion and avoidance has become one of the cornerstones of governmental policies in developed countries after the financial crisis in 2008. This is for two reasons. First, non-compliance yields a substantial revenue loss whose reduction would allow to avoid public expenditure reductions and cuts in welfare benefits as, for instance, the ones observed in the aftermath of the financial crisis in many countries. Thus, according to the European Commission, in 2009 the European Union (EU) accounted a revenue loss of € 1 trillion due to tax evasion and avoidance representing more than eight times the size of the EU annual expenditure budget (€ 116 billion).[1] In the United States (US), the Internal Revenue Service (IRS) reports an average annual net tax gap of $ 406 billion over the period 2008-2010 which amounts to more than 4 times the annual cost of the healthcare programm promoted by US president Barack Obama.[2] Second, tax evasion and avoidance impede the socially desired degree of income redistribution. Piketty (2015), for instance, states that, as a consequence of this, his results underestimate the increase of inequality that can be observed in most countries after 1970 and, in particular, the role of income from capital (see pp. 201, Piketty, 2015).

While the focus of this paper is primary empirical, i.e., on the estimated impact of ideological stances on tax morale, we also develop a simple political economy

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[1]See Murphy (2012), who estimates that the revenue loss due to tax evasion and tax avoidance amounts up to € 860 billion and € 150 billion, respectively.

[2]The net tax gap is calculated by the Internal Revenue Service as the gross tax gap less tax that will be subsequently collected, either paid voluntarily or as the result of IRS administrative and enforcement activities.

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model to disentangle the relationship between tax compliance, ideology and income. In this model individuals' tax compliance is, apart from deterrence intensity and tax pressure, influenced by fairness considerations in line with, for example, Bordignon (1993) and Falkinger (1995). These fairness considerations comprise, on the one hand, the difference between desired and implemented policies (taxation and public spending) and, on the other hand, the observed levels of tax compliance in the individuals' reference groups (as proposed by Porcano, 1988; Spicer and Hero, 1985). Following the literature on voting for redistributive taxation (Borck, 2009; Roine, 2006; Solano-Garcia, 2017; Traxler, 2012), the government policy is determined endogenously through voting of political platforms. The empirical analysis uses individual data from the World Values Survey (WVS) and the European Values Study (EVS) to test the implications of the theoretical analysis. Furthermore, as tax morale and ideological motives are likely to be jointly determined and instrumental variables are not available, we employ the new approach by Lewbel (2012) that uses heteroskedasticity to generate valid instruments.

Our theoretical model allows two main conclusions. First, tax compliance decreases with the difference between individual and government ideology. Thus, right-wing voters that believe that the public sector is oversized reduce tax compliance while left-wing voters that believe that the public sector is undersized increase tax compliance. Second, as ideological stances and income are positively related, omitting ideological motives in tax compliance yields an overestimation of the income effect.

The empirical analysis confirms that tax morale decreases significantly with ideological differences between citizens and their governments. We find that the probability for a taxpayer to exhibit the highest tax morale level is by 2% lower for a moderate rightist as compared to a moderate leftist. Equally, a shift from a moderate right-wing to a moderate left-wing coalition would cause the same decrease in tax morale. This effect is more than twice as large in countries with a public sector size that lies ten percentage point above the average. By contrast, in countries with a public sector size that is five percentage points below the average, the difference in the impact of ideological difference to the government on tax morale between moderate leftists and rightists vanishes completely.

These results suggest a new perspective on tax evasion. Citizens do not only evade for individual pecuniary motives but also to correct governmental public expenditure toward what they consider from their ideological perspective as the optimal level. This 'voting with tax compliance' gives a rather pessimistic view on the extent to which income redistribution can be effectively achieved in modern welfare states. Similar to the 'voting with the feet' argument from local public economics (Tiebout, 1956), citizens who consider that taxes are too high move part of their income underground or abroad. Considering current levels of tax evasion and avoid-

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ance in developed economies, it appears that the degree of income redistribution is considerably below the preferences of the median voter. The resulting discrepancy between the level of income distribution desired by a majority and the one actually observed is a source of frustration for many citizens and, therefore, is a potential source of political and social conflict. Our results indicate that more polarization in turn contributes to a reduction in tax compliance which even aggravates the problem. A deeper analysis of the motives for tax evasion and avoidance followed by policies aimed to reduce ideological polarization should therefore be upfront in the agendas of policy makers in the next years.

The rest of this paper is organized as follows. Section 2.2 reviews the literature related to this paper. In Section 2.3 we set up a theoretical model of voting over public sector size in which citizens' compliance behavior is driven by fairness concerns. In section 2.4 we describe the empirical strategy. In Section 2.5 we discuss the estimation results. Finally, Section 2.6 concludes.

2.2   Related literature

Our paper relates to two strands in the literature: *(i)* the literature on tax morale; and *(ii)* the literature on voting for redistributive taxation.

Tax morale literature.   There is a rather rich literature on tax morale and the variables that correlate with it. While ideological motives and ideological differences between citizens and their government have been overlooked in this literature so far, several studies have included citizens perceptions about the quality of public institutions. The basic idea behind the relationship between tax morale and institutional quality is that citizens and governments sign an implicit 'psychological' contract under which citizens in exchange for their tax payments receive public goods and services from the government (Feld and Frey, 2002). Accordingly, a positive relationship between tax morale and institutional quality is predicted. As measures of institutional quality at the country level the literature has used, for instance, corruption (Torgler, 2006), tax progressivity (Doerrenberg and Peichl, 2013), or the adequacy of public goods provision approximated by ethnic fractionalization (Lago-Peñas and Lago-Peñas, 2010). Other studies have used individual-level data from survey responses to specific questions about trust in public institutions. The results show that high levels of tax morale can be associated with high levels of trust in public institutions. Focusing on the specific measures of trust which are most related to our study, higher levels of tax morale are found in individuals with more trust in the government (e.g. Chan et al., 2017; Daude et al., 2012; Torgler, 2003b)

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and in the president (e.g. Torgler, 2005b).[3]

The present paper relates to this literature as these measures of trust can be partially explained by citizens' ideological stances. To some extent, measures of trust in government and trust in the president can be seen as proxies for ideological alignment between citizens and the government in office. However, an important drawback of these measures is that trust is a wide and highly subjective concept that does not allow to assess the drivers behind it and, therefore, to derive any valuable insights for the design of specific policies. Consequently, the main contribution of this paper to the literature on tax morale is that it identifies ideological differences between citizens and governments as an important determinant of tax morale. This allows, for instance, to predict the impact of changes in government on tax morale. Finally, to the best of our knowledge, this is the first paper that deals with the endogeneity problem in the estimation of tax morale using heteroskedasticity-based instruments as proposed by Lewbel (2012).

Finally, a recent study by Cullen et al. (2018) finds that reported taxable income in US counties increases as a county moves into political alignment with the president. As the increases are concentrated in income sources that are easy to evade, they conclude that political alignment affects tax evasion. While we consider that these results corroborate the ones in this paper, there are two main differences between their and our approach. First, our analysis is based on individual instead of regional-level data which allows to establish a direct link between citizens intrinsic motivations to pay taxes and their ideology and, at the same time, to control for individual characteristics that are fundamental to tax compliance. Second, our data is not limited to the US but comprises 23 developed economies. This allows to obtain a broader perspective of the influence of ideology on tax compliance than the one obtained from the US two-party system.

Voting for redistributive taxation literature. As the relationship between tax morale and the difference between citizens' and governments' ideological stances has yet not been analyzed, we set up a theoretical model to obtain hypotheses for our empirical analysis. The model is based, on the one hand, on the literature that introduces fairness or moral concerns into the classical tax evasion model by Allingham and Sandmo (1972). On the other hand, it is connected to the voting for redistributive taxation literature that links individual ideological stances (preferences for redistribution) with government ideology (effective redistribution through voting).

Moral concerns have been considered for example by Spicer and Hero (1985) and Porcano (1988) who find that tax compliance depends on *social norms* such as

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[3]For other measures of trust in public institutions in the literature see the overview by Horodnic (2018).

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the perceived level of average tax evasion. The impact of *fairness* considerations on tax compliance has been modeled theoretically by Spicer and Lundstedt (1976), Becker et al. (1987), Bordignon (1993) and Falkinger (1995), among others. Empirically, it has been shown that the adequacy of public goods provision (Alm et al., 1993), perceived distributive justice (e.g., Spicer and Becker, 1980), or procedural and retributive justice (e.g., Kaplan et al., 1986; Kirchler et al., 2006) influence taxpayers' compliance behavior.[4] In this paper, we focus on the first two of these fairness aspects and on social norms. Specifically, we formalize a model in which an individual's utility function includes a moral cost of tax non-compliance which depends, on the one hand, on the deviation of an individual's own amount of tax evasion from the perceived level of average tax evasion and, on the other hand, on the difference between the observed tax rate and what an individual considers as the optimal tax rate.

Our theoretical model also relates to the voting for redistributive taxation literature. Building on the work of Romer (1975) and Roberts (1977), a first political economy model of voting for redistributive taxation was developed by Meltzer and Richard (1981). A basic insight from this model is that an increase in mean income relative to the median voter's income increases the size of the public sector. However, as empirical studies have failed to confirm this result (e.g., Karabarbounis, 2011; Milanovic, 2000; Perotti, 1996), more recent theoretical work has extended the Meltzer and Richard (1981) model to account for costly enforcement, personal beliefs and fairness considerations (e.g., Alesina and Angeletos, 2005; Alesina and Giuliano, 2011; Bethencourt and Kunze, 2015; Fehr and Schmidt, 1999). Most related to our theoretical model are the studies by Roine (2006), Borck (2009), Traxler (2012), and Solano-Garcia (2017) that analyze the effect of tax compliance on majority voting over income redistribution. The main differences from our approach to these studies are, first, that we allow for fairness concerns and social norms to account for the moral cost of tax avoidance and, second, that we provide empirical evidence for the hypotheses derived from our theoretical model.

2.3 Theoretical model: Tax compliance, income and political alignment

The objective of our theoretical model is twofold. First, we explain how ideological motives can be related to tax compliance behavior to obtain predictions on the sign

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[4]See Kirchler (2007) and Wenzel (2003) for an overview of the literature. Interestingly, some authors have indicated that voting on fines and the enforcement regime can improve the perception of procedural justice and rise tax compliance (Alm et al., 1999; Feld and Tyran, 2002).

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of the marginal effects of the variables that are used in the empirical application. Second, as ideological motives have been so far not considered in the analysis of tax evasion or compliance behavior, we use the equilibrium analysis of our simple political economy model to uncover the relationship between political alignment and income, the most prominent variable in explaining tax evasion. The results of this analysis are employed to set up the empirical model and to analyze the consequences of omitting ideological motives.

2.3.1 Framework

Consider a simple model of voting for public goods provision in which citizens' preferences over public sector size (commonly labeled as ideology) are determined by their income and fairness considerations.[5] The economy is inhabited by a large number of citizens or voters modelled as a continuum with mass equal to one. A citizen of type i has pre-tax income $y_i \in (0, Y]$ which is distributed according to the cumulative distribution function $F(\cdot)$ with mean $\overline{y}$ and median $y_m = F^{-1}(1/2)$, where $y_m < \overline{y}$. Denote x_i the income that is not declared, i.e., the *evaded income* by individual i, where $x_i < y_i$. Denote the unknown total amount of evaded income $X = \int_0^Y x_i dF(y_i)$ and $E[x]$ its expected mean value, which is assumed to be the same for all individuals.[6] Citizens have preferences over consumption c_i, public goods $g_i = g$ (which are provided in the same amount to everyone), and the moral cost of tax evasion. The moral cost depends on two factors. On the one hand, it depends on social norms such as the perceived level of average tax evasion (e.g., Porcano, 1988; Solano-Garcia, 2017). On the other hand, it depends on fairness considerations regarding the tax system. Thus, perceived fairness of taxation has been found to influence tax compliance behavior according to various aspects, for example, the adequacy of public goods provision (Alm et al., 1993), distributive justice (e.g., Spicer and Becker, 1980), or procedural and retributive justice (e.g., Kaplan et al., 1986; Kirchler et al., 2006).[7] Focusing on the first two of these fairness aspects and on social norms, we formalize a moral cost function that depends on the deviation of an individual's own amount of tax evasion from the perceived level of average tax evasion and on the difference between an individual's preferred size of the public sector (denoted as her 'ideology'), τ_i , and the size of the public sector implemented by the government ('government ideology'), τ. Specifically, the

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[5]For similar models see, e.g., Bordignon (1993), Myles and Naylor (1996) and Solano-Garcia (2017). See also Corneo and Grüner (2002) and Alesina et al. (2012) for a general discussion of the relationship between ideology, income and redistribution.

[6]Note that allowing for idiosyncratic believes would make the model less tractable without changing its basic insights.

[7]See Kirchler (2007) and Wenzel (2003) for an overview of the literature.

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following quasi-linear utility function is assumed

$$u_i(c_i, g, x_i, \tau_i) = c_i + v(g) - \alpha\,(\tau_i - \tau)\,(x_i - E\,[x]) \tag{2.1}$$

with $v'(.) > 0$, $v''(.) < 0$, $lim_{g \to 0} v'(g) \to \infty$, $lim_{g \to \infty} v'(g) \to 0$, $\epsilon_{v',g} \equiv -v''g/v' \leq 1$, and $0 \leq \alpha \leq 1$. As it turns out, the cost is positive for individuals that evade more than the average and consider that the public sector is undersized, and for individuals that evade less than the average and consider that the public sector is oversized. By contrast, individuals that evade more than the average and consider that the public sector is oversized (e.g., right-wing voters in countries with high government spending levels) find a moral justification for their evasion behavior. The same occurs for citizens that evade less than the average when they consider that the size of the public sector is inefficiently small.[8] Finally, note that taxpayers face no moral cost if the implemented public sector size coincides with their preferred public sector size.[9]

The government levies a proportional tax $t \in [0, 1)$ on declared income. Taxpayers are audited with probability $p \in [0, 1]$ by governmental tax agencies (in which case tax evasion will be discovered with probability one) and punished with the fine $\lambda x_i^2/2y_i$.[10] Denoting $\theta = p\lambda$ as the intensity of tax enforcement, we can write the expected penalty π as $\pi\,(x_i; y_i, \theta) \equiv \pi\,(x_i) = \theta x_i^2/2y_i$.[11] We assume that the intensity of tax enforcement is bounded from below and from above. Specifically, we assume that $t < \theta < 1$.[12] Moreover, we assume that the cost of tax enforcement is totally covered by the fines that are levied.[13]

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[8]See also Solano-Garcia (2017) for a related assumption on the moral cost of tax evasion. Differently to our model he does not consider the difference between preferred and observed tax rates. Furthermore, in this specification it is assumed that individuals suffer equally by evading more as well as by evading less than what they expect from the average taxpayer.

[9]While this seems to be a strong assumption is should be noted that, as can be observed in Section 2.3.4, this holds only for the median voter, i.e., for a mass of voters of zero.

[10]The assumption of an expected marginal penalty which is decreasing in income can be justified by the fact that fines also increase with the share of evaded income. This means that for the same amount of evaded income the fine will be lower for an individual with larger income. Other explanations are that high income owners have more possibilities for legal tax avoidance or that the probability of detecting tax evasion decreases with income. In both cases the expected marginal penalty would also decrease with income.

[11]The assumption of this specific functional form is to simplify the exposition of the results. The main results of this paper will also hold if a more general functional form is assumed that fulfills $\pi'(.) > 0$, $\pi''(.) > 0$, $\partial\pi'(.)/\partial\theta > 0$, $\partial\pi'(.)/\partial y_i < 0$, $\pi(0) = 0$, $\pi'(0) = 0$, $\pi(y_i) < y_i$, and $\pi'(y_i) < 1$.

[12]For a similar assumption, see (e.g., Allingham and Sandmo, 1972; Slemrod, 1985).

[13]If the tax agency's budget (say B) is pre-assigned, this assumptions implies that the budget constraint of the tax agency is balanced, i.e., $E\pi(x) = B$. With perfectly rational individuals this implies that the auditing probability p will depend on B and the taxpayers' expectations about tax evasion. In a more general model, the budget B (and with it p) could also be subjected to voting such that t and p would be endogenous (see, e.g., Solano-Garcia (2017) for an analysis of this type).

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Tax revenues are returned to citizens via transfers or public goods and services. The shadow price of public funding is given by $1 - \delta$ such that, as the government's objective is purely redistributive, the proportion $\delta \in (0, 1]$ of tax revenues is returned to citizens. Furthermore, the government budget is assumed to be balanced. Consequently, citizen i expects to receive the following amount of per capita public goods provision from the government

$$g = \delta t \left(\overline{y} - E\left[x\right] \right) \tag{2.2}$$

Citizens are risk neutral and consume their whole after-tax income such that

$$c_i = (1 - t)\, y_i + t x_i - \pi\left(x_i\right). \tag{2.3}$$

Therefore, after substituting (2.2) and (2.3) into (2.1), citizen i's expected indirect utility function can be written as

$$u_i(x_i, y_i, \tau_i; t, \tau, \boldsymbol{\omega}) = (1 - t)\, y_i + t x_i - \pi\left(x_i\right) + v\left(\delta t \left(\overline{y} - E\left[x\right]\right)\right) - \alpha\left(\tau_i - \tau\right)\left(x_i - E\left[x\right]\right) \tag{2.4}$$

where $\boldsymbol{\omega} = (\alpha, \delta, \theta, \overline{y})$.

The timing of the game is as follows. In stage 1, political parties announce their political platforms consisting of an income redistribution policy implemented via the tax rate t. In stage 2, elections take place where citizens vote for a tax policy according to their preferences for taxation. The winner implements his proposed tax rate after the elections. In stage 3, taxpayers decide their level of tax compliance according to the observed tax rate, their preferences for taxation and their expected level of general tax compliance. The game is solved by backward induction.

2.3.2   Tax evasion

Given the tax rate, the enforcement level and expected tax evasion, at stage 3 of the game, citizens decide their optimal level of tax evasion by maximizing (2.4) with respect to x_i. This yields the optimal level of tax evasion

$$x_i^* = x\left(y_i, \tau_i; t, \tau, \boldsymbol{\omega}\right) = \begin{cases} \frac{t - \alpha(\tau_i - \tau)}{\theta} y_i & \text{for} \quad t - \alpha\left(\tau_i - \tau\right) < \theta \\ y_i & \text{else} \end{cases}. \tag{2.5}$$

Studying the comparative statics of (2.5), we obtain the following result:

Proposition 2.3.1. *The evaded income increases with the level of taxation and income, and decreases with the intensity of tax enforcement and the difference between individual and government ideology.*

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This result is common to models of tax evasion and in accordance with empirical evidence. Thus, the evaded income increases with the tax rate and income, and decreases with the intensity of tax enforcement (e.g., Allingham and Sandmo, 1972; Slemrod, 1985).[14] Moreover, the moral cost of tax evasion yields tax evasion to rise (decline) when the observed tax rate lies above (below) what is considered as the optimal level of taxation. Analyzing the implication of this optimal tax evasion behavior for the provision of public goods, we can state the following result:

Proposition 2.3.2. *Public goods provision follows a Laffer curve, where $\partial^2 g/\partial t^2 > 0$, $\lim_{t\to 0} g(t) = \lim_{t\to 1} g(t) = 0$, $\lim_{t\to 0} g'(t) = \infty$, and $\lim_{t\to 1} g'(t) = -\infty$.*

2.3.3 Ideology and public sector size

Next, to solve stage 2 of the game, consider citizens' ideological stances regarding public sector size. For simplicity let us assume that there is no debt nor government deficit or surplus such that public sector size and average taxation coincide, i.e., $t = \tau$.[15] Furthermore, let us suppose that individuals form their ideological positioning on what is the optimal public sector size (τ_i^*) from the maximization of individual welfare. Then, after substituting the optimal level of tax evasion x_i^* into (2.4), the individual's expected indirect utility function at $\tau = \tau_i$ becomes

$$u_i(y_i, \tau_i; \boldsymbol{\omega}) = (1 - \tau_i) y_i + \frac{y_i}{2\theta} \tau_i^2 + v\left(g(\tau_i)\right). \tag{2.6}$$

Expression (2.6) underlines some important features that shape individual's preferences regarding optimal taxation (public sector size). The first term is decreasing in the tax rate as higher taxation reduces an individual's net income. The second term is the difference between evaded tax payments and the expected penalties and is increasing in the tax rate because, with optimal evasion behavior, the benefits from tax evasion dominate the expected costs. Finally, the third term denotes an individual's utility from public goods provision which, as observed in Proposition 2.3.2, is inversely U-shaped in the tax rate. From maximization of the utility function in (2.6) with respect to τ_i we obtain, as the stage-2 equilibrium values, citizen i's preferred level of taxation, $\tau_i^* = \tau(y_i, \boldsymbol{\omega})$.

Proposition 2.3.3. *Citizens' desired tax rate or public sector size (ideology): i) lies strictly between zero and one ($0 < \tau_i^* < 1$); ii) decreases with income, i.e., richer citizens prefer less public spending ($\partial \tau_i^*/\partial y_i < 0$); iii) increases/decreases with mean*

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[14]Note however, that in more general theoretical models the relationship between income tax evasion and the tax rate depends on the degree of risk aversion and the way in which fines are imposed (Allingham and Sandmo, 1972; Yitzhaki, 1974).

[15]Note however, that the empirical part of this paper is not based on this assumption.

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income for rich/poor citizens ($\partial \tau_i^*/\partial \overline{y} > 0/\partial \tau_i^*/\partial \overline{y} < 0$); iv) increases/decreases with the moral cost parameter for rich/poor citizens ($\partial \tau_i^*/\partial \alpha > 0/\partial \tau_i^*/\partial \alpha < 0$); v) increases with the efficiency of the public sector ($\partial \tau_i^*/\partial \delta > 0$); and vi) increases with the intensity of tax enforcement ($\partial \tau_i^*/\partial \theta > 0$).

The first result is non-surprising as the provision of public goods follows a Laffer curve. Therefore, the rich prefer a strictly positive tax rate to guarantee a minimum amount of public good provision from which they derive a large marginal utility. On the other hand, the poor prefer a tax rate below one, as they anticipate that, due to increased tax evasion, an increase in the tax rate will not yield more public good provision. The second result indicating that citizens' preferred public sector size decreases with income is common in the literature (Persson and Tabellini, 2002). The driving force behind this result is that the marginal utility of an increase in taxation decreases with income, i.e., poor citizens benefit more from a rise in the tax rate than rich citizens. The third result seems to be surprising at first sight. However, to understand it, consider that poor citizens prefer a large public sector. Therefore, at their preferred tax rate we are at the downward sloping part of the Laffer curve. Consequently, an increase in mean income (because of tax evasion) will decrease public revenues. Thus, to raise tax revenues it becomes optimal to decrease taxation. For rich citizens the effect goes into the opposite direction which explains the third result. The importance of moral concerns in tax evasion has a positive impact on the preferred tax rate by rich citizens. This is because with larger values of α they will evade more, and, thus contribute less to financing public spending from which, however, they benefit through the consumption of public goods. By contrast, for poor citizens a larger moral cost will decrease their tax evasion and consequently, they benefit less from public spending and prefer a smaller public sector. Regarding the last two results, as expected, we observe that citizens prefer a larger public sector when it is more efficient and when tax enforcement is more intense.

2.3.4 Political competition

Now, at stage 1 of the game, consider the political equilibrium in this model of income tax evasion to determine the tax policy proposed by parties at equilibrium. As is common in the literature, we assume that the government is formed by the winner of a two-party electoral process (Persson and Tabellini, 2002). Parties compete under the majority rule and announce simultaneously their platforms. Platforms are unidimensional and consist of a public spending policy implemented with a proposed tax rate. Parties merely derive utility from winning the election where their utility equals their winning probability. Thus, under the majority rule their utility is one

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(zero) if their obtain more (less) than half of the votes. In case of a tie their utility is $1/2$. Voters vote for the platform that gives them highest utility. The winning party implements its announced policy. Parties have perfect information about citizens' ideology (preferences on public spending or income taxation). Consequently, they also can anticipate citizens' tax evasion behavior.

To derive the tax rate proposed by parties at equilibrium, from Proposition 2 we know that citizens' optimal tax rates are strictly decreasing in income, i.e., richer citizens prefer lower tax rates. Consequently, the monotonicity of preferences assures that the median voter theorem can be applied and that the pivotal citizen is the one with median income. Thus, the stage-1 equilibrium tax rate that wins majority voting and that will be implemented by the government is given by $\tau = \tau_m^* = \tau(y_m, \boldsymbol{\omega})$.

The effect of an increase in income inequality, captured by an increase in mean income compared to median voter's income, on the size of the public sector has been a central issue since the seminal paper by Meltzer and Richard (1981). In their paper they find a positive relationship that, however, has not been confirmed by empirical evidence (e.g., Karabarbounis, 2011). From Proposition 2.3.3 follows that the effect of a rise in mean income on the median citizen's preferred tax rate is ambiguous. Generally, it will depend on how close the median voter's income is to the income of the poor (i.e., on the income distribution) and on the level of taxation. Thus, with an extremely left-skewed income distribution or with strong moral concerns, high government effectiveness and intensive tax enforcement it is more likely that an increase in mean income yields a decrease in taxation. By contrast, the Meltzer and Richard (1981) result that public sector size increases with mean income in our model is obtained when the opposite conditions hold. Considering, for instance, that government efficiency should be expected to be a decreasing function of public sector size, this result also gives an explanation for the empirical observation that public sector size is not monotonically increasing with mean income (Karabarbounis, 2011).

With regard to tax evasion, substituting τ_i^* and τ_m^* into (2.5) allows to write the stage-1 equilibrium level of tax evasion as $x_i^* = x(y_i, y_m, \boldsymbol{\omega})$. Regarding the marginal effects of the explanatory variables, we obtain the following result:

Proposition 2.3.4. *Citizens' tax evasion: i) increases with income where the effect is more pronounced than the direct (stage-3) income effect ($\partial x_i^*/\partial y_i > 0$); ii) decreases with the income of the median voter ($\partial x_i^*/\partial y_m < 0$); and iii) with a rise in the efficiency of the public sector ($\partial x_i^*/\partial \delta > 0$); More intensive tax enforcement has anambiguous effect on tax evasion.*

The first two results follow directly from the fact that tax evasion decreases in t_i and increases in t_m, and that tax rates decrease in income (see Proposition 2.3.3).

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A consequence of this is that the omission of fairness and ideological concerns yields an exaggerated direct effect of income on non-compliance. Regarding the effect of a change in government efficiency on tax evasion, this only depends on how it affects the effective tax rate. Since from Proposition 2.3.3 we know that an increase in government efficiency increases effective taxation (which in turn spurs tax evasion), higher government efficiency yields more tax evasion. Finally, the ambiguous effect of the intensity of tax enforcement on tax evasion is explained by the fact, that, on the one hand, it makes tax evasion less profitable, but, on the other hand, increases public sector size and taxation and, hence, the gains from tax evasion.

2.4   Empirical approach

In this section, we propose an empirical application to test the validity of the theoretical predictions and to assess the magnitude of possible impacts of ideology on tax compliance. The organization of this section is as follows. We first describe the data and formulate the hypothesis subject to empirical testing. We then specify the empirical model and discuss the estimation results.

2.4.1   Data

Our individual-level data are from the World Values Survey (WVS) and European Values Study (EVS). These surveys contain representative questionnaire data from face-to-face interviews conducted by professional scientific institutions at the respondents' home. In this study we make use of the combined WVS/EVS data file which, for the variables of interest, leaves us with nearly 48,000 observations between 1995 and 2012 for 23 OECD countries: Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Denmark (DEN), Finland (FIN), France (FRA), Germany (GER), Greece (GRE), Iceland (ICE), Ireland (IRE), Italy (ITA), Japan (JAP), Luxembourg (LUX), the Netherlands (NED), New Zealand (NZL), Norway (NOR), Spain (SPA), Sweden (SWE), Switzerland (SWI), Turkey (TUR), the United Kingdom (UK) and the US.[16] Furthermore, for some of our explanatory variables we make use of country-level data. Details on variable definitions, data sources and the descriptive statistics of our variables can be found in Tables A2.1, A2.2 and A2.3 in the Appendix.

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[16] As tax evasion behavior and fairness perceptions are substantially different in Eastern European countries, these were not included into the analysis. For details on the number of observation per country and the year in which they have been taken see Table A2.7 in the Appendix.

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Dependent variable: Tax morale

Our dependent variable is *Tax morale*. We use the following question from the WVS/EVS: *Please tell me for each of the following whether you think it can always be justified, never be justified, or something in between, using this card: 'Cheating on tax if you have the chance'*. The respondents' answers are on a ten-point scale ranging from 1 (never justify) to 10 (always). As is common in the literature, we recoded *Tax morale* into a four-point scale to facilitate the interpretation of our results. Thus, for the ordered probit estimation *Tax morale* is recoded into a four-point scale using the following criterion: responses from 7 to 10 were combined into a value 0 (lowest level of tax morale), responses 5 and 6 were recoded as 1; responses 3 and 4 recoded as 2; and 1 and 2 are recoded as 3 (the highest level of tax compliance). For the remaining estimation methods (GLM, OLS, Lewbel) we employ the original ten-point scale.[17]

The advantage of this measurement of the dependent variable is that it allows us to obtain cross-country comparable data for a large set of countries over a period of 18 years.[18] Another advantage is that tax compliance comprises both tax evasion and tax avoidance behavior which are both core to ideological motives. Finally, it should be noted that in developed countries, as shown for instance by Richardson (2006) and Torgler et al. (2008), actual tax evasion and tax morale are strongly negative correlated.[19]

Explanatory variables

Income. The variable *Income* is measured on a ten-point scale: *Lower step* (1), *Second step* (2), *Third step* (3), *Fourth step* (4), *Fifth step* (5), *Sixth step* (6), *Seventh step* (7), *Eigth step* (8), *Nineth step* (9), *Tenth step* (10), where respondents to the WVS/EVS classify themselves into these income scales by answering the following question: *'Here is a scale of incomes and we would like to know in what group your family is, counting all wages, salaries, pensions, and other income that comes in. Just give me the number of the group your household falls into before tax and other deductions'*. The income groups are constructed with information from country-specific income distributions. From the theoretical model we expect a negative influence of *Income* on *Tax compliance*.

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[17]See Figures A2.1 and A2.2 in the Appendix for the distribution of the dependent variable on a four-point scale and on the original ten-point scale, respectively.

[18]A cross-country comprehensive data base for this variable is not available as tax evasion behavior is rather difficult to measure and existing information in many countries is not publicly revealed (Andreoni et al., 1998).

[19]See also Elffers et al. (1987) and Frey and Torgler (2007) for an extensive discussion on the bias of self-reported tax evasion measures.

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Ideological difference. To measure the ideological difference between individuals and their government, i.e., $\tau_i - \tau$, we define two variables: *Ideology* and *Government ideology*. The variable *Ideology* is constructed on the basis of the following WVS/EVS question: *'In political matters, people talk of 'the left' and 'the right'. How would you place your views on this scale generally speaking?'*. The respondents' answers to this question are ranked on a ten-point scale, from 1 (extreme leftist) to 10 (extreme rightist).[20] Consequently, as right-wing (left-wing) voters typically advocate for a small (large) public sector, *Ideology* has the opposite sign to τ_i. *Government ideology* is from the Parliaments and Governments Database (ParlGov) by Döring and Manow (2018). This database contains information on parties' ideological positioning (their platform) on a 0 (leftist)-10 (rightist) scale such that this variable is also negatively related to τ. Moreover, it includes data on the composition of Parliaments and government coalitions. Our variable *Ideological difference* is the difference between the respondents' ideology (*Ideology*) and the ideology of the government in office (*Government ideology*) which, in case of multi-party governments, is measured as the unweighted mean of coalition parties' ideology.[21] To test the robustness of our results, two alternative measures are employed. First, *Weighted ideological difference* calculates *Government ideology* as the weighted mean of coalition parties' ideology using the seats in Parliament for the construction of weights. Secondly, *Ideological difference to prime minister* is the difference between the respondents' ideology and the ideology of the party of the prime minister. From the above consideration follows that *Ideological difference*, *Weighted ideological difference*, and *Ideological difference to prime minister* $\in [-10, 10]$, where a positive (negative) value indicates that the respondent is more rightist (leftist) than the government or prime minister.

While in the theoretical model ideological difference refers to the difference between the actual and preferred public sector size (or taxation), our empirical variable measures discrepancy with governmental policies in a broader sense, as for instance, regarding the distribution of the public budget over different spending categories. As such a dissidence might also affect taxpayers' willingness to comply, we consider this measurement of the ideological difference variable even more advantageous for the purpose of the empirical analysis.[22] From the results in Proposition 2.3.1 we expect a negative impact of *Ideological difference* on *Tax morale*.

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[20]The distribution of *Ideology* is displayed in Figure A2.3 in the Appendix.

[21]In election years, we consider the ideology of the government that has been the main part of the year in office.

[22]Note also that there are two questions in the WVS/EVS that are closely related to our analysis: "Extensive welfare versus lower taxes" and "Importance of eliminating big income inequalities". However, the use of these data would reduce our sample size by more than 75%. Therefore, we have not considered these data.

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Public sector size. The variable *Public sector size* is measured by total general government expenditure as a share of Gross Domestic Product (GDP) from OECD (2018). The variable is measured in percentage points and, to simplify the interpretation of our results, centered around its mean 44.26 such that *Public sector size* $\in$ $[-12.35, 18.05]$. We use *Public sector size* as an interaction variable with *Ideological difference* to allow for distinguished level effects in the latter variable.

Government effectiveness. The efficiency of the public sector (as a proxy for δ and θ) is measured with *Government effectiveness* as defined by World Bank Governance Indicators. It is measured on a scale that ranges from -2.5 (weak) to 2.5 (strong) government performance. From our theoretical results we expect an ambiguous impact on the probability to exhibit the highest *Tax morale* level (see Proposition 2.3.4).

Economic controls. As further country-specific economic variables we use *Inflation* and *Unemployment*. Both variables are measured in percentage points.

Socio-demographic controls. As is common in the literature that uses data from the WVS/EVS, we include in our analysis a number of variables to account for the respondents' socio-demographic characteristics such as age, gender, educational level, occupational status and marital status. Furthermore, to account for personal and social norms, we define two dichotomous variables indicating religious beliefs and patriotism, respectively.[23] Finally, we include fixed effects to account for time invariant institutional and idiosyncratic differences across countries that are not captured by the aforementioned country-specific variables.

Hypotheses

With this measurement of our dependent and explanatory variables at hand and noticing that tax evasion and tax compliance are inversely related, Proposition 2.3.4 indicates a negative relationship between tax compliance and income. However, Proposition 2.3.1 and Proposition 2.3.3 reveal that part of this influence stems from ideological motivations. The objective of the empirical application, therefore, is to test the following hypotheses:

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[23]The choice of the control variables is motivated by two criteria. Firstly, we have used those variables that have been commonly found to have an influence on tax compliance behavior. Secondly, we have included those variables that are commonly available for all waves and countries. A more detailed description of the definition and measurement of these variables is in Table A2.1.

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Hypothesis 1: *Tax morale* is influenced by ideological motives. It decreases with *Ideological difference.*

Hypothesis 2: This influence is partly channeled through income whose impact is overestimated when ideological motives are not considered.

2.4.2   Empirical model

We employ an ordered probit regression model to account for the categorical character of our dependent variable *Tax morale*. The model contains country and time dummies to account for unobservable country and time-specific effects with the US and 1995 as the reference country and year, respectively. Specifically, the estimation model is:

$$y_{i,c}^* = \boldsymbol{\beta'}\boldsymbol{x_{i,c}} + \boldsymbol{\gamma'}\boldsymbol{z_{i,c}} + \boldsymbol{\eta_j} + \boldsymbol{\rho_t} + \boldsymbol{\nu_c} + \varepsilon_{i,c} \tag{2.7}$$

where y^* is a latent variable (tax compliance of individual i in country c), $\mathbf{x}$ is a vector of main explanatory variables, $\mathbf{z}$ is a vector of control variables, $\eta_{\mathbf{j}}$ is a vector of intercepts for each tax compliance category (*Middle low, Middle high* and *High* as compared to the base category *Low*), and $\rho_{\mathbf{t}}$ and $\nu_{\mathbf{c}}$ are vectors of time and country dummies, respectively. The latent variable $y_{i,c}^*$ is only observable when it crosses thresholds:

$$y_{i,c}^* = j \qquad \text{if} \qquad \alpha_j < j \leq \alpha_{j+1}, \quad j = 0, 1, 2, 3,$$

and the probability that $y_{i,c}^* = j$ is:

$$P(y_{i,c}^* = j) = F(\alpha_{j+1} - \boldsymbol{\beta'}\boldsymbol{x_{i,c}} - \boldsymbol{\gamma'}\boldsymbol{z_{i,c}} - \boldsymbol{\eta_j} - \boldsymbol{\rho_t} - \boldsymbol{\nu_c}) - F(\alpha_j - \boldsymbol{\beta'}\boldsymbol{x_{i,c}} - \boldsymbol{\gamma'}\boldsymbol{z_{i,c}} - \boldsymbol{\eta_j} - \boldsymbol{\rho_t} - \boldsymbol{\nu_c})$$

where F denotes the standard normal cumulative distribution function. The four categories for our tax compliance variable y^* are: low ($j = 0$), medium low ($j = 1$), medium high ($j = 2$), and high ($j = 3$). The vector of control variables $\mathbf{z}$ includes: *Age*, a gender dummy (*Female*), a dummy for religious beliefs (*Religious*), a dummy for patriotism (*Patriotic*), two educational level dummies (*Medium* and *High*), four occupational status dummies (*Unemployed, Self-employed, Retired, Other*), three marital status dummies (*Married, Divorced* and *Widowed*) and, as economic controls, *Inflation* and *Unemployment*.

2.5   Results

This section is organized as follows. First, we present the main estimation results allowing to assess the validity of Hypothesis 1. Second, we use the approach proposed

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by Lewbel (2012) to address possible endogeneity issues. Then, we employ different robustness checks to assess whether our results are sensitive to our most important specification assumptions. Finally, to test Hypothesis 2, we explore the consequences of omitting ideological motives in the analysis of tax morale.

2.5.1   Tax morale and ideological motives

Main results

The estimation results are displayed in Table 2.1. The reported p-values are clustered by country to avoid an underestimation because of intra-group error correlation. The discussion is limited to estimates with a p-value below 5 percent.

Specification I shows the results from ordered-probit estimation with *Tax morale* on a four-point scale. It should be noted that due to the non-linearity of the ordered-probit regression model, the coefficient estimates cannot be interpreted directly. Therefore, to obtain an impression of the quantitative impact of the variables, we also provide the marginal effects for the probability to exhibit the highest level of tax morale (i.e., *Tax morale = High*) in column 2.

As it turns out, both *Ideological difference* and its interaction with *Public sector size* are highly significant and negatively related to tax morale thereby confirming Hypothesis 1. Considering countries of average public sector size (i.e., *Public sector size* =0) we observe, as predicted, that the probability for a taxpayer to exhibit the highest tax compliance level decreases significantly with *Ideological difference*. From the marginal effects in column 2 we obtain that this probability is by 2% lower for a moderate rightist (e.g., with *Ideology*=7.5) when compared to a moderate leftist (*Ideology*=2.5). Similarly, the consequences of a change in government ideology caused, for instance, by a shift from a moderate right-wing to a moderate left-wing coalition (e.g., from the Republican to the Democratic Party in the US) would reduce the probability to exhibit the highest tax morale level of voters by the same amount. This effect is in size comparable to a shift from a middle to a high income category (e.g., from 5 to 10).

From the estimates of the interaction term, we observe that for countries with a public sector above the average this effect would be even larger. For example, in a country that lies 5 (10) percentage points above the average such as Germany (France) the probability is by 3.3% (4.7%) lower for a moderate rightist when compared to her leftist counterpart. By contrast, in countries 5 percentage points below the average, the difference in the impact of ideological difference to the government on tax morale between moderate leftists and rightists vanishes completely. Taken together, these results indicate that both the ideological difference to the government

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and the size of the public sector significantly and sizeably influence tax compliance behavior in developed economies leading us to confirm the predictions in Hypothesis 1 regarding the impact of ideological difference on tax morale.

The remaining results in Specification I regarding *Income* and *Government effectiveness* have expected negative effects on tax compliance behavior. The parameter estimate of *Inflation* turns out to be negative while that of *Unemployment* is positive. With regard to the socioeconomic control variables, the results obtained are in line with previous empirical studies based on the WVS/EVS. Thus, elderly people, women, and religious or patriotic individuals exhibit higher levels of tax morale. The marginal effects for the latter three variables with respect to their reference categories are 6.78%, 4.35% and 6.20%, respectively. The educational level turns out to have no significant impact on tax compliance.[24] By contrast, the employment and marital status have a significant influence on tax compliance with positive effects for retired and married individuals and negative effects for self-employed and divorced individuals with respect to their base categories (Employed and Never married, respectively).

---

[24]However, see Rodriguez-Justicia and Theilen (2018) for the role of education as an indirect channel in shaping individuals' tax morale.

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Table 2.1: Tax morale and *Ideological difference.*

	(I) Tax morale oprobit	ME	(II) Tax morale OLS	(III) Tax morale Lewbel
Ideological difference	-0.013***	-0.395	-0.025***	-0.019***
	(0.004)		(0.002)	(0.000)
Public sector size	-0.014**	-0.426	-0.019	-0.017**
	(0.035)		(0.135)	(0.012)
x Ideological difference	-0.002***	-0.054	-0.003**	-0.005***
	(0.002)		(0.013)	(0.000)
Government effectiveness	-0.141***	-4.310	-0.264**	-0.278***
	(0.005)		(0.015)	(0.002)
Unemployment	0.023***	0.694	0.037**	0.039***
	(0.001)		(0.011)	(0.000)
Inflation	-0.076***	-2.341	-0.091***	-0.087***
	(0.000)		(0.000)	(0.000)
Income	-0.008**	-0.235	-0.010	-0.009*
	(0.036)		(0.123)	(0.082)
Age	0.009***	0.283	0.013***	0.013***
	(0.000)		(0.000)	(0.000)
Gender (Ref.: Male)	0.220***	6.778	0.332***	0.317***
	(0.000)		(0.000)	(0.000)
Religious (Ref.: Non religious)	0.141***	4.353	0.222***	0.238***
	(0.000)		(0.000)	(0.000)
Patriotic (Ref.: Non patriotic)	0.194***	6.204	0.324***	0.321***
	(0.000)		(0.000)	(0.000)
Educational level (Ref.: Low)				
Medium	0.002	0.078	-0.002	0.011
	(0.911)		(0.926)	(0.728)
High	0.079**	2.396	0.137***	0.156***
	(0.016)		(0.003)	(0.001)
Occupational status (Ref.: Employed)				
Unemployed	-0.096***	-3.053	-0.185***	-0.204***
	(0.001)		(0.003)	(0.000)
Self-employed	-0.124***	-3.944	-0.180***	-0.148***
	(0.001)		(0.004)	(0.000)
Retired	0.070**	2.133	0.098**	0.104***
	(0.011)		(0.013)	(0.000)
Other	0.045**	1.382	0.051	0.058***
	(0.020)		(0.146)	(0.007)
Marital status (Ref.: Never married)				
Married / living together	0.088***	2.725	0.169***	0.182***
	(0.000)		(0.001)	(0.000)
Divorced / separated	-0.082***	-2.629	-0.103**	-0.088***
	(0.001)		(0.035)	(0.006)
Widowed	0.032	1.013	0.082	0.099**
	(0.332)		(0.127)	(0.010)
Constant(s) (omitted)	YES		YES	YES
Observations	46,778		46,778	46,778
Pseudo R-squared	0.0536			
R-squared			0.0910	
Centered R-squared				0.0392

All estimations with clustered standard errors by country (23 clusters) and country and time fixed effects. Marginal effects (ME) in percentage points. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Endogeneity issues

It is well recognized that endogeneity is a major problem in the estimation of tax morale. This is mainly due to simultaneity and the omission of relevant variables. In our case, tax morale and ideological motives are likely to be jointly determined by omitted variables. Therefore instrumental variables estimation is indicated. However, as in most cases, it is hard to find valid instruments for *Ideological difference* fulfilling relevance and exogeneity conditions. In this paper we solve this problem employing a new approach proposed by Lewbel (2012) that allows to estimate models with endogenous regressors using heteroskedasticity to generate valid instruments.

In the following we briefly sketch the Lewbel (2012) approach of heteroskedasticity-based identification. Consider Equation (2.7) in the form of a linear regression

$$y_{i,c} = \boldsymbol{\beta}' \boldsymbol{x_{i,c}} + \boldsymbol{\gamma}' \boldsymbol{z_{i,c}} + \boldsymbol{\eta_j} + \boldsymbol{\rho_t} + \boldsymbol{\nu_c} + \varepsilon_{i,c} \tag{2.8}$$

Now, suppose that *Ideological difference* is endogenous such that *Ideological difference* ($\tilde{x}$) and its interaction, *Ideological difference* $\times$ *Public sector size* ($\hat{x}$), depend on y, i.e.,

$$\tilde{x}_{i,c} = \tilde{\psi} y_{i,c} + \tilde{\boldsymbol{\gamma}}' \boldsymbol{z_{i,c}} + \tilde{\boldsymbol{\eta_j}} + \tilde{\boldsymbol{\rho_t}} + \tilde{\boldsymbol{\nu_c}} + u_{i,c} \tag{2.9}$$

$$\hat{x}_{i,c} = \hat{\psi} y_{i,c} + \hat{\boldsymbol{\gamma}}' \boldsymbol{z_{i,c}} + \hat{\boldsymbol{\eta_j}} + \hat{\boldsymbol{\rho_t}} + \hat{\boldsymbol{\nu_c}} + v_{i,c} \tag{2.10}$$

Lewbel (2012) shows that the structural model parameters in Equation (2.8) are identified if exogenous or predetermined variables $\boldsymbol{z_{i,c}}$ are available with $Cov[\boldsymbol{z_{i,c}}, \varepsilon_{i,c}^2] \neq 0$, $Cov[\boldsymbol{z_{i,c}}, u_{i,c}^2] \neq 0$, $Cov[\boldsymbol{z_{i,c}}, v_{i,c}^2] \neq 0$, and $Cov[\boldsymbol{z_{i,c}}, \varepsilon_{i,c} u_{i,c}] = Cov[\boldsymbol{z_{i,c}}, \varepsilon_{i,c} v_{i,c}] = Cov[\boldsymbol{z_{i,c}}, v_{i,c} u_{i,c}] = 0$. These assumptions allow to use generated instruments $(\boldsymbol{z_{i,c}} - E[\boldsymbol{z_c}]) u_{i,c}$ and $(\boldsymbol{z_{i,c}} - E[\boldsymbol{z_c}]) v_{i,c}$ as instruments to evaluate the model in Equation (2.8) by means of efficient GMM estimation. This IV estimation method is implemented by Baum and Schaffer (2019) in the STATA module 'ivreg2h' (with options 'gmm2s' and 'robust').

Specification III and IV in Table 2.1 show the results from OLS and Instrumental Variable estimations respectively. As it turns out, the parameter estimates remain fairly robust both in significance and magnitude after controlling for endogeneity by means of instrument variable estimation following the method proposed by Lewbel (2012). Regarding the validity of our generated instruments we obtain that: (i) underidentification is rejected by the Kleibergen and Paap (2006) LM-statistic with p-value 0.0016 ; (ii) weak identification is not a problem as the Kleibergen and Paap (2006) Wald F-statistic is above 10% maximal IV relative bias and above 20% maximal IV size (using critical values from Stock and Yogo (2005); (iii) there is no overidentification as the null hypothesis that our instruments are valid cannot be rejected employing the Hansen (1982) J-statistic with a p-value of

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0.2705. Consequently, these tests confirm the quality and validity of our instruments. Therefore, we conclude that the endogeneity bias is not such as to modify the results in Specifications I-III substantially.

Robustness checks

Several robustness checks are indicated whose results are displayed in the Appendix. First, we check whether our results are sensitive to the categorization of the dependent variable. For this purpose we perform alternative estimations with the original 10 point scale. The results in Table A2.4 (Specification II) indicate that this alternative categorization does not imply substantial changes.

Second, as an alternative estimation method in Table A2.4 we use the generalized linear model (GLM) where we rescale our dependent variable from the original ten-point scale to take values between 0 and 1. The estimates in Specification III are similar in terms of sign and significance to those in Specification I and indicate that this alternative estimation procedure does not modify our conclusions regarding the impact of *Ideological difference* on *Tax morale*.

Third, to test the sensitivity of the above results regarding the measurement of the ideological difference to the governmental coalition, in Table A2.5 *Ideological difference* (in Specification I) is replaced by *Weighted ideological difference* (in Specification II) and by *Ideological difference to prime minister* (in Specification III), respectively. We find that these alternative forms of measuring government ideology have negligible effects on the results commented on above.

Finally, to exclude that the results are driven by outliers, the model in (2.7) is estimated by excluding the countries with the most left and right-skewed distribution of tax compliance. As observed in Figure A2.4, these countries are Belgium, Greece, Japan, Luxembourg, Norway and Turkey. The results in Table A2.6 indicate that despite the loss of nearly 8,000 observations the sign, the significance and the magnitude of the parameter estimates of our main explanatory variables remain unchanged.

2.5.2 Tax morale and income under the ignorance of ideological motives

The results in Table 2.2 allow us to assess the validity of Hypothesis 2. To analyze the consequences of ignoring ideological motives, in Specification II, *Ideological difference* is taken out from the model. We observe that this causes an overestimation of the income effect as the marginal effect of *Income* decreases by nearly 20% (namely,

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from -0.235 to -0.279). This reinforcement of the negative effect of income on tax morale is in accordance with the results in Proposition 2.3.3 which predicts a negative impact of *Ideology* on *Tax morale* which is also empirically confirmed in Specification III. Thus, in column 5 we observe that the parameter estimate of *Income* has a significantly positive influence on *Ideology*. These results are confirming Hypothesis 2 that the influence of ideology on tax morale is partly channeled through income such that the income effect is overestimated when ideological motives are not considered.

Furthermore, from Specification III in Table 2.2 we see that the influence of other variables such as gender or religion on ideology is more important than that of income. However, it is well understood that ideological stances are only partially explained by our explanatory variables such that the influence of ideology on tax morale is not totally captured by these variables in Specification II. Therefore, our results emphasize the importance of including ideological motives in the analysis of tax compliance behavior (as in Specification I).

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Table 2.2: Tax morale and the overestimation of the income effect.

	(I) Tax morale		(II) Tax morale		(III) Ideology	
	oprobit	ME	oprobit	ME	oprobit	ME
Income	-0.008**	-0.235	-0.009**	-0.279	0.029***	0.208
	(0.036)		(0.012)		(0.000)	
Ideological difference	-0.013***	-0.395				
	(0.004)					
Public sector size	-0.014**	-0.426	-0.015**	-0.460		
	(0.035)		(0.025)			
x Ideological difference	-0.002***	-0.054				
	(0.002)					
Government effectiveness	-0.141***	-4.310	-0.064	-1.977		
	(0.005)		(0.231)			
Unemployment	0.023***	0.694	0.015**	0.473		
	(0.001)		(0.028)			
Inflation	-0.076***	-2.341	-0.070***	-2.142		
	(0.000)		(0.000)			
Age	0.009***	0.283	0.009***	0.281	0.003**	0.020
	(0.000)		(0.000)		(0.025)	
Gender (Ref.: Male)	0.220***	6.778	0.223***	6.852	-0.097***	-0.697
	(0.000)		(0.000)		(0.000)	
Religious (Ref.: Non religious)	0.141***	4.353	0.134***	4.129	0.290***	1.968
	(0.000)		(0.000)		(0.000)	
Patriotic (Ref.: Non patriotic)	0.194***	6.204	0.185***	5.895	0.339***	1.909
	(0.000)		(0.000)		(0.000)	
Educational level (Ref.: Low)						
Medium	0.002	0.078	0.002	0.063	-0.001	-0.006
	(0.911)		(0.929)		(0.983)	
High	0.079**	2.396	0.080**	2.432	-0.109	-0.752
	(0.016)		(0.017)		(0.111)	
Occupational status (Ref.: Employed)						
Unemployed	-0.096***	-3.053	-0.093***	-2.944	-0.033	-0.221
	(0.001)		(0.001)		(0.249)	
Self-employed	-0.124***	-3.944	-0.130***	-4.145	0.133***	1.030
	(0.001)		(0.001)		(0.000)	
Retired	0.070**	2.133	0.069**	2.081	0.032	0.227
	(0.011)		(0.012)		(0.202)	
Other	0.045**	1.382	0.043**	1.322	0.072***	0.524
	(0.020)		(0.027)		(0.000)	
Marital status (Ref.: Never married)						
Married / living together	0.088***	2.725	0.088***	2.722	0.049*	0.341
	(0.000)		(0.000)		(0.057)	
Divorced / separated	-0.082***	-2.629	-0.079***	-2.556	-0.027	-0.179
	(0.001)		(0.001)		(0.272)	
Widowed	0.032	1.013	0.029	0.921	0.095***	0.697
	(0.332)		(0.382)		(0.001)	
Constant(s) (omitted)	YES		YES		YES	
Observations	46,778		46,778		46,778	
Pseudo R-squared	0.0536		0.0530		0.0191	

Ordered probit with clustered standard errors by country (23 clusters). All estimations include country and time fixed effects. Marginal effects (ME) in percentage points. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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2.6 Conclusions

In this paper we analyze the importance of ideological stances for tax compliance behavior. Our theoretical and empirical results confirm that, indeed, ideology has a considerable influence on tax compliance. Thus, citizens use tax evasion to correct for undesired levels and ways of governmental spending. This 'voting with tax evasion' give a rather pessimistic view on the extent to which income redistribution can be effectively achieved in modern welfare states and hints as political polarization as an important hurdle to it. Therefore, as ideological stances are not completely exogenous (see Alesina et al., 2012), policy makers concerned about increasing income inequality should promote policies that allow to reduce ideological polarization.

While in this paper we have focused on the impact of ideological stances on tax compliance, future research should analyze its impact on effective tax evasion and avoidance, and deepen our understanding of the relationship between political polarization, tax compliance and public spending policies.

Acknowledgements

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Appendix

This appendix contains the proofs of Propositions 2.3.2, 2.3.3 and 2.3.4, details on variable definitions, data sources and descriptive statistics (Tables A2.1, A2.2 and A2.3, and Figures A2.1, A2.2, A2.3 and A2.4), robustness checks (Tables A2.4, A2.5 and A2.6), the number of surveys by country and year (Table A2.7) and the correlation matrix (Table A2.8).

Proof of Proposition 2.3.2

From expression (2.5) follows that expected evasion is given by

$$E\left[x;t\right] = \frac{t\overline{y} + \alpha\tau\overline{y} - \alpha E\left[\tau_i y_i\right]}{\theta}. \tag{2.11}$$

Thus, the first and second-order derivatives of $g(t) = \delta t\left(\overline{y} - E\left[x;t\right]\right)$ with respect to t are

$$g'(t) = \delta\left(\overline{y} - E\left[x;t\right]\right) - \frac{\delta\overline{y}}{\theta}t, \text{ and } g''(t) = -\frac{2\delta}{\theta}\overline{y} < 0.$$

Furthermore, since $t \leq \theta \leq 1$, for $t = 1$ we have $\theta = 1$ such that $x_i = y_i$ and $E\left[x;1\right] = \overline{y}$. Accordingly, $g(0) = g(1) = 0$, $g'(0) = \delta\overline{y} > 0$ and $g'(1) = -\delta\overline{y}/\theta < 0$.

Finally, it can be observed that the tax-elasticity of public good provision is less than unity

$$\epsilon_{g,t} \equiv \frac{g'}{g}t = 1 - \frac{t\overline{y}}{\theta\left(\overline{y} - E\left[x;t\right]\right)} < 1. \tag{2.12}$$

Proof of Proposition 2.3.3

The first-order condition from maximizing (2.6) with respect to τ_i is

$$u'(\tau_i^*) = -y_i + \frac{y_i}{\theta}\tau_i^* + v'\left(g(\tau_i^*)\right)g'\left(\tau_i^*\right) = 0. \tag{2.13}$$

Using the fact that $\lim_{\tau_i \to 0} g(\tau_i) = \lim_{\tau_i \to 1} g(\tau_i) = 0$, existence of an interior solution for $\forall i$ is guaranteed by

$$\lim_{\tau_i \to 0} u'(\tau_i) = -y_i + \delta\overline{y}v'(0) = \infty > 0, \text{ and } \lim_{\tau_i \to 1} u'(\tau_i) = -\frac{\delta\left(1 + \alpha\right)\overline{y}}{\theta}v'(0) = -\infty < 0,$$

which proves the first statement. Moreover, from (2.13) follows that $\lim_{y_i \to 0} u'(\tau_i^*)$ implies $g'\left(\tau_i^*\right) = 0$ and $\lim_{y_i \to \infty} u'(\tau_i^*)$ implies $v'\left(g(\tau_i^*)\right) = \infty$. Thus,

$$\lim_{y_i \to 0} \tau_i^* = \frac{\theta\overline{y} + \alpha E\left[\tau_i y_i\right]}{2\left(1 + \alpha\right)\overline{y}} \equiv \overline{\tau} \text{ and } \lim_{y_i \to \infty} \tau_i^* = 0.$$

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Next, noticing that $u''(\tau_i^*) < 0$, from implicit differentiation of (2.13) we obtain

$$\frac{dt_i^*}{dy_i} = \frac{\theta - \tau_i^*}{\theta u''(\tau_i^*)} < 0, \tag{2.14}$$

which proves the second statement.

To prove statement $iii)$, from implicit differentiation of (2.13) we obtain

$$
\begin{aligned}
\frac{dt_i^*}{d\overline{y}} &= -\frac{v''\left(g(\tau_i^*)\right)g'\left(\tau_i^*\right)\frac{\partial g}{\partial \overline{y}} + v'\left(g(\tau_i^*)\right)\frac{\partial g'}{\partial \overline{y}}}{u''(\tau_i^*)} \\
&= \delta \frac{(1 - \epsilon_{v',g}\epsilon_{g,\tau})\left[(1+\alpha)\,\tau t_i^* - \theta\right] + (1+\alpha)\,\tau_i^*}{\theta u''(\tau_i^*)} v'\left(g(\tau_i^*)\right).
\end{aligned} \tag{2.15}
$$

Thus, from our assumption regarding v' and (2.12) we obtain

$$
\begin{aligned}
\lim_{t_i^* \to 0} d\tau_i^*/d\overline{y} &= -\delta\left(1 - \epsilon_{v',g}\epsilon_{g,\tau}\right)v'(0)u''(0)^{-1} > 0 \text{ and} \\
\lim_{\tau_i^* \to \overline{\tau}} dt_i^*/d\overline{y} &= (\delta/2)\left[(2 - \epsilon_{v',g}\epsilon_{g,\tau})\frac{\alpha E\left[\tau_i y_i\right]}{\theta \overline{y}} + \epsilon_{v',g}\epsilon_{g,\tau}\right]v'(g(\overline{\tau}))u''(\overline{\tau})^{-1} < 0.
\end{aligned}
$$

As an individual's optimal tax rate decreases with income, we obtain the third statement.

Regarding statement $iv)$, from implicit differentiation of (2.13) we obtain

$$
\begin{aligned}
\frac{d\tau_i^*}{d\alpha} &= -\frac{v''\left(g(\tau_i^*)\right)g'\left(\tau_i^*\right)\frac{\partial g}{\partial \alpha} + v'\left(g(\tau_i^*)\right)\frac{\partial g'}{\partial \alpha}}{u''(\tau_i^*)} \\
&= \frac{(1 - \epsilon_{v',g}\epsilon_{g,\tau})\left(\tau_i^*\overline{y} - E\left[\tau_i y_i\right]\right) + \tau_i^*\overline{y}}{\theta u''(\tau_i^*)}\delta v'\left(g(\tau_i^*)\right).
\end{aligned} \tag{2.16}
$$

Thus, from our assumption regarding v' and (2.12) we obtain

$$
\begin{aligned}
\lim_{\tau_i^* \to 0} d\tau_i^*/d\alpha &= -\delta\theta^{-1}\left(1 - \epsilon_{v',g}\epsilon_{g,\tau}\right)E\left[\tau_i y_i\right]v'(0)u''(0)^{-1} > 0 \text{ and} \\
\lim_{\tau_i^* \to \overline{\tau}} d\tau_i^*/d\alpha &= \delta\theta^{-1}\left[(1 - \epsilon_{v',g}\epsilon_{g,\tau})\left(\overline{\tau y} - E\left[\tau_i y_i\right]\right) + \overline{\tau y}\right]v'(0)u''(1)^{-1} < 0
\end{aligned}
$$

as $\overline{\tau y} - E\left[\tau_i y_i\right] > 0$.

Statement $v)$ follows directly from implicit differentiation of (2.13):

$$
\begin{aligned}
\frac{d\tau_i^*}{d\delta} &= -\frac{v''\left(g(\tau_i^*)\right)g'\left(\tau_i^*\right)\frac{\partial g}{\partial \delta} + v'\left(g(\tau_i^*)\right)\frac{\partial g'}{\partial \delta}}{u''(\tau_i^*)} \\
&= -\frac{(1 - \epsilon_{v',g})\,g'\left(\tau_i^*\right)v'\left(g(\tau_i^*)\right)}{\delta u''(\tau_i^*)} > 0.
\end{aligned} \tag{2.17}
$$

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Finally, statement $vi)$ follows from

$$
\begin{aligned}
\frac{d\tau_i^*}{d\theta} &= -\frac{-\frac{y_i}{\theta^2}\tau_i^* + v''\left(g(\tau_i^*)\right)g'\left(\tau_i^*\right)\frac{\partial g}{\partial \theta} + v'\left(g(\tau_i^*)\right)\frac{\partial g'}{\partial \theta}}{u''(\tau_i^*)} \\
&= \frac{\tau_i^* y_i}{\theta^2 u''(\tau_i^*)} + \frac{-\theta\left(1 - \epsilon_{v',g}\epsilon_{g,\tau}\right)E\left[x;\tau_i^*\right] - \left(1+\alpha\right)\tau_i^*\overline{y}}{\theta^2 u''(\tau_i^*)}\delta v'\left(g(\tau_i^*)\right).(2.18)
\end{aligned}
$$

Substituting $v'\left(g(\tau_i^*)\right) = y_i\frac{\left(\theta - \tau_i^*\right)}{\theta g'\left(\tau_i^*\right)}$ in (2.18) and using (2.13) this can be written as

$$
\frac{d\tau_i^*}{d\theta} = -\frac{\left(\alpha\overline{y} + E\left[x;\tau_i^*\right]\right)\tau_i^* + \left(\theta - \tau_i^*\right)\left(1 - \epsilon_{v',g}\epsilon_{g,\tau}\right)E\left[x;\tau_i^*\right]}{\theta^2 u''(\tau_i^*)g'\left(\tau_i^*\right)}\delta y_i > 0, \qquad (2.19)
$$

which proves the last statement.

Proof of Proposition 2.3.4

Making use of our assumption $t = \tau$, from (2.5) we obtain

$$
\begin{aligned}
\frac{dx_i}{dy_i} &= \frac{\left(1+\alpha\right)\tau_m^* - \alpha\tau_i}{\theta} - \frac{\alpha y_i}{\theta}\frac{d\tau_i^*}{dy_i} > 0, \text{ and} & (2.20) \\
\frac{dx_i}{dy_m} &= \frac{\left(1+\alpha\right)y_i}{\theta}\frac{d\tau_m^*}{dy_m} < 0, & (2.21)
\end{aligned}
$$

as from Proposition 2.3.2 we have $\frac{d\tau_i^*}{dy_i} < 0$ for $\forall i$, which proves the first two statements. Furthermore,

$$
\begin{aligned}
\frac{\partial x_i}{\partial \delta} &= \frac{\partial \tau_m}{\partial \delta}\frac{y_i}{\theta} > 0, \text{ and} & (2.22) \\
\frac{\partial x_i}{\partial \theta} &= -\frac{x_i}{\theta} + \frac{\partial \tau_m}{\partial \theta}\frac{y_i}{\theta} \gtrless 0. & (2.23)
\end{aligned}
$$

Chapter 2. Voting with tax compliance: ideological stances and tax morale
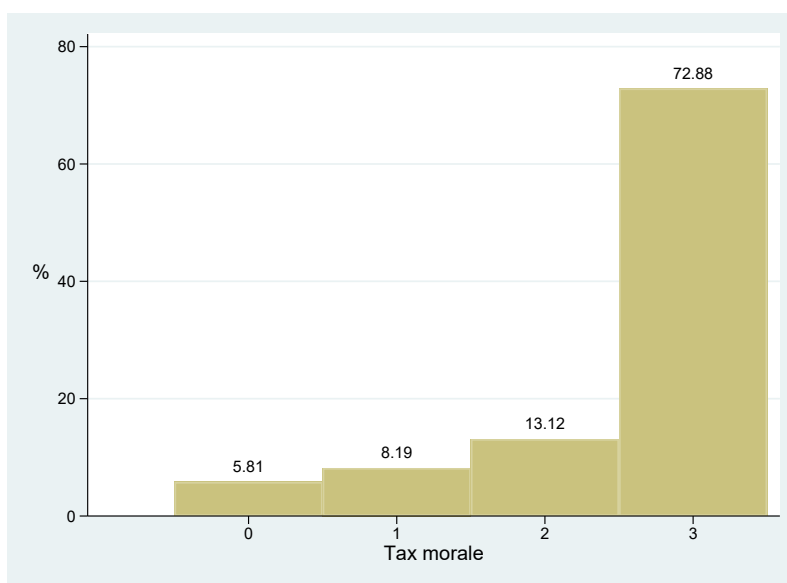
Figure A2.1: Respondents' tax morale (4 point scale).
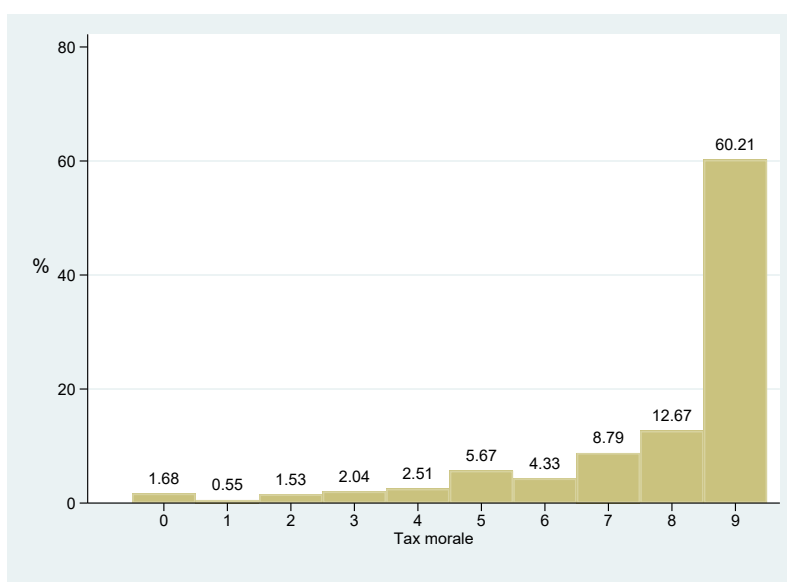

Figure A2.2: Respondents' tax morale (10 point scale).

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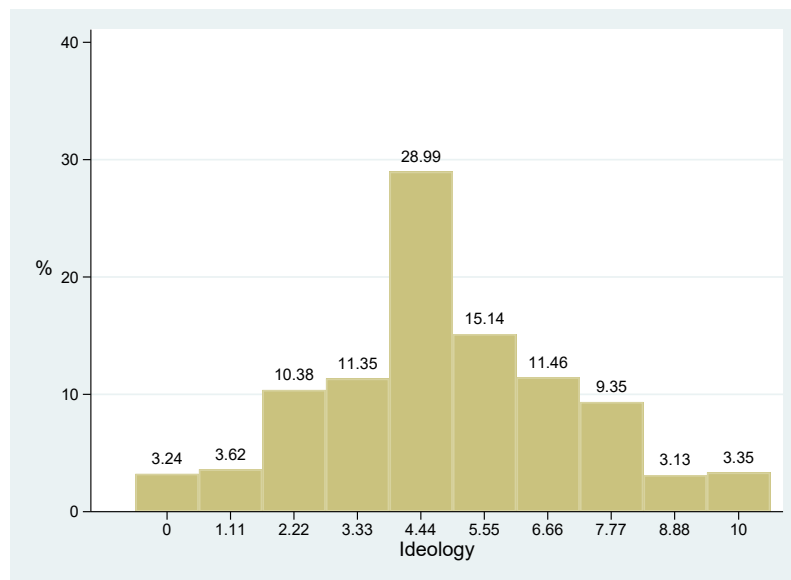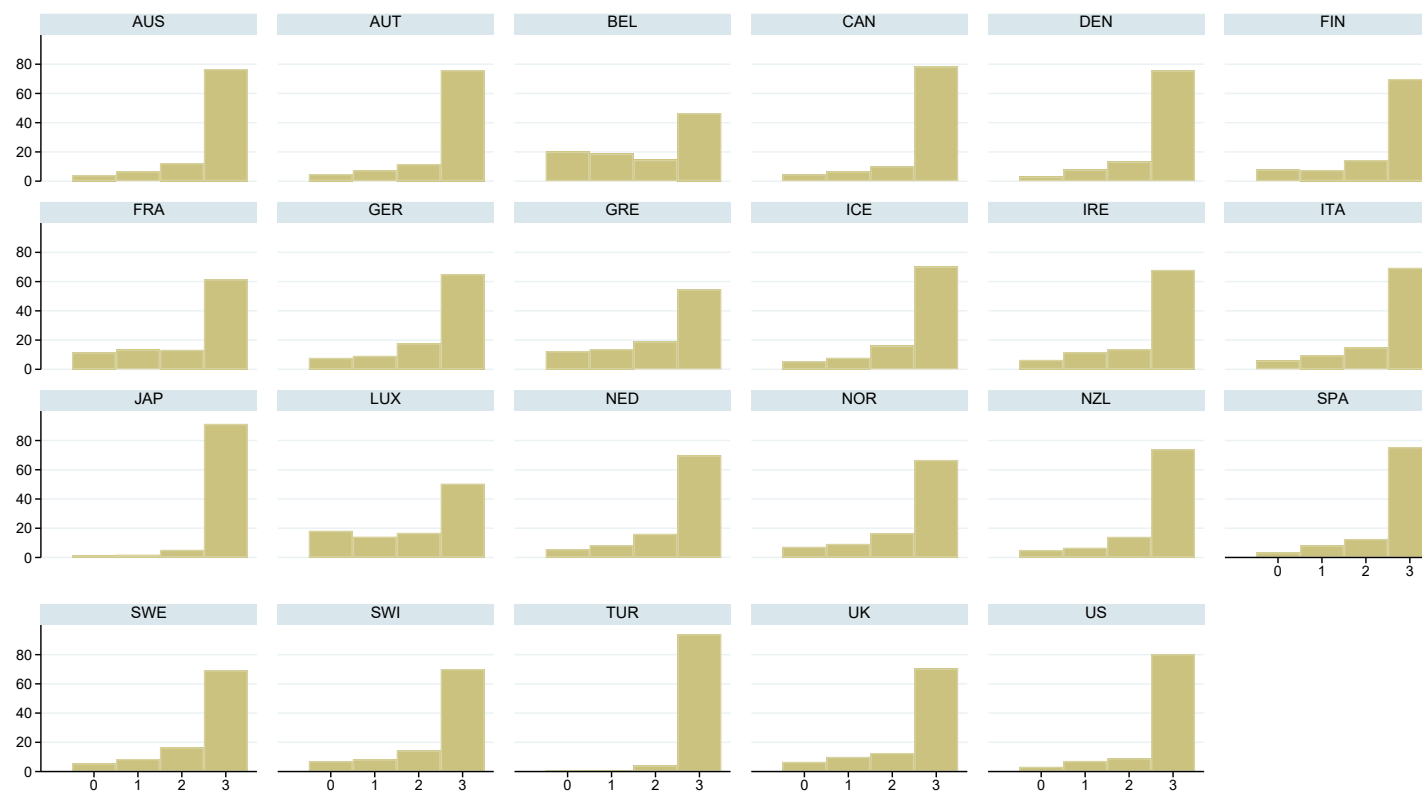Figure A2.3: Respondents' ideology from left (0) to right (10).

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Figure A2.4: Tax morale by country.

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Table A2.1: Data definitions and sources.

Variable	Measurement	Source
Tax morale	Respondents' tax morale rescaled into a four-point scale. Responses 7 through 10 were combined into a value 0 (low tax morale), while the remaining responses were combined in groups of two (5 and 6 into 1; 3 and 4 into 2; 1 and 2 into 3).	WVS (2015)/EVS (2016)
Income	Respondents' self-reported household income level before taxes and deductions on a ten-point scale.	WVS (2015)/EVS (2016)
Public sector size	Measured as the total general government expenditure as percentage of GDP.	OECD (2018)
Ideology	Self-reported ideology rescaled to take values between 0 (left) and 10 (right).	WVS (2015)/EVS (2016)
Ideological difference	Difference between each respondent's ideology and that of her government calculated as the unweighted mean of all parties in the cabinet.	Döring and Manow (2018)
Weighted ideological difference	Difference between the respondent's ideology and that of her government calculated as a weighted mean by occupied seats in the cabinet.	Döring and Manow (2018)
Ideological difference to prime minister	Difference between the respondent's ideology and that of the prime minister's party.	Döring and Manow (2018)
Government effectiveness	Perceptions of (i) the quality of public services, (ii) its independence from political parties, and (iii) the credibility of government. Ranges from -2.5(weak) to 2.5(strong).	World Bank. (2018b)
Inflation	Annual percentage change in consumer prices.	World Bank. (2018a)
Unemployment	Annual unemployment rate in percentage points.	World Bank. (2018a)
Age	Respondent's age calculated using the year of birth.	WVS (2015)/EVS (2016)
Female	Dichotomous variable taking value 1 for female and 0 for male.	WVS (2015)/EVS (2016)
Religious	Dichotomous variable taking value 1 if the respondent declares to be a religious person and 0 if otherwise (not religious or convinced atheist).	WVS (2015)/EVS (2016)
Patriotic	Dichotomous variable taking vale 1 if the respondent declares to be very or quite proud of being a citizen of the country and 0 otherwise (not very or not at all proud).	WVS (2015)/EVS (2016)

(continued)

Variable	Measurement	Source
Educational level	Three dummy variables (Low, Medium and High) accounting for whether the respondent has adequately or inadequately completed primary (compulsory), secondary or tertiary education respectively.	WVS (2015)/EVS (2016)
Unemployed	Dichotomous variable taking value 1 if the respondent is currently unemployed and 0 if otherwise.	WVS (2015)/EVS (2016)
Self-employed	Dichotomous variable taking value 1 if the respondent is currently self-employed and 0 if otherwise.	WVS (2015)/EVS (2016)
Retired	Dichotomous variable taking value 1 if the respondent is retired/pensioned and 0 if otherwise.	WVS (2015)/EVS (2016)
Other	Dichotomous variable taking value 1 if the respondent is: in military service, housewife not otherwise employed, student, not working because of disability, other reasons; and 0 if otherwise.	WVS (2015)/EVS (2016)
Married / Partnership	Dichotomous variable taking value 1 if the respondent is currently married or in a partnership and 0 if otherwise.	WVS (2015)/EVS (2016)
Divorced / Separated	Dichotomous variable taking value 1 if the respondent is currently divorced or separated and 0 if otherwise.	WVS (2015)/EVS (2016)
Widowed	Dichotomous variable taking value 1 if the respondent is currently widowed and 0 if otherwise.	WVS (2015)/EVS (2016)

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Table A2.2: Descriptive statistics of categorical and dummy variables.

Variable	Value		Frequency	Percent
Tax morale	Low		2,718	5.81
	Medium low		3,829	8.19
	Medium high		6,138	13.12
	High		34,093	72.88
		Total	46,778	100
Gender	Male		23,236	49.67
	Female		23,542	50.33
		Total	46,778	100
Religious	Non religious		20,195	43.17
	Religious		26,583	56.83
		Total	46,778	100
Patriotic	Non patriotic		5,672	12.13
	Patriotic		41,106	87.87
		Total	46,778	100
Educational level	Low		9,563	20.45
	Medium		23,040	49.25
	High		14,175	30.30
		Total	46,778	100
Occupational status	Employed		24,137	51.60
	Unemployed		2,547	5.44
	Self-employed		2,946	6.30
	Retired		10,036	21.45
	Other		7,112	15.20
		Total	46,778	100
Marital status	Never married		9,620	20.57
	Married / partnership		29,935	63.99
	Divorced / separated		4,178	8.93
	Widowed		3,045	6.51
		Total	46,778	100

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Table A2.3: Descriptive statistics of continuous variables.

Variable	Mean	SD	Min	Max
Individual-level variables				
Income	4.125	2.537	0	9
Ideological difference	-0.191	2.742	-8.66	8.06
Weighted ideological difference	-0.235	2.757	-8.66	7
Ideological difference to prime minister	-0.271	2.851	-8.66	7.37
Age	47.25	16.931	15	99
Ideology	4.883	2.224	0	10
Country-level variables				
Public sector size	-0.352	6.886	-12.59	17.88
			(SWI)	(SWE)
			(2007)	(1996)
Government effectiveness	1.664	0.385	0.31	2.13
			(TUR)	(FIN)
			(2007)	(2013)
Inflation	2.075	1.575	-0.72	8.76
			(JAP)	(TUR)
			(2010)	(2007)
Unemployment	7.740	3.921	2.2	22.7
			(ICE)	(SPA)
			(1999)	(1995)

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Table A2.4: Tax morale on a ten-point scale and on a $[0,1]$ interval.

	(I) Tax morale 4 point		(II) Tax morale 10 point		(III) Tax morale $[0,1]$	
	oprobit	ME	oprobit	ME	GLM	ME
Ideological difference	-0.013***	-0.395	-0.009**	-0.338	-0.011***	-0.225
	(0.004)		(0.028)		(0.003)	
Public sector size	-0.014**	-0.426	-0.015**	-0.543	-0.010	-0.210
	(0.035)		(0.040)		(0.109)	
x Ideological difference	-0.002***	-0.054	-0.002***	-0.064	-0.001***	-0.027
	(0.002)		(0.002)		(0.008)	
Government effectiveness	-0.141***	-4.310	-0.184***	-6.599	-0.149***	-3.055
	(0.005)		(0.000)		(0.004)	
Unemployment	0.023***	0.694	0.021***	0.740	0.018***	0.374
	(0.001)		(0.005)		(0.006)	
Inflation	-0.076***	-2.341	-0.056***	-2.023	-0.052***	-1.071
	(0.000)		(0.000)		(0.000)	
Income	-0.008**	-0.235	-0.009***	-0.339	-0.005	-0.104
	(0.036)		(0.003)		(0.102)	
Age	0.009***	0.283	0.009***	0.323	0.007***	0.152
	(0.000)		(0.000)		(0.000)	
Gender (Ref.: Male)	0.220***	6.778	0.211***	7.580	0.176***	3.627
	(0.000)		(0.000)		(0.000)	
Religious (Ref.: Non religious)	0.141***	4.353	0.146***	5.227	0.113***	2.324
	(0.000)		(0.000)		(0.000)	
Patriotic (Ref.: Non patriotic)	0.194***	6.204	0.167***	5.975	0.157***	3.229
	(0.000)		(0.000)		(0.000)	
Educational level (Ref.: Low)						
Medium	0.002	0.078	-0.009	-0.316	0.004	0.078
	(0.911)		(0.590)		(0.803)	
High	0.079**	2.396	0.026	0.946	0.071***	1.465
	(0.016)		(0.296)		(0.004)	
Occupational status (Ref.: Employed)						
Unemployed	-0.096***	-3.053	-0.070**	-2.495	-0.084***	-1.739
	(0.001)		(0.032)		(0.000)	
Self-employed	-0.124***	-3.944	-0.109***	-3.896	-0.093***	-1.912
	(0.001)		(0.001)		(0.001)	
Retired	0.070**	2.133	0.077***	2.744	0.061***	1.249
	(0.011)		(0.001)		(0.003)	
Other	0.045**	1.382	0.040**	1.425	0.041***	0.836
	(0.020)		(0.027)		(0.007)	
Marital status (Ref.: Never married)						
Married / living together	0.088***	2.725	0.088***	3.159	0.071***	1.469
	(0.000)		(0.000)		(0.000)	
Divorced / separated	-0.082***	-2.629	-0.057***	-2.039	-0.072***	-1.472
	(0.001)		(0.006)		(0.001)	
Widowed	0.032	1.013	0.063*	2.251	0.033	0.680
	(0.332)		(0.053)		(0.261)	
Constant(s) (omitted)	YES		YES		YES	
Observations	46,778		46,778		46,778	
Pseudo R-squared	0.0536		0.0376			
AIC					0.62329	
BIC					-486204.6	

Ordered probit and generalized linear model (GLM) with clustered standard errors by country (23 clusters). All estimations include country and time fixed effects. Marginal effects (ME) in percentage points. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Table A2.5: Tax morale and alternative ideological difference measures.

	(I) Tax morale 4 point		(II) Tax morale 4 point		(III) Tax morale 4 point	
	oprobit	ME	oprobit	ME	oprobit	ME
Public sector size	-0.014** (0.035)	-0.426	-0.013* (0.061)	-0.396	-0.012* (0.069)	-0.354
Ideological difference	-0.013*** (0.004)	-0.395				
Weighted ideological difference			-0.012*** (0.005)	-0.382		
Ideological difference to prime minister					-0.013*** (0.003)	-0.396
x Public sector size	-0.002*** (0.002)	-0.054	-0.002*** (0.002)	-0.054	-0.002*** (0.001)	-0.056
Government effectiveness	-0.141*** (0.005)	-4.310	-0.131** (0.014)	-4.002	-0.141*** (0.001)	-4.329
Unemployment	0.023*** (0.001)	0.694	0.022*** (0.001)	0.677	0.023*** (0.000)	0.697
Inflation	-0.076*** (0.000)	-2.341	-0.077*** (0.000)	-2.361	-0.075*** (0.000)	-2.306
Income	-0.008** (0.036)	-0.235	-0.008** (0.036)	-0.235	-0.008** (0.040)	-0.231
Age	0.009*** (0.000)	0.283	0.009*** (0.000)	0.283	0.009*** (0.000)	0.283
Gender (Ref.: Male)	0.220*** (0.000)	6.778	0.221*** (0.000)	6.782	0.221*** (0.000)	6.782
Religious (Ref.: Non religious)	0.141*** (0.000)	4.353	0.141*** (0.000)	4.343	0.141*** (0.000)	4.354
Patriotic (Ref.: Non patriotic)	0.194*** (0.000)	6.204	0.194*** (0.000)	6.192	0.194*** (0.000)	6.206
Educational level (Ref.: Low)						
Medium	0.002 (0.911)	0.078	0.002 (0.916)	0.074	0.003 (0.906)	0.081
High	0.079** (0.016)	2.396	0.079** (0.016)	2.398	0.079** (0.016)	2.408
Occupational status (Ref.: Employed)						
Unemployed	-0.096*** (0.001)	-3.053	-0.096*** (0.001)	-3.052	-0.096*** (0.001)	-3.040
Self-employed	-0.124*** (0.001)	-3.944	-0.124*** (0.001)	-3.951	-0.123*** (0.001)	-3.934
Retired	0.070** (0.011)	2.133	0.070** (0.011)	2.131	0.070** (0.011)	2.131
Other	0.045** (0.020)	1.382	0.045** (0.020)	1.379	0.045** (0.020)	1.380
Marital status (Ref.: Never married)						
Married / living together	0.088*** (0.000)	2.725	0.088*** (0.000)	2.723	0.088*** (0.000)	2.722
Divorced / separated	-0.082*** (0.001)	-2.629	-0.082*** (0.001)	-2.627	-0.082*** (0.001)	-2.630
Widowed	0.032 (0.332)	1.013	0.032 (0.331)	1.013	0.033 (0.328)	1.022
Constant(s) (omitted)	YES		YES		YES	
Observations	46,778		46,778		46,778	
Pseudo R-squared	0.0536		0.0536		0.0536	

Ordered probit with clustered standard errors by country (23 clusters). All estimations include country and time fixed effects. Marginal effects (ME) in percentage points. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Table A2.6: Estimation results excluding Belgium, Greece, Japan, Luxembourg, Norway and Turkey.

	(I) Tax morale 4 point		(II) Tax morale 4 point	
	oprobit	ME	oprobit	ME
Ideological difference	-0.013***	-0.395	-0.014***	-0.427
	(0.004)		(0.008)	
Public sector size	-0.014**	-0.426	-0.014**	-0.444
	(0.035)		(0.045)	
x Ideological difference	-0.002***	-0.054	-0.002**	-0.048
	(0.002)		(0.013)	
Government effectiveness	-0.141***	-4.310	-0.145***	-4.569
	(0.005)		(0.003)	
Unemployment	0.023***	0.694	0.022***	0.706
	(0.001)		(0.001)	
Inflation	-0.076***	-2.341	-0.075***	-2.356
	(0.000)		(0.000)	
Income	-0.008**	-0.235	-0.006	-0.201
	(0.036)		(0.141)	
Age	0.009***	0.283	0.009***	0.298
	(0.000)		(0.000)	
Gender (Ref.: Male)	0.220***	6.778	0.218***	6.880
	(0.000)		(0.000)	
Religious (Ref.: Non religious)	0.141***	4.353	0.152***	4.851
	(0.000)		(0.000)	
Patriotic (Ref.: Non patriotic)	0.194***	6.204	0.218***	7.197
	(0.000)		(0.000)	
Educational level (Ref.: Low)				
Medium	0.002	0.078	-0.005	-0.144
	(0.911)		(0.855)	
High	0.079**	2.396	0.073**	2.278
	(0.016)		(0.042)	
Occupational status (Ref.: Employed)				
Unemployed	-0.096***	-3.053	-0.098***	-3.206
	(0.001)		(0.003)	
Self-employed	-0.124***	-3.944	-0.114***	-3.745
	(0.001)		(0.004)	
Retired	0.070**	2.133	0.075***	2.338
	(0.011)		(0.008)	
Other	0.045**	1.382	0.058***	1.830
	(0.020)		(0.007)	
Marital status (Ref.: Never married)				
Married / living together	0.088***	2.725	0.097***	3.078
	(0.000)		(0.000)	
Divorced / separated	-0.082***	-2.629	-0.074***	-2.463
	(0.001)		(0.002)	
Widowed	0.032	1.013	0.044	1.425
	(0.332)		(0.227)	
Constant(s) (omitted)	YES		YES	
Observations	46,778		39,231	
Pseudo R-squared	0.0536		0.0386	

Ordered probit with clustered standard errors by country (17 clusters). All estimations include country and time fixed effects. Marginal effects (ME) in percentage points. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

Table A2.7: Observations by country and year.

	1995	1996	1997	1998	1999	2000	2004	2005	2006	2007	2010	2011	2012	Total
Australia	1,501	-	-	-	-	-	-	1,188	-	-	-	-	1,302	3,991
Austria	-	-	-	-	900	-	-	-	-	-	-	-	-	900
Belgium	-	-	-	-	1,049	-	-	-	-	-	-	-	-	1,049
Canada	-	-	-	-	-	1,446	-	-	1,317	-	-	-	-	2,763
Denmark	-	-	-	-	697	-	-	-	-	-	-	-	-	697
Finland	-	766	-	-	-	715	-	815	-	-	-	-	-	2,296
France	-	-	-	-	960	-	-	-	800	-	-	-	-	1,760
Germany	-	-	1,225	-	1,158	-	-	-	1,484	-	-	-	-	3,867
Greece	-	-	-	-	757	-	-	-	-	-	-	-	-	757
Iceland	-	-	-	-	784	-	-	-	-	-	-	-	-	784
Ireland	-	-	-	-	666	-	-	-	-	-	-	-	-	666
Italy	-	-	-	-	1,180	-	-	518	-	-	-	-	-	1,698
Japan	-	-	-	-	-	735	-	649	-	-	1,169	-	-	2,553
Luxembourg	-	-	-	-	273	-	-	-	-	-	-	-	-	273
Netherlands	-	-	-	-	860	-	-	-	592	-	-	-	1,398	2,850
New Zealand	-	-	-	606	-	-	477	-	-	-	-	439	-	1,522
Norway	-	984	-	-	-	-	-	-	-	895	-	-	-	1,879
Spain	633	-	-	-	572	682	-	-	-	916	-	862	-	3,665
Sweden	-	820	-	-	841	-	-	-	856	-	-	966	-	3,483
Switzerland	-	679	-	-	-	-	-	-	-	844	-	-	-	1,523
Turkey	-	-	-	-	-	-	-	-	-	1,036	-	-	-	1,036
United Kingdom	-	-	-	-	813	-	-	625	-	-	-	-	-	1,438
United States	1,150	-	-	-	1,036	-	-	-	1,125	-	-	2,017	-	5,328
Total	3,284	3,249	1,225	606	12,546	3,578	477	3,795	6,174	3,691	1,169	4,284	2,700	46,778

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Table A2.8: Correlation matrix.

		1	2	3	4	5	6	7	8	9
1	Tax morale	1								
2	Ideological difference	-0.03	1							
3	Weighted ideological difference	-0.02	0.99	1						
4	Ideo. diff. to prime minister	-0.02	0.97	0.98	1					
5	Ideology	0.01	0.80	0.80	0.78	1				
6	Income	-0.03	0.07	0.08	0.08	0.06	1			
7	Age	0.14	0.05	0.05	0.03	0.08	-0.13	1		
8	Gender	0.08	-0.02	-0.02	-0.02	-0.03	-0.06	-0.02	1	
9	Religious	0.07	0.12	0.12	0.14	0.15	-0.02	0.13	0.12	1
10	Patriotic	0.07	0.12	0.13	0.14	0.13	0.01	0.05	0.02	0.13
11	Educational level	-0.01	-0.01	-0.01	-0.01	-0.01	0.34	-0.20	-0.03	-0.06
12	Employment status	0.07	0.01	0.01	0.01	0.04	-0.27	0.34	0.15	0.11
13	Marital status	0.07	0.04	0.04	0.03	0.04	-0.12	0.49	0.14	0.10
14	Public sector size	-0.10	0.14	0.12	0.12	-0.04	-0.05	-0.02	-0.01	-0.08
15	Government effectiveness	-0.06	0.03	0.03	0.01	0.00	0.10	0.07	0.01	-0.07
16	Inflation	0.06	-0.04	-0.04	-0.03	0.04	-0.03	-0.09	0.01	0.15
17	Unemployment	-0.03	0.05	0.04	0.04	-0.08	-0.13	-0.05	0.00	0.00

		10	11	12	13	14	15	16	17
1	Tax morale								
2	Ideological difference								
3	Weighted ideological difference								
4	Ideo. diff. to prime minister								
5	Ideology								
6	Income								
7	Age								
8	Gender								
9	Religious								
10	Patriotic	1							
11	Educational level	-0.05	1						
12	Employment status	0.02	-0.23	1					
13	Marital status	0.03	-0.14	0.15	1				
14	Public sector size	-0.06	-0.07	-0.01	0.00	1			
15	Government effectiveness	0.00	0.08	-0.09	0.07	0.15	1		
16	Inflation	0.15	-0.02	0.07	-0.04	-0.31	-0.36	1	
17	Unemployment	0.00	-0.18	0.08	-0.02	0.36	-0.32	0.23	1

Chapter 3

Immigration as a threat to the welfare state: a self-fulfilling prophecy

Overview. This paper analyzes whether the belief that immigrants represent a threat to welfare sustainability affects citizens' willingness to pay taxes. We approach this question using individual-level data from the 4th wave of the European Values Study (EVS). Our results robustly reveal lower levels of tax morale among those citizens who believe that immigrants are a strain on their country's welfare system. Considering that citizens' perceptions are unrelated to real levels of immigration and its real economic impact, our results suggest that the belief that immigration erodes the welfare system could become a self-fulfilling prophecy.

JEL classification: J15; H26; I30; H41

Key words: Immigration; Tax morale; Tax compliance; Welfare system; Welfare state sustainability;

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3.1 Introduction

Immigration and its impact on welfare state sustainability is today one of the most salient topics in the political debate in European countries. This can be attributed to three phenomena observed since the 2000s. First, there has been a continuous increase in the non-native population in many European countries over recent decades culminating in the migrant crisis that began in 2015 and has led to more than 1.7 million unauthorized migrants crossing the Mediterranean Sea.[1] As a result, the non-native population has become considerable. In 2005, in many of these countries one in ten residents were born abroad and the proportion of foreign-born residents in Austria and Germany, for example, reached 12 percent, a level characteristic of a traditional immigration country such as the US (Dancygier, 2010). Second, in the aftermath of the financial crisis of 2008 and the subsequent sovereign debt crisis, the welfare systems of many developed economies had to deal with decreasing revenues and rising expenditures forcing many governments to retrench the welfare state. And third, over the last decade we have witnessed the increasing electoral success of far-right anti-immigration parties in many European countries (e.g. the Alternative für Deutschland in Germany, the United Kingdom Independent Party in the UK, the League Party in Italy, the National Front in France, the Freedom Party in Austria and VOX in Spain). A central idea in the electoral campaigns of these far-right parties is that immigration is partly responsible for decreased welfare benefits for the native population. Far from rejecting this thesis, we have seen how major parties have adopted immigration policy positions closer to those of anti-immigration parties (Van Spanje, 2010) and thus that the idea that immigrants are a strain on the welfare system has gained high levels of acceptance among much of the European population.

In this paper we analyze whether the belief that immigrants represent a threat to welfare sustainability affects citizens' willingness to pay taxes. We begin by deriving the theoretical link between immigration and tax morale from two strands of the literature: one relating immigration and welfare state sustainability and the other relating tax morale and the welfare state. From the first we obtain that citizen's perceptions regarding the impact of immigration on welfare state sustainability differ from the predicted real (likely positive) overall impact, relying heavily on personal circumstances and general perceptions of the impact of immigration in the context of electoral competition and media coverage. From the second strand we conclude that tax morale is influenced by, on the one hand, taxpayers' personal circumstances relating to their direct costs and benefits from tax compliance, and on the other, the indirect benefits they receive from general public sector performance. From these

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[1]According to the IOM (2019), unauthorized new arrivals in Europe by land or sea totaled 1 million in 2015, 390,000 in 2016, 185,000 in 2017 and 144,000 in 2018.

Chapter 3. Immigration as a threat to the welfare state: a self-fulfilling prophecy

two findings we derive the hypothesis that tax morale decreases with taxpayers' belief that immigration reduces welfare state sustainability, and country-contextual factors play an important role in this. We test this hypothesis using individual-level data from the fourth wave of the European Values Study (EVS), which for the first time includes a battery of questions regarding citizens' opinions on the impact of immigration on different aspects of life. Indeed, our results indicate a negative relationship between tax morale and unfavorable perceptions of immigration. We find lower levels of tax morale among citizens who believe that immigrants are a strain on their country's welfare system. Considering that citizens' perceptions are unrelated to real levels of immigration and its real economic impact, our results suggest that the belief that immigration erodes the welfare system could become a self-fulfilling prophecy that merits the attention of both policy makers and scholars.

To the best of our knowledge, this is the first paper to analyze the link between tax morale and perceptions of the economic impact of immigration. Other studies have, however, considered immigration in the study of tax morale. Using immigrant data from the 2004 wave of the European Social Survey, Kountouris and Remoundou (2013) identify the existence of a cultural component in individual tax morale. Thus the level of tax morale in the immigrant's country of origin influences their tax morale in the destination country. María-Dolores et al. (2010) analyze the determinants of tax morale in Spain. Using individual data from the 'Survey into the Tax Morale of the Citizenry', they find that individuals who believe that immigrants should pay taxes exhibit higher levels of tax morale. Finally, Russo (2013) constructs an alternative measure of tax morale for Italy at provincial level on the basis of voluntary reports of tax evasion to a website. Using the 102 observations thus obtained, he finds that Italian provinces with a higher proportion of regular immigrant population have fewer reports of tax evasion.

The remainder of the present paper is organized as follows. In Section 3.2 we put forward our hypothesis regarding the link between citizens' opinions on the impact of immigration on welfare state sustainability and tax morale. Section 3.3 describes the data and the empirical model. Section 3.4 contains the main results of our empirical model. In Section 3.5 we discuss the results and explore the role of individual and country-contextual factors in the formation of immigration perceptions. Finally, Section 3.6 concludes.

3.2   Immigration and tax morale

Although there is a vast literature on the determinants of tax morale, the impact of immigration on tax morale has not yet been analyzed either from a theoretical or an empirical perspective. In this paper we establish a link between immigration

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and tax morale by reviewing, on the one hand, theoretical and empirical predictions regarding the impact of immigration on welfare state sustainability, and on the other, the relationship between tax morale and welfare state quality. We use insights from the literature to formulate the hypotheses that will be empirically tested in this paper.

3.2.1   Immigration and welfare state sustainability

A major concern about immigration that has motivated much of the hostility towards immigrants is the belief that they receive more than they contribute to public finances which undermines the fundamentals of the welfare state (Card et al., 2012). In reviewing the literature on the economic impact of immigration, in the following, we distinguish between its real impact and its perceived impact.

Economic effects of immigration

According to Preston (2014), any analysis of the economic impact of immigration needs to at least take into account: *(i)* immigrant tax payments and benefit use in cash and in kind, *(ii)* the labor market effects of immigration, and *(iii)* the long-run dynamic consequences of immigration.

Tax payments and benefit use.   Regarding tax payments and cash benefits, the empirical evidence suggests that the net contribution of immigration crucially depends on the generosity of the welfare state system. An indicator of this is that in both the US and Europe, welfare state benefits distort migration (e.g. McKinnish, 2005). A recent study by Boeri (2010) reports that, while migrants to Denmark, Finland, Norway and Sweden are less likely than natives to be net fiscal contributors, the opposite is true for migrants to Austria, Germany, Spain and the UK. Assessing the consequences of immigration for benefits in kind is highly complex as it needs to take into account the use of public goods and services such as education, health, public transport and public security.[2] In a recent study, Dustmann and Frattini (2014) assess the overall contributions and spending impacts of immigration. They find that for the period between 1995 and 2012 some migrant groups made a positive net contribution to the welfare state (recent immigrants and migrants from within the European Economic Area) while for other groups this is less clear (older immigrants).

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[2]For a detailed discussion of the impact of immigration on benefits in kind see Preston (2014).

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Labor market competition.   Economic theory suggests that immigration can have a potential impact on factor prices. Wages, in particular, could be affected. As the skill composition of immigrants differs from that of the native workforce, these wage effects are heterogeneous across qualification profiles (Dustmann et al., 2013). However, from a macroeconomic perspective, factor price effects are expected to be non-significant for several reasons (Preston, 2014). Firstly, immigration might also have an impact on the return to capital that compensates for its effect on wages. Secondly, with internationally mobile capital, the labor price is determined on the international market in such a way that immigration has no impact on relative factor prices. Finally, even with immobile capital but factor mobility across sectors, the reallocation of production from less to more labor-intensive sectors allows the pressure on factor prices to decrease. Consequently, although immigration might affect specific groups, the overall impact of immigration on factor prices should be negligible.

Long-run impact.   The long-run economic impact of immigration is analyzed within the framework of an overlapping generations exchange economy with pay-as-you-go education and pensions funding. In this context, potential gains from immigration arise because immigrants mostly arrive at a stage in their life-cycle when the fiscally costly period of childhood has passed. Thus high-skilled immigration, in particular, will help to alleviate the fiscal burden of future generations. However, to assess this empirically involves controlling for numerous factors such as immigrant productivity, the fiscal cost of immigrant children and future earning paths (Preston, 2014). Empirical studies that obtain an overall positive long-run impact of immigration include: Lee and Miller (2000) and Auerbach and Oreopoulos (2000) for the US economy, Mayr (2005) for Austria, Chojnicki (2013) for France and Collado et al. (2004) for Spain.

Overall, these results indicate that the relationship between immigration and welfare state sustainability is a complex one. However, the empirical evidence suggests a likely positive impact of immigration, at least in the long run.

Citizens' perceptions of the economic impact of immigration

The positive evaluation of immigration on economic grounds contrasts sharply with citizens' perceptions of its economic impact. In the 2002 European Social Survey (ESS) of 21 countries with a total of more than 40,000 respondents, nearly 35% of the interviewees believed that immigration was quite bad for the economy and around 30% believed that it was neither bad nor good (Card et al., 2012). There are several explanations for this discrepancy between the real and perceived impact of immigration. First, people's beliefs about the general economic impact could be

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contaminated by their personal circumstances. Second, people might not be able to separate the economic impact of immigration from its general (cultural) impact. Finally, their views on the issue could be distorted in the context of electoral competition by political parties and the media. Moreover, it has been shown that citizens' preferences for redistribution are shaped by (perceived) levels of immigration.

The influence of personal circumstances on perceptions of the economic impact of immigration. According to the considerations above, citizens' can be personally affected by immigration on economic grounds in the short run for two main reasons: (i) increased labor market competition, and (ii) congestion and compositional change of public goods and services. The labor market competition hypothesis states that individuals oppose immigration more intensely the more they perceive incoming immigrants as being threats to their own earning prospects (Mayda, 2006; Scheve and Slaughter, 2001). The basic prediction of theoretical models underlying this hypothesis is that immigration generates negative wage effects for natives with similar skills, while natives with different skills are likely to benefit from it (Hainmueller et al., 2015). While the recent literature unanimously agrees that the labor market competition hypothesis is not the main determining factor in explaining overall attitudes to immigration (Card et al., 2012; Facchini and Mayda, 2009; Hainmueller and Hiscox, 2007; Hainmueller et al., 2015), the link between people's perceptions of its economic impact and material self-interest remains unresolved. In this regard Davis and Deole (2015) analyze the determinants of economic and cultural attitudes to immigration separately. They find that individuals' economic characteristics, such as income, education and employment status carry more weight for their economic than for their cultural concerns about immigration while their cultural characteristics carry more weight for their cultural than for their economic concerns. To be specific, they find that high income earners, the highly educated and the self-employed judge the economic impact of immigration more positively than their counterparts. Although this would be in line with the labor market competition hypothesis if immigrants were mainly low-skilled, there are other possible explanations for these findings. For example, as suggested by Hainmueller and Hiscox (2007), the positive impact of education might stem from the fact that the highly educated are better informed about the real economic impact of immigration and are therefore more likely to believe that immigration generates positive gains for the host economy as a whole. The impact of immigration on the congestion and compositional change of public goods and services crucially depends on the distributional characteristics of immigrants. Nevertheless, on this basis immigration is expected to more negatively affect the attitudes of those population groups that make a more intensive use of public goods and services (mostly education and health) such as females, the elderly and families with children. Indeed,

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Davis and Deole (2015) find that females, married individuals and those living with children are more concerned about the economic impact of immigration, while the impact of age is non-conclusive. Again, although there are alternative explanations for these findings (some of which will be discussed below), we can conclude that material self-interest seems to influence citizens' perceptions of the economic impact of immigration.

The influence of general perceptions of immigration on the perception of its economic impact. As mentioned earlier, attitudes towards immigration are mainly influenced by non-economic concerns.[3] However, since most citizens will not clearly separate the impact of immigration on public finances from, for example, its influence on the host country's culture, then economic and non-economic impact valuations of immigration should be expected to be closely related. Indeed, as mentioned above, Davis and Deole (2015) report that cultural characteristics matter when assessing the economic impact of immigration (though to a lesser extent than economic characteristics). As explanatory variables of cultural characteristics the literature has used measures of tolerance, altruism and multiculturalism, perceptions of the impact of immigration on crime, immigrant friends and family members, race, and religion and religiosity (Card et al., 2012; Davis and Deole, 2015; Facchini and Mayda, 2009; Hainmueller and Hiscox, 2007). Although the impact of this class of variables on citizens' perceptions of the economic impact of immigration has yet to be analyzed extensively, we would expect its sign to be the same as for overall attitudes to immigration.

Electoral competition and the media. In the context of electoral competition political parties might exaggerate the negative consequences of immigration for opportunistic electoral reasons in such a way that the issue becomes distorted and some citizens form a false impression about the real impact of immigration. Indeed, Sides and Citrin (2007) and Citrin and Sides (2008) find that European and US citizens tend to overestimate foreign-born population living in their countries and that this misperception increases with their opposition to immigration. There are reasons for believing that political parties and the media contribute to this misperception. First, we see that since the 2000s immigration has become a salient issue in day-to-day politics and now plays a prominent role in citizens' party preferences (Van der Brug et al., 2000). Although anti-immigration policies initially only appeared in the programs of far-right parties, after the recent electoral success of these parties in many countries (e.g. the Alternative für Deutschland in Germany, the United

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[3]Thus, Card et al. (2012) quantify the impact of non-economic concerns as being 2 to 5 times more important in explaining variations in individual attitudes toward immigration policy than economic concerns.

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Kingdom Independent Party in the UK, the League Party in Italy, the National Front in France, the Freedom Party in Austria, and VOX in Spain), major parties have adopted immigration policy positions closer to those of the anti-immigration parties (Van Spanje, 2010). Second, to achieve larger audiences, the media emphasize the sensationalist extreme aspects of politics. In this shift toward a more populist treatment of information, anti-immigration parties find a perfect platform for communicating their positions to the electorate resulting in an increasing media coverage of far-right parties (Ellinas, 2010).

The causality between party positioning and citizens' perceptions of immigration is naturally a major issue in the political science literature. The evidence suggests that causality goes in both directions, i.e., not only do citizens' perceptions of immigration influence party positioning, but political parties influence citizens' perceptions of immigration. Thus, while Lubbers and Scheepers (2002), Norris (2005), Ivarsflaten (2008) and Rydgren (2008) state that support for far-right parties stems from negative individual attitudes to immigration, Golder (2003) acknowledges that much of the far-right parties' success stems from exploiting citizens' concerns by exaggerating the 'negative' economic effects of immigration in the host country.

As for the relationship between perceived economic effects and support for far-right parties, the literature has focused on the labor market competition hypothesis which predicts increased support for anti-immigration parties with increasing immigration, particularly in times of economic scarcity. While some studies confirm this hypothesis (e.g. Barone et al., 2016; Becker et al., 2016; Brunner and Kuhn, 2014; Edo and Rapoport, 2018), others acknowledge that individual perceptions of economic threat do not automatically translate into far-right support and stress the importance of contextual factors such as, for example, the electoral power of immigrants (Dancygier, 2010), the immigrants' skill level (Halla et al., 2017) and the characteristics of the labor market (Golder, 2003).

Evidence of the relationship between the perceived cultural effects of immigration and individuals' support for far-right parties is also inconclusive.[4] While some studies confirm a positive relationship between the size of the immigrant community and support for anti-immigrant parties (e.g. Golder, 2003; Knigge, 1998; Lubbers and Scheepers, 2002; Swank and Betz, 2003; Van der Brug et al., 2005), others conclude that the two variables are uncorrelated (e.g. Arzheimer and Carter, 2006; Lucassen and Lubbers, 2012; Norris, 2005; Rydgren, 2008).

Immigration perceptions and redistribution preferences. The size of the welfare state is driven mainly by citizens' preferences for income redistribution

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[4]The cultural effects of immigration on support for right-wing parties have been studied in the context of the social identity theory (Tajfel et al., 1979).

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through either cash transfers or the provision of public goods and services.[5] That immigration can influence citizens' preferences for redistribution has been shown by Alesina et al. (2014). In their study of 28 European countries based on the European Social Study they find that natives' support for redistribution declines as the proportion of immigrant population rises. According to Edo et al. (2018), immigration can affect preferences for redistribution due to both economic and cultural concerns. The demand for redistribution would depend firstly on whether or not individuals are recipients of personal welfare benefits schemes, and secondly, on whether other beneficiaries are regarded as worthy recipients of welfare benefits.

Conclusion

The above considerations can be summarized as follows. While immigration likely has a positive overall economic impact on welfare state sustainability, citizens' perceptions deviate from the objective economic impact predicted. This is because individual perceptions on this issue are strongly influenced by personal circumstances and the general perception of the impact of immigration in the context of electoral competition and media coverage. The perception of immigration in turn influences society's redistribution preferences and thus the size of the welfare state.

3.2.2   Tax morale and the welfare state

The channel whereby immigration is expected to influence tax compliance is through its impact on welfare state quality and benefits. While the previous section described the link between immigration and its (perceived) economic consequences for welfare state sustainability and quality, in this section, we review the literature on the relationship between welfare state quality and tax morale, distinguishing between personal or direct benefits that individuals receive from the welfare state and the general or indirect benefits they also obtain.

Direct welfare state benefits and tax morale

Direct welfare state benefits are related to the citizens' personal situations, e.g. their family, health and employment status. Thus the people who are likely to receive higher direct welfare benefits are those with children (either through public education or public health care provision), the unemployed and the retired or elderly. People who are likely to receive lower direct benefits from the welfare state are high

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[5]A basic insight from the theoretical model by Meltzer and Richard (1981) is that public sector size increases with mean income relative to median income.

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income earners, the employed and the self-employed. Indeed, empirical studies have shown that tax morale is higher for individuals with children (e.g. Rodriguez-Justicia and Theilen, 2018), the retired (e.g. Konrad and Qari, 2012; Torgler, 2005a) and elderly (e.g. Martinez-Vazquez and Torgler, 2009; Torgler, 2005b, 2006), and lower for high income earners (e.g. Alm et al., 2006; Doerrenberg and Peichl, 2013; Torgler, 2006) and the self-employed (e.g. Alm and Torgler, 2006; Torgler, 2004b).[6]

Indirect welfare state benefits and tax morale

Indirect welfare state benefits are related to the general quality of the goods and services provided by the public sector. According to Feld and Frey (2002), tax morale in this context can be understood as an implicit or 'psychological' contract between citizens and their governments, through which citizens expect to receive public goods and services in exchange for their tax payments. Empirically, welfare state quality has been measured by considering the tax authority's treatment of taxpayers (Frey and Feld, 2002), public spending efficiency (Barone and Mocetti, 2011), ethnic fractionalization (Lago-Peñas and Lago-Peñas, 2010), institutional transparency (Torgler, 2006), tax progressivity (Doerrenberg and Peichl, 2013) and citizens' trust in government and public institutions.

The influence of tax officials' treatment of taxpayers' on tax morale is explored in Frey and Feld (2002). In their study of 26 Swiss cantons over the period 1970-1995, they find that tax morale increases when taxpayers are treated with respect. In contrast, taxpayers respond to the tax authorities' more aggressive deterrence attitudes with increased tax avoidance. Feld and Frey (2002) show that differences in the treatment by tax authorities across cantons can be attributed to differences in political participation rights in these cantons.

The impact of public spending efficiency on tax morale is studied by Barone and Mocetti (2011). They combine 2004 survey data with data on public expenditure and outputs taken from the balance sheets of 1,458 Italian municipalities. Their results indicate that tax morale declines when taxpayers perceive that government resources are spent inefficiently. This effect is stronger in places where public spending is low or where fiscal autonomy is high.

Lago-Peñas and Lago-Peñas (2010) use an ethnic fractionalization index to assess the impact of the quality of public goods provision on tax morale. In their study, based on the 2004–2005 wave of the European Social Survey, the authors apply

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[6]The relationship between income and tax compliance is rather complex (see Allingham and Sandmo, 1972; Yitzhaki, 1974). Consequently, in various empirical studies that merely estimate the direct impact of income on tax morale the parameter estimate is non-significant (e.g. Rodriguez-Justicia and Theilen, 2018; Torgler et al., 2008).

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a multilevel statistical model covering 159 regions in 17 countries. Their results hint at a negative relationship between ethnic fractionalization and tax morale which means that tax morale rises when public goods better match citizens' preferences.

With regard to institutional transparency, Torgler (2006) obtains a negative correlation between tax morale and the perceived size of corruption (as opposed to institutional transparency). As a possible causal mechanism for his finding, Torgler (2006) argues that corruption in public institutions reduces the moral cost of evading taxes by creating an atmosphere of distrust and breeding opportunistic behavior.

As a measure of tax system's fairness, Doerrenberg and Peichl (2013) analyze the effect of tax progressivity on tax morale. Using data from the World Values Survey and the European Values Study over the period 1981-2004, they find that tax morale is higher in countries with more progressive tax systems.

The general quality of publicly provided goods and services has also been assessed by means of surveys. Questions in these surveys have dealt with citizens' trust in officials (Torgler et al., 2008), trust in the legal system (Torgler, 2005a), trust in the parliament (Alm and Torgler, 2006) and trust in the government (Torgler, 2004a). The results can be summarized to conclude that trust in government and public institutions fosters tax morale.

Conclusion

We conclude that tax morale is influenced on the one hand by the personal circumstances of the taxpayers (i.e. their direct benefits and costs from tax compliance), and on the other by country-contextual factors that account for the general quality of the public goods and services provided by the welfare state (indirect benefits).

3.2.3 Hypothesis

From the above considerations (summarized in Conclusions 3.2.1 and 3.2.2) we obtain that, since tax morale depends on the perceived quality of welfare benefits, which in turn is influenced by perceptions of the impact of immigration on welfare state sustainability, these perceptions should have an influence on tax morale. To be specific, we would expect individuals who perceive immigrants as a threat to welfare state sustainability to be less willing to comply with their obligations as taxpayers. Moreover, the relationship between perceptions of the consequences of immigration and tax morale is expected to depend on contextual factors that influence both individual perceptions of the impact of immigration (e.g. electoral competition and media coverage) and tax morale (e.g. trust in institutions or the fairness of redistribution). Accordingly, we derive the following hypothesis that will be subject to

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empirical testing in Section 3.4:

H1: Tax morale decreases with taxpayers' beliefs that immigration reduces welfare state sustainability. The effect strongly depends on individual and country-contextual factors.

3.3 Empirical approach

3.3.1 Data

The data are from the fourth wave of the EVS, conducted over the period 2008-2009. Our sample comprises nearly 20,000 observations for 24 European OECD member countries, namely Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.[7]

Dependent variable

Our dependent variable is *Tax morale* and is constructed on the basis of the following EVS question:

Please tell me for each of the following whether you think it can always be justified, never justified, or something in between, using this card: 'Cheating on tax if you have the chance'

Respondents were asked to assess this issue on a ten-point scale, from 1 (never) to 10 (always). As is common in the literature (e.g. Torgler, 2004a, 2006), to facilitate the interpretation of our results we recode the answers to this question into a four-point scale using the following criterion: responses 7 through 10 into 0 (low tax morale), responses 4 through 6 into 1 (medium-low tax morale), responses 2 and 3 into 2 (medium-high tax morale) and 1 into 3 (high tax morale).[8]

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[7]The sample choice is motivated by the availability of our main explanatory variable, i.e.*Immigrants are a strain on the welfare system.*

[8]Note, however, that our estimation results are robust to the use of the original ten-point scale as shown in Section 3.4.2. The Appendix to this paper contains two figures showing the distribution of the dependent variable on a four-point scale and on the original ten-point scale respectively.

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The literature has extensively discussed whether the responses to this question supply information related to real tax compliance. The general conclusion is that a certain bias exists (Elffers et al., 1987), but that it is smaller than the bias obtained by asking directly about tax compliance instead of tax morale (Frey and Torgler, 2007). Furthermore, different studies have shown that, at least in developed economies, tax morale and tax compliance are strongly correlated (e.g. Richardson, 2006; Torgler et al., 2008). This measurement of the dependent variable has also the advantage of providing us with cross-country comparable data which are not available for tax evasion. Consequently, we consider that the question provides an appropriate cross-country comparable measure of tax morale that is closely related to tax evasion behavior.

Main explanatory variables

Hypothesis 1 can be effectively tested using a question that was included for the first time in the fourth wave of the EVS in 2008. The question is formulated as follows:

Please look at the following statements and indicate where you would place your views on this scale? '1 immigrants are a strain on country's welfare system, 2, 3, 4, 5, 6, 7, 8, 9, 10 immigrants are not a strain on country's welfare system'.

The inclusion of this question in the EVS can be seen as indicative of the growing concern of European policy makers regarding the belief that immigration is harmful to welfare state sustainability. In this paper we analyze whether such a belief has an impact on tax morale. We denote this main explanatory variable *Immigrants are a strain on the welfare system*. To facilitate the interpretation of our results, we recode the answers to this question such that the value 0 represents the value 10 in the original scale (immigrants are not a strain on country's welfare system) and the value 9 represents the value 1 in the original scale (immigrants are a strain on country's welfare system).[9]

As can be seen in Figure 3.1, relating the responses to these questions on the perceived impact of immigration to real stocks and flows of immigration in European countries shows that they are mostly unrelated. This confirms the conclusions obtained from the literature review in Section 3.2.1 that citizens' perceptions of immigration and its impact deviate from its real effects. Therefore, since tax compliance behavior is driven mainly by taxpayers' beliefs, the analysis of an influence of immigration on tax morale makes *Immigrants are a strain on the welfare system*

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[9]Two figures showing the distribution of this variable among individuals and across countries can be found in the appendix.

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and *Too many immigrants* particularly suitable for the objective of this paper.

Figure 3.1: Perceptions on immigration versus real immigration in 2008.
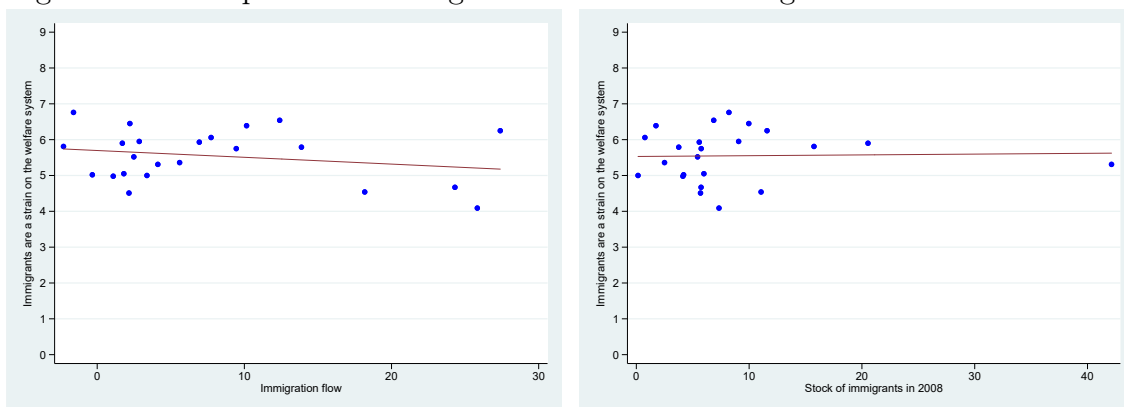
Immigrants are a strain on the welfare system by country in average values. *Immigrant flow* is measured as the average growth rate over the period 2003-2008. Data for *Immigrant flow* and *Stock of immigrants* are from OECD (2019).

Control variables

As is common in the literature, we include among our explanatory variables three that account for personal and social norms, namely *Religious*, *Patriotic* and *Ideology*, along with a number of socio-demographic controls, namely *Native*, *Age*, *Gender*, *Children in the household*, *Educational level*, *Income level*, *Occupational status* and *Marital status*. As regards the variables that account for personal and social norms, we expect individuals with stronger religious beliefs, patriotic feelings and left-wing voters to exhibit higher tax morale.[10] As for the socio-demographic control variables, we expect this to hold for the elderly, women, parents, low income earners, the retired and married individuals, while the impact of education on tax morale is more complex.[11] Definitions are shown in Table A3.1. Descriptive statistics for categorical and continuous variables are shown in Table A3.2 and Table A3.3 respectively.

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[10] For an extensive overview of the literature on tax compliance and tax morale see Torgler (2007). The relationship between ideology and tax morale is studied in Rodriguez-Justicia and Theilen (2019).

[11] For an extensive review of the literature on the relationship between education and tax morale see Rodriguez-Justicia and Theilen (2018).

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3.3.2 Empirical model

As is common in the literature, we employ an ordered probit model for our four-point-scale dependent variable (*Tax morale*). All specifications include country dummies to account for unobservable country-specific effects with Germany being used as the reference country. We report clustered standard errors by country to avoid an underestimation of standard errors due to intra-group error correlation. Thus, our estimation model is:

$$y_{i,c} = \beta' x_{i,c} + \boldsymbol{\gamma}' \boldsymbol{z_{i,c}} + \boldsymbol{\eta_k} + \boldsymbol{\nu_c} + \varepsilon_{i,c}, \tag{3.1}$$

where y is a latent variable (tax morale of individual i in country c) operationalized in four k categories: low ($k = 0$), medium low ($k = 1$), medium high ($k = 2$), and high ($k = 3$), x is our main explanatory variable (*Immigrants are a strain on the welfare system*), $\boldsymbol{z}$ is a vector of control variables, $\boldsymbol{\eta_k}$ is a vector of intercepts for each tax morale category k, and $\boldsymbol{\nu_c}$ is a vector of country dummies. The vector of control variables $\boldsymbol{z}$ includes a dummy for nationality acquisition by birth (*Native*), age (*Age*), a gender dummy (*Female*), a dummy for children living in the household (*Children in the household*), two education level dummies (*Medium* and *High*), two income level dummies (*Medium* and *High*), ideology (*Ideology*), a dummy for religious beliefs (*Religious*), a dummy for patriotism (*Patriotic*), four occupational status dummies (*Unemployed, Self-employed, Retired, Other*) and three marital status dummies (*Married, Divorced* and *Widowed*).

3.4 Results

3.4.1 Main results

The estimation results for our main explanatory variable *Immigrants are a strain on the welfare system* are shown in Table 3.1. We test our hypothesis using three different specifications. Specification I includes only *Immigrants are a strain on the welfare system* in categorical form. Specification II includes further explanatory variables. Finally, Specification III employs *Immigrants are a strain on the welfare system* in continuous form together with our control variables. All estimations include country fixed effects.

Due to the non-linearity of ordered probit regression models, the coefficient estimates of Specifications I, II and III in columns 1, 3 and 5 respectively cannot be interpreted directly. Therefore, to obtain an impression of the quantitative impact of the variables, we also provide the marginal effects for the probability of exhibiting the highest tax morale level (i.e. *Tax morale* = High) in columns 2, 4 and 6. The

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reported p-values are clustered by country to avoid an underestimation due to intra-group error correlation. The discussion of the results is limited to estimates with a p-value below 5 percent.

From Table 3.1 we obtain that individuals who believe that immigrants are a strain on the welfare system exhibit lower levels of tax morale. This result holds across our different specifications. Furthermore, from columns 1 and 3 we observe on the one hand that estimation results are quite robust to the inclusion of further control variables, and on the other that a higher value of *Immigrants are a strain on the welfare system* is associated with a lower level of tax morale. Accordingly, our variable of interest in its continuous form is negative and highly significant in Specification III. From the marginal effects of the estimates in this specification (shown in column 6) we obtain that the probability of exhibiting the highest level of tax morale for an individual who is most pessimistic about the impact of immigration on welfare state sustainability (*Immigrants are a strain on the welfare system* = 9) is 5.4% lower than that for an individual who believes that immigrants are no strain on the welfare state (*Immigrants are a strain on the welfare system* = 0). This effect is comparable in size to the impact of variables that are commonly found to have a sizable impact on tax morale such as *Religious*, *Self-employed*, *Retired* and *Native*.

The sign and significance of our socio-demographic controls are in line with previous studies based on the EVS. Thus we observe a positive relationship between *Tax morale* and *Age, Gender, Children in the household, Religious* and *Patriotic*, while the relationship with *Native, Ideology* and *Self-employed* is negative. Employment and marital status also have a significant influence on tax compliance, with positive effects for *Retired* and *Married* and negative effects for *Self-employed* with respect to their base categories (*Employed* and *Never married* respectively). In contrast, education and income levels have no significant impact on tax morale.[12]

Taken together, our results enable us to confirm Hypothesis 1 that tax morale decreases with taxpayers' beliefs that immigration reduces welfare state sustainability.

Next, to ascertain whether country-contextual factors are important in explaining the link between tax morale and immigration perceptions, we estimate equation (3.1) at country level using the following model:

$$y_{i,c} = \beta' x_{i,c} + \gamma' \boldsymbol{z_{i,c}} + \boldsymbol{\eta_k} + \varepsilon_{i,c}. \tag{3.2}$$

From the results in Table 3.2 we observe considerable cross-country heterogeneity in the parameter estimates of *Immigrants are a strain on the welfare system*,

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[12] For a more in-depth analysis of the relationship between tax morale and education and between tax morale and income see Rodriguez-Justicia and Theilen (2018) and Doerrenberg and Peichl (2013) respectively.

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Table 3.1: Tax morale and *Immigrants are a strain on the welfare system.*

	(I) Tax morale		(II) Tax morale		(III) Tax morale	
	oprobit	ME	oprobit	ME	oprobit	ME
Immigrants are a strain on the welfare system (Ref.: Are not a strain)						
1	-0.170*** (0.009)	-0.063	-0.212*** (0.001)	-0.075		
2	-0.186*** (0.004)	-0.069	-0.210*** (0.000)	-0.075		
3	-0.322*** (0.000)	-0.121	-0.345*** (0.000)	-0.125		
4	-0.283*** (0.001)	-0.106	-0.319*** (0.000)	-0.115		
5	-0.209*** (0.005)	-0.078	-0.258*** (0.000)	-0.092		
6	-0.342*** (0.000)	-0.129	-0.375*** (0.000)	-0.136		
7	-0.272*** (0.000)	-0.102	-0.330*** (0.000)	-0.119		
8	-0.291*** (0.000)	-0.109	-0.358*** (0.000)	-0.130		
Are a strain	-0.186** (0.049)	-0.069	-0.245*** (0.001)	-0.088		
Immigrants are a strain on the welfare system					-0.016*** (0.008)	-0.006
Native			-0.130** (0.019)	-0.048	-0.136** (0.013)	-0.050
Age			0.008*** (0.000)	0.003	0.008*** (0.000)	0.003
Gender (Ref.: Male)			0.186*** (0.000)	0.069	0.185*** (0.000)	0.069
Children in the household (Ref.: No)			0.041* (0.081)	0.015	0.041* (0.071)	0.015
Educational level (Ref.: Low)						
Medium			0.018 (0.533)	0.007	0.012 (0.679)	0.004
High			0.077* (0.056)	0.028	0.069* (0.094)	0.026
Income level (Ref.: Low)						
Medium			-0.012 (0.712)	-0.005	-0.015 (0.656)	-0.006
High			-0.059 (0.268)	-0.022	-0.063 (0.239)	-0.023
Ideology			-0.024*** (0.002)	-0.009	-0.024*** (0.002)	-0.009
Religious (Ref.: Not religious)			0.150*** (0.000)	0.056	0.144*** (0.000)	0.054
Patriotic (Ref.: Not patriotic)			0.239*** (0.000)	0.090	0.226*** (0.000)	0.085
Occupational status (Ref.: Employed)						
Unemployed			0.032 (0.573)	0.012	0.037 (0.521)	0.014
Self-employed			-0.143*** (0.000)	-0.054	-0.138*** (0.000)	-0.052
Retired			0.139*** (0.000)	0.051	0.140*** (0.000)	0.052
Other			0.073** (0.030)	0.027	0.072** (0.035)	0.027
Marital status (Ref.: Never married)						
Married			0.096*** (0.000)	0.036	0.096*** (0.000)	0.036
Divorced			-0.040 (0.226)	-0.015	-0.039 (0.246)	-0.014
Widowed			-0.007 (0.904)	-0.002	-0.009 (0.868)	-0.003
Constant cut1	-1.981*** (0.000)		-1.497*** (0.000)		-1.327*** (0.000)	
Constant cut2	-1.216*** (0.000)		-0.705*** (0.000)		-0.534*** (0.000)	
Constant cut3	-0.503*** (0.000)		0.032 (0.782)		0.201* (0.072)	
Observations	19,778		19,778		19,778	
Pseudo R-squared	0.0188		0.0407		0.0390	

Ordered probit with clustered standard errors by country (24 clusters). All estimations include country fixed effects. Marginal effects (ME) have been calculated for the highest category of *Tax morale* (High). Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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although throughout they are either significantly negative or insignificant. Significant negative estimates are obtained for Belgium, Denmark, Estonia, Finland, Italy, Norway, Portugal and Sweden. These results indicate that the impact of perceptions of immigration on tax morale in some countries is between two and five times stronger than the average estimate shown in Table 3.1. Given that there are significant impacts of perceptions of immigration on tax morale in seven countries we take this as evidence that the effect strongly depends on country-contextual factors, which confirms the second statement in Hypothesis 1.

Table 3.2: Tax morale and *Immigrants are a strain on the welfare system* by country.

	AUT	BEL	CZE	DEN	EST	FIN	FRA	GER	GRE	HUN	ICE	IRE
Immigrants are a strain on welfare system	0.028	-0.048***	0.001	-0.032*	-0.045**	-0.049**	-0.018	-0.006	0.013	-0.007	-0.013	-0.005
	(0.108)	(0.001)	(0.934)	(0.099)	(0.015)	(0.011)	(0.209)	(0.697)	(0.663)	(0.554)	(0.868)
Native	-0.326	-0.382***	-0.965***	-0.180	-0.022	-0.619	-0.259	0.211	-0.369*	0.403	-0.297	-0.342
	(0.160)	(0.007)	(0.004)	(0.476)	(0.895)	(0.378)	(0.110)	(0.264)	(0.126)	(0.262)	(0.321)
Age	0.015***	-0.000	0.008**	0.010**	0.010**	0.011**	0.004	0.008**	0.017***	0.019***	0.010**	0.014**
	(0.000)	(0.976)	(0.038)	(0.041)	(0.015)	(0.019)	(0.181)	(0.021)	(0.000)	(0.000)	(0.012)	(0.023)
Gender (Ref.: Male)	0.197**	0.312***	0.188**	0.440***	0.280***	0.265***	0.300***	0.082	0.002	0.241***	0.082	0.296*
	(0.013)	(0.000)	(0.014)	(0.000)	(0.002)	(0.003)	(0.000)	(0.234)	(0.979)	(0.003)	(0.417)	(0.053)
Children in the household (Ref.: No)	0.245**	-0.097	0.066	-0.173*	0.157	0.081	0.099	0.106	0.005	-0.037	-0.126	0.133
	(0.016)	(0.252)	(0.466)	(0.088)	(0.103)	(0.473)	(0.240)	(0.207)	(0.961)	(0.709)	(0.284)	(0.415)
Educational level (Ref.: Low)												
Medium	-0.006	-0.121	0.175	0.011	-0.085	0.234	-0.062	0.139	0.079	-0.332***	-0.145	0.185
	(0.961)	(0.172)	(0.132)	(0.926)	(0.398)	(0.183)	(0.536)	(0.203)	(0.467)	(0.007)	(0.281)	(0.241)
High	0.042	-0.067	0.158	0.215*	0.080	0.262	0.010	0.313**	0.123	-0.614***	-0.202	0.482**
	(0.800)	(0.483)	(0.303)	(0.074)	(0.447)	(0.118)	(0.928)	(0.013)	(0.339)	(0.000)	(0.166)	(0.023)
Income level (Ref.: Low)												
Medium	0.268***	-0.045	-0.070	0.194*	0.018	0.046	-0.042	-0.152*	-0.111	-0.170*	-0.184	0.221
	(0.008)	(0.633)	(0.561)	(0.098)	(0.869)	(0.695)	(0.640)	(0.091)	(0.248)	(0.097)	(0.145)	(0.266)
High	0.443***	-0.147	-0.199	0.356**	-0.269**	-0.002	0.072	-0.277***	-0.112	-0.002	-0.105	0.100
	(0.000)	(0.205)	(0.121)	(0.017)	(0.031)	(0.990)	(0.468)	(0.010)	(0.354)	(0.985)	(0.468)	(0.643)
Ideology	-0.054**	-0.050***	-0.038**	-0.022	0.004	-0.004	-0.014	-0.107***	-0.015	0.007	-0.014	0.098***
	(0.024)	(0.007)	(0.028)	(0.315)	(0.851)	(0.831)	(0.384)	(0.000)	(0.426)	(0.695)	(0.529)	(0.008)
Religious (Ref.: Not religious)	0.062	0.151**	0.053	0.020	0.101	0.187**	0.155**	0.044	0.367***	0.194**	0.012	0.531***
	(0.469)	(0.031)	(0.524)	(0.825)	(0.262)	(0.044)	(0.032)	(0.544)	(0.002)	(0.019)	(0.904)	(0.000)
Patriotic (Ref.: Not patriotic)	-0.005	0.266**	0.341***	0.064	0.467***	0.198	0.229**	0.369***	0.188	0.417***	0.201	-0.811*
	(0.973)	(0.013)	(0.001)	(0.671)	(0.000)	(0.241)	(0.045)	(0.000)	(0.242)	(0.000)	(0.334)	(0.068)
Occupational status (Ref.: Employed)												
Unemployed	0.550**	0.132	0.218	-0.050	-0.195	-0.047	0.293	0.140	-0.064	-0.056	-0.320	0.561*
	(0.045)	(0.378)	(0.279)	(0.836)	(0.456)	(0.839)	(0.121)	(0.282)	(0.795)	(0.702)	(0.277)	(0.081)
Self-employed	-0.522***	0.113	-0.280	-0.052	0.073	-0.297*	0.269	-0.039	-0.125	-0.018	-0.369**	-0.506
	(0.000)	(0.507)	(0.147)	(0.762)	(0.713)	(0.082)	(0.168)	(0.831)	(0.318)	(0.928)	(0.018)	(0.123)
Retired	0.154	0.076	0.227	0.305*	0.286*	0.204	0.216*	0.221*	0.006	-0.105	0.158	-0.164
	(0.281)	(0.544)	(0.111)	(0.055)	(0.064)	(0.190)	(0.061)	(0.059)	(0.960)	(0.525)	(0.588)	(0.535)
Other	-0.231**	0.087	0.278**	0.154	0.022	0.134	0.124	0.080	0.074	0.048	0.198	-0.026
	(0.039)	(0.405)	(0.025)	(0.441)	(0.879)	(0.437)	(0.311)	(0.503)	(0.506)	(0.677)	(0.193)	(0.882)
Marital status (Ref.: Never married)												
Married	0.014	0.127	0.021	0.070	0.115	0.114	0.094	0.021	-0.139	-0.089	0.381**	-0.135
	(0.906)	(0.263)	(0.869)	(0.571)	(0.323)	(0.388)	(0.335)	(0.843)	(0.305)	(0.507)	(0.012)	(0.501)
Divorced	-0.197	-0.023	-0.205	0.211	-0.033	0.030	0.010	-0.136	-0.233	-0.131	0.013	-0.438*
	(0.167)	(0.874)	(0.157)	(0.228)	(0.834)	(0.867)	(0.935)	(0.297)	(0.220)	(0.441)	(0.941)	(0.078)
Widowed	0.017	0.025	-0.273	0.240	0.123	-0.058	-0.072	-0.018	-0.205	-0.307	0.253	-0.396
	(0.928)	(0.900)	(0.118)	(0.294)	(0.474)	(0.822)	(0.657)	(0.906)	(0.286)	(0.227)	(0.561)	(0.204)
Constant cut1	-0.796**	-1.643***	-1.811***	-1.425***	-0.887***	-1.547**	-1.026***	-1.355***	-0.688**	-0.864**	-1.735***	-0.976
	(0.017)	(0.000)	(0.000)	(0.000)	(0.003)	(0.047)	(0.000)	(0.000)	(0.049)	(0.021)	(0.000)	(0.156)
Constant cut2	-0.095	-0.831***	-1.030**	-0.623*	-0.096	-0.842	-0.343	-0.508*	-0.005	-0.116	-0.914**	-0.102
	(0.772)	(0.002)	(0.014)	(0.084)	(0.749)	(0.281)	(0.216)	(0.079)	(0.988)	(0.749)	(0.026)	(0.881)
Constant cut3	0.606*	-0.167	-0.131	0.153	0.908***	0.104	0.367	0.298	0.652*	0.539	-0.019	0.612
	(0.063)	(0.536)	(0.753)	(0.669)	(0.002)	(0.893)	(0.185)	(0.299)	(0.058)	(0.136)	(0.963)	(0.375)
Observations	950	1,182	988	972	810	753	1,213	1,375	972	1,154	621	337
Pseudo R-squared	0.0672	0.0281	0.0412	0.0536	0.0656	0.0440	0.0252	0.0433	0.0375	0.0649	0.0390	0.0684

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(*continued*)

	ITA	LUX	NED	NOR	POL	POR	SVK	SVN	SPA	SWE	SWI	UK
Immigrants are a strain on welfare system	-0.033*	-0.029	-0.011	-0.064***	-0.006	-0.101***	0.019	-0.006	0.002	-0.061***	0.014	-0.008
	(0.091)	(0.216)	(0.520)	(0.001)	(0.717)	(0.000)	(0.353)	(0.780)	(0.908)	(0.001)	(0.594)	(0.685)
Native	0.263	-0.497**	-0.078	0.555**	0.342	-0.716	-0.364	-0.300	0.252	0.108	-0.210	0.021
	(0.435)	(0.030)	(0.665)	(0.025)	(0.361)	(0.156)	(0.116)	(0.201)	(0.238)	(0.557)	(0.205)	(0.895)
Age	0.020***	0.003	-0.005	0.003	0.003	0.007	0.012**	0.024***	0.008**	0.006	-0.009	0.001
	(0.000)	(0.627)	(0.165)	(0.503)	(0.495)	(0.166)	(0.014)	(0.000)	(0.041)	(0.181)	(0.154)	(0.755)
Gender (Ref.: Male)	-0.069	0.224**	0.083	0.219***	-0.051	-0.005	-0.053	0.440***	0.181*	0.144	0.346***	0.199**
	(0.535)	(0.049)	(0.266)	(0.006)	(0.553)	(0.962)	(0.556)	(0.000)	(0.062)	(0.174)	(0.004)	(0.017)
Children in the household (Ref.: No)	-0.260*	0.222*	-0.026	-0.024	-0.017	-0.014	0.169	0.137	-0.027	-0.014	-0.014	0.068
	(0.072)	(0.096)	(0.771)	(0.793)	(0.872)	(0.918)	(0.133)	(0.278)	(0.795)	(0.902)	(0.933)	(0.485)
Educational level (Ref.: Low)												
Medium	0.071	0.044	-0.172*	-0.117	0.228*	-0.241	0.295**	-0.182	0.030	0.189	-0.245	0.231**
	(0.566)	(0.762)	(0.078)	(0.266)	(0.091)	(0.123)	(0.011)	(0.177)	(0.778)	(0.257)	(0.202)	(0.041)
High	0.135	-0.018	-0.134	0.063	0.206	0.104	0.542***	-0.025	-0.151	0.203	-0.234	0.244**
	(0.403)	(0.918)	(0.175)	(0.550)	(0.202)	(0.643)	(0.004)	(0.868)	(0.232)	(0.248)	(0.275)	(0.028)
Income level (Ref.: Low)												
Medium	0.186	-0.130	0.001	-0.166	-0.001	0.401**	0.256**	-0.167	-0.261**	0.052	0.125	-0.082
	(0.135)	(0.417)	(0.989)	(0.123)	(0.996)	(0.012)	(0.039)	(0.227)	(0.022)	(0.729)	(0.469)	(0.476)
High	0.185	-0.245	-0.073	-0.052	-0.433***	0.671***	0.082	-0.087	-0.401***	-0.103	-0.081	-0.106
	(0.168)	(0.139)	(0.471)	(0.648)	(0.000)	(0.000)	(0.519)	(0.607)	(0.000)	(0.513)	(0.659)	(0.417)
Ideology	-0.049**	-0.029	0.018	-0.053**	0.046**	-0.017	0.013	-0.018	-0.001	-0.089***	0.060*	-0.027
	(0.038)	(0.400)	(0.361)	(0.018)	(0.029)	(0.582)	(0.566)	(0.526)	(0.953)	(0.000)	(0.087)	(0.299)
Religious (Ref.: Not religious)	0.209	0.002	-0.115	0.317***	0.339***	0.286*	0.911***	0.063	0.038	0.295***	0.145	0.226***
	(0.164)	(0.988)	(0.136)	(0.000)	(0.005)	(0.059)	(0.000)	(0.599)	(0.707)	(0.010)	(0.243)	(0.008)
Patriotic (Ref.: Not patriotic)	-0.034	0.369**	0.118	0.123	0.238	0.367	0.071	0.379**	-0.079	-0.092	-0.202	0.332**
	(0.837)	(0.038)	(0.232)	(0.364)	(0.220)	(0.181)	(0.653)	(0.029)	(0.680)	(0.577)	(0.284)	(0.028)
Occupational status (Ref.: Employed)												
Unemployed	-0.236	0.070	0.401	1.327**	-0.316*	-0.320*	-0.032	-0.224	0.178	0.330	-0.561**	-0.214
	(0.301)	(0.882)	(0.198)	(0.019)	(0.054)	(0.069)	(0.873)	(0.391)	(0.360)	(0.131)	(0.013)	(0.216)
Self-employed	-0.251*	0.052	-0.235	-0.132	0.007	0.189	-0.146	-0.159	0.180	0.033	0.142	-0.278
	(0.086)	(0.817)	(0.128)	(0.351)	(0.966)	(0.643)	(0.517)	(0.509)	(0.273)	(0.875)	(0.612)	(0.110)
Retired	-0.326*	0.084	0.164	0.239	0.170	0.256	0.100	-0.191	0.214	0.551**	0.114	0.196
	(0.086)	(0.723)	(0.198)	(0.132)	(0.251)	(0.147)	(0.494)	(0.341)	(0.178)	(0.011)	(0.540)	(0.182)
Other	0.181	-0.008	0.036	0.203*	-0.001	0.098	0.294	0.261	0.046	-0.007	0.246	0.026
	(0.239)	(0.965)	(0.767)	(0.097)	(0.992)	(0.699)	(0.116)	(0.121)	(0.729)	(0.970)	(0.257)	(0.866)
Marital status (Ref.: Never married)												
Married	0.143	0.008	0.307***	0.119	0.178	-0.062	-0.308*	0.174	0.270**	0.184	0.368	0.049
	(0.401)	(0.964)	(0.006)	(0.353)	(0.224)	(0.724)	(0.063)	(0.298)	(0.035)	(0.206)	(0.182)	(0.689)
Divorced	0.223	-0.179	0.259	-0.138	0.193	-0.034	-0.457**	-0.150	-0.287*	0.217	0.397	0.033
	(0.314)	(0.440)	(0.100)	(0.416)	(0.394)	(0.884)	(0.049)	(0.594)	(0.082)	(0.263)	(0.178)	(0.821)
Widowed	0.168	-0.166	0.423**	-0.664**	0.133	-0.239	-0.413**	-0.554**	0.203	0.522	0.724**	0.337*
	(0.606)	(0.615)	(0.012)	(0.017)	(0.526)	(0.331)	(0.038)	(0.042)	(0.300)	(0.165)	(0.032)	(0.090)
Constant cut1	-0.815*	-1.520***	-1.761***	-1.395***	-0.226	-1.985***	-0.708*	-0.745*	-1.058***	-1.687***	-1.721***	-1.391***
	(0.072)	(0.000)	(0.000)	(0.000)	(0.657)	(0.005)	(0.078)	(0.062)	(0.001)	(0.000)	(0.001)	(0.000)
Constant cut2	-0.089	-0.741*	-0.935***	-0.604*	0.712	-1.004	0.876**	0.177	-0.145	-0.930**	-1.032**	-0.444
	(0.843)	(0.060)	(0.003)	(0.074)	(0.145)	(0.145)	(0.029)	(0.643)	(0.650)	(0.010)	(0.048)	(0.176)
Constant cut3	0.469	-0.215	-0.206	0.336	1.445***	-0.201	1.596***	1.006***	0.514	-0.034	0.002	0.116
	(0.295)	(0.583)	(0.504)	(0.321)	(0.005)	(0.768)	(0.000)	(0.009)	(0.109)	(0.924)	(0.996)	(0.724)
Observations	658	437	1,117	914	794	519	744	574	728	567	441	958
Pseudo R-squared	0.0435	0.0223	0.0126	0.0463	0.0431	0.0571	0.0621	0.0730	0.0498	0.0653	0.0380	0.0321

Ordered probit. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

3.4.2 Robustness checks

We consider that individual perceptions of the economic impact of immigration can hardly be determined by pre-existing levels of tax morale. Therefore, simultaneity should not be a source of endogeneity in our case. However, the omission of relevant variables might be one. In the following, we check for omitted variables bias and the robustness of our results performing five additional estimations employing our dependent variable *Tax morale* with its original ten-point scale.[13]

First, we employ *Tax morale* on its original ten-point scale to test whether our results are sensitive to the categorization of our dependent variable. The results are displayed in Table A3.6 and do not change qualitatively from those of our main estimations.

Second, we use the generalized linear model (GLM) to test whether our results are sensitive to the estimation method employed. For this, we rescale *Tax morale* from its original ten-point scale to take values between 0 and 1. The results of this alternative estimation method are shown in Table A3.7 in the Appendix. It can be seen that the sign and magnitude of the parameter estimates are in line with our main results, and therefore neither the different scaling nor the estimation model (ordered probit) have an influence on our results.

Third, an important source of omitted variable bias could be due to our sample containing individuals who have a negative attitude towards any immigration-related issue beyond reasoned arguments with respect to the impact of immigration on the welfare system. To address this issue, we perform an alternative estimation using the variable *Immigrants as neighbors*. As part of the EVS, the interviewees were asked which type of persons they would not like as neighbors. From the responses to this question we construct a dichotomous variable, *Immigrants as neighbors*, that takes value 1 if the interviewee selected 'immigrants/foreign workers' and 0 otherwise. The results obtained are shown in Table A3.8. We see that the estimated impact of *Immigrants are a strain on the welfare system* on *Tax morale* does not differ qualitatively from that of our main estimations.

Fourth, motivations to pay taxes and perceptions regarding the impact of immigration on welfare state sustainability might be both influenced by citizens' perceptions of public institutions' performance. Table A3.9 shows the results of an alternative estimation in which, along with our variable of interest, we include two additional variables to control for citizens' assessment of public institutions, these being *Confidence in the government* and *Confidence in the EU*. Again, the results of these estimations regarding the estimated impact of *Immigrants are a strain on*

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[13]Definitions and descriptive statistics for the variables introduced in this subsection can be found in Table A3.4 and Table A3.5.

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the welfare system on *Tax morale* are in line with those in Table 3.1.

Finally, we test whether our results remain valid after including the aforementioned variables jointly. As can be observed in Table A3.10, the parameter estimates for *Immigrants are a strain on the welfare system* again do not differ substantially in size and significance compared with those obtained earlier. We therefore conclude that omitted variable bias is not such that it would modify the results in Section 3.4.1.

3.5   Discussion

The above results have shown that citizens' perceptions of the impact on welfare state sustainability affect their tax morale. Furthermore, the effect is heterogeneous across countries. In this section we investigate which individual characteristics and country-contextual factors explain these perceptions, pointing the way to possible policy recommendations to mitigate their negative impact.

3.5.1   Individual characteristics

Starting with individual characteristics, we explore the determinants of our main explanatory variable by running an OLS regression employing the vector of controls $\boldsymbol{z}$ as regressors for x (*Immigrants are a strain on the welfare system*). Thus the following model is estimated:

$$x_{i,c} = \alpha + \boldsymbol{\delta'z_{i,c}} + \boldsymbol{\nu_c} + \varepsilon_{i,c}, \tag{3.3}$$

where α is a constant and $\boldsymbol{\nu_c}$ a vector of country dummies. The estimation results are shown in Table 3.3.

Considering the estimation results, we obtain that natives, females, the elderly, right-wing voters and patriotic individuals are more inclined to perceive immigration as negative. This also holds for married and divorced individuals compared to those who never married. In contrast, the highly educated, high income earners and the self-employed are less likely to perceive immigration as being a threat. These results are in line with the literature as summarized in Section 3.2.1. For instance, Davis and Deole (2015) also find that high income earners, the highly educated and the self-employed have a more positive evaluation of immigration compared to their counterparts. Moreover, their result that females and married individuals are more concerned about immigration is also confirmed. As for those living with children, although we obtain the same negative sign for the estimated impact of *Children in*

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Table 3.3: Immigration perceptions and individual characteristics.

	(I) Immigrants are a strain on the welfare system OLS
Native	0.710***
	(0.000)
Age	0.007**
	(0.012)
Gender (Ref.: Male)	-0.113**
	(0.015)
Children in the household (Ref.: No)	-0.055
	(0.311)
Educational level (Ref.: Low)	
Medium	-0.217***
	(0.001)
High	-0.829***
	(0.000)
Income level (Ref.: Low)	
Medium	-0.058
	(0.233)
High	-0.211***
	(0.001)
Ideology	0.175***
	(0.000)
Religious (Ref.: Not religious)	-0.007
	(0.930)
Patriotic (Ref.: Not patriotic)	0.233**
	(0.048)
Occupational status (Ref.: Employed)	
Unemployed	0.219*
	(0.080)
Self-employed	-0.220***
	(0.009)
Retired	0.052
	(0.412)
Other	0.039
	(0.582)
Marital status (Ref.: Never married)	
Married	0.218***
	(0.001)
Divorced	0.304***
	(0.000)
Widowed	0.231**
	(0.013)
Constant	4.981***
	(0.000)
Observations	19,778
R-squared	0.129

Ordinary Least Squares with clustered standard errors by country (24 clusters). All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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the household on the dependent variable the estimate is non-significant. Overall our results confirm that personal circumstances play a crucial role in the assessment of the impact of immigration on welfare state sustainability. This can be explained on the one hand by concerns regarding the congestion and compositional change of public goods and services and by the fear of increased labor market competition, and on the other by the role of education in processing information from the media and political parties regarding the impact of immigration on the welfare state and cultural identity.

3.5.2   Country-contextual factors

We now explore the possible causes for the above observed cross-country heterogeneity in the impact of perceptions of immigration on tax morale, i.e. in estimates $\hat{\beta}_i$. To this end we re-estimate the model in Equation (3.1) as

$$y_{i,c} = \beta' x_{i,c} + \boldsymbol{\theta}' \boldsymbol{w_i} + \boldsymbol{\psi}' (\boldsymbol{w_i} \times x_{i,c}) + \boldsymbol{\gamma}' \boldsymbol{z_{i,c}} + \boldsymbol{\eta_k} + \boldsymbol{\nu_c} + \varepsilon_{i,c}, \tag{3.4}$$

where $\boldsymbol{w_i}$ is a vector of contextual variables at country level, namely *Welfare system generosity*, *Extreme-right party support*, *Immigration flow* and *GDP growth*, which are all measured as deviations from the average value across the 24 countries of our sample.

   Welfare system generosity is the sum of public spending on education, health and social protection measured as a share of GDP. Following the arguments in Section 3.2.1, we expect that in more generous countries the belief that immigrants are a strain on the welfare system is more likely to reduce citizens' tax morale. *Extreme-right party support* is measured as the total vote share of far-right parties in the most recent elections, where parties are considered as being extreme right if party ideology scores above 8 on a 0-10 point scale. We thus follow the arguments of Ellinas (2010) and Van Spanje (2010) who highlight the role of far-right parties in spreading the view that immigration has a negative economic impact. Consequently, in countries with a larger share of far-right voters we would expect to see lower levels of tax morale among citizens who believe that immigrants are a strain on the welfare state. *Immigration flow* is measured as the average growth rate of immigration over the period 2003 to 2008.[14] As commented on in Section 3.2, although perceptions of the number of immigrants and current levels of immigration are not necessarily related, we would expect a stronger impact on tax morale in countries with a high (recent) inflow of immigrants. Finally, *GDP growth* is the growth rate of GDP in the year the respondents were surveyed, i.e. 2008 or 2009. In line with the literature

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[14]Note that our database does not report data for Slovenia. Therefore, the estimations including this variable consist of observations for only 23 countries, i.e. 574 fewer observations.

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Figure 3.2: Marginal impacts of *Immigrants are a strain on the welfare system* on tax morale versus country-contextual factors.
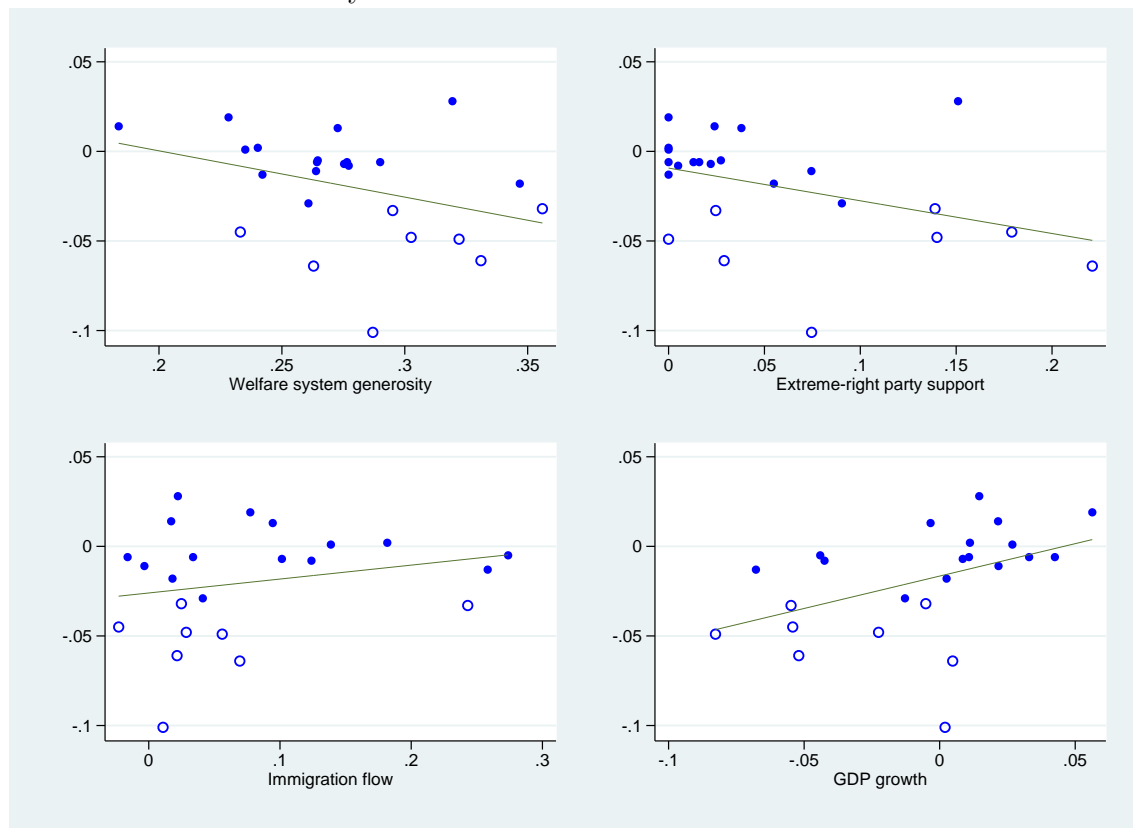
Marginal impacts are parameter estimates $\hat{\beta}_i$ as shown in row one in Table 3.2. For the definition and measurement of the country-contextual variables see Table A3.1.

(e.g. Golder, 2003), we expect that under unfavorable economic conditions negative perceptions of immigration are more likely to reduce tax morale.

The scatter plots in Figure 3.2 give a first impression of the impact of these variables on parameter estimates $\hat{\beta}_i$ (*Immigrants are a strain on the welfare system*) shown in row 1 of Table 3.2. We see that the negative impact of *Immigrants are a strain on the welfare system* on tax morale can be explained by *Welfare system generosity*, *Extreme-right party support* and *GDP growth*, while the impact of *Immigration flow* is not conclusive. The parameter estimates in Table 3.4 confirm these findings. Thus, the simple regression results in Specifications I to IV indicate significant negative correlations of tax morale with *Welfare system generosity* and *Extreme-right party support* along with a significant positive correlation with *GDP growth*. In Specification V we estimate the joint impact of our explanatory variables. We see that *GDP growth* maintains its significant impact in this specification while the other two variables become non-significant.

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Table 3.4: Tax morale, *Immigrants are a strain on the welfare system* and country-contextual factors.

	(I)	(II)	(III)	(IV)	(V)
Welfare system generosity	4.090***				-21.437***
	(0.000)				(0.000)
Extreme-right party support		-30.432***			-164.530***
		(0.000)			(0.000)
Immigration flow			-8.251***		-20.353***
			(0.000)		(0.000)
GDP growth				-25.924***	-60.545***
				(0.000)	(0.000)
Immigrants are a strain on the welfare system	-0.014**	-0.016***	-0.016**	-0.017***	-0.015***
	(0.012)	(0.006)	(0.010)	(0.001)	(0.002)
x Welfare system generosity	-0.281**				-0.123
	(0.021)				(0.313)
x Extreme-right party support		-0.174*			-0.116
		(0.089)			(0.351)
x Immigration growth			0.068		0.060
			(0.334)		(0.402)
x GDP growth				0.428***	0.432***
				(0.000)	(0.003)
Native	-0.136**	-0.135**	-0.130**	-0.137**	-0.129**
	(0.013)	(0.014)	(0.023)	(0.013)	(0.023)
Age	0.008***	0.008***	0.008***	0.008***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender (Ref.: Male)	0.185***	0.185***	0.179***	0.184***	0.178***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Children in the household (Ref.: No)	0.041*	0.042*	0.037	0.042*	0.038
	(0.075)	(0.071)	(0.115)	(0.066)	(0.108)
Educational level (Ref.: Low)					
Medium	0.010	0.012	0.019	0.012	0.018
	(0.715)	(0.664)	(0.526)	(0.676)	(0.541)
High	0.067	0.069*	0.072*	0.069*	0.071*
	(0.100)	(0.095)	(0.090)	(0.091)	(0.090)
Income level (Ref.: Low)					
Medium	-0.014	-0.015	-0.010	-0.014	-0.009
	(0.671)	(0.662)	(0.765)	(0.672)	(0.791)
High	-0.063	-0.063	-0.059	-0.062	-0.058
	(0.241)	(0.244)	(0.280)	(0.247)	(0.292)
Ideology	-0.023***	-0.023***	-0.024***	-0.023***	-0.023***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
Religious (Ref.: Not religious)	0.144***	0.143***	0.146***	0.143***	0.146***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Patriotic (Ref.: Not patriotic)	0.226***	0.229***	0.225***	0.227***	0.227***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Occupational status (Ref.: Employed)					
Unemployed	0.038	0.035	0.039	0.037	0.039
	(0.511)	(0.538)	(0.505)	(0.516)	(0.508)
Self-Employed	-0.138***	-0.137***	-0.137***	-0.136***	-0.134***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Retired	0.142***	0.140***	0.147***	0.141***	0.148***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Other	0.071**	0.071**	0.073**	0.072**	0.072**
	(0.039)	(0.039)	(0.040)	(0.031)	(0.039)
Marital status (Ref.: Never married)					
Married	0.096***	0.095***	0.092***	0.095***	0.091***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Divorced	-0.037	-0.038	-0.038	-0.037	-0.036
	(0.261)	(0.248)	(0.258)	(0.265)	(0.284)
Widowed	-0.009	-0.011	0.003	-0.008	0.002
	(0.863)	(0.845)	(0.959)	(0.883)	(0.966)
Constant cut1	-1.283***	-0.078	-0.594***	-1.760***	5.659***
	(0.000)	(0.622)	(0.000)	(0.000)	(0.000)
Constant cut2	-0.490***	0.715***	0.197	-0.966***	6.451***
	(0.000)	(0.000)	(0.143)	(0.000)	(0.000)
Constant cut3	0.246**	1.450***	0.931***	-0.231**	7.185***
	(0.027)	(0.000)	(0.000)	(0.026)	(0.000)
Observations	19,778	19,778	19,204	19,778	19,204
Pseudo R-squared	0.0393	0.0393	0.0387	0.0395	0.0394

Ordered probit with clustered standard errors by country (24 clusters). All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Acknowledging the limitations of our sample with 24 independent country observations and a likely endogeneity bias when country-contextual factors are considered, our results hint at three factors that may explain cross-country heterogeneity in the impact of perceptions of immigration on tax morale.[15] First, while tax morale is higher in countries with more generous welfare systems, it is also the case that in these countries the tax morale of those who see immigration as a strain on welfare state sustainability is greatly reduced. Second, we see that the tax morale of those who see immigration as a strain on the welfare system is particularly eroded in countries with high extreme-right party support. Finally, in countries experiencing (a more severe) economic downturn it is more likely that immigration perceptions negatively affect voluntary tax compliance.

3.5.3   Policy implications

From the results in Section 3.4 we concluded that negative perceptions of immigration erode citizens' motivation to pay taxes, thus becoming a threat to welfare state sustainability. The results in this section uncover some important individual and country-contextual factors that favor the formation of these beliefs and that might be the subject of policy measures. First, extreme right-wing positions at both individual and country levels are crucial in shaping negative perceptions of immigration. As indicated by Ellinas (2010), a major channel contributing to shaping these perceptions is the media, which emphasize the sensationalistic extreme aspects of politics in order to increase their audiences. This ultimately leads to a contagion of anti-immigration positions to major center parties (Van Spanje, 2010). Second, highly-educated citizens are less likely to perceive immigration as a threat, an effect that cannot be explained by income differences. One reason for this finding could be that low-educated citizens compete with immigrants for jobs, thus giving support to the labor market competition hypothesis. Alternatively, the psychological and political science literature associates higher levels of formal education with a better understanding of information from the media (Eveland and Scheufele, 2000; Tichenor et al., 1970), higher pro-activity in seeking political information (Johnson and Kaye, 2003) and greater engagement with public affairs (Dalton, 2005). Thus highly-educated citizens are more knowledgeable about political matters and are therefore less susceptible to populist arguments. Third, we concluded that the business cycle has a sizeable influence on the impact that perceptions of immigration have on citizens' willingness to pay taxes. The literature predicts an increase in far-

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[15]Endogeneity should be a concern as the general level of tax morale should affect pre-existing levels of welfare system generosity or extreme-right party support. However, due to the limitations of our data and the fact that the scope of this section is only to hint at possible sources of cross-country heterogeneity, we refrain from elaborating on this point here.

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right party support in times of economic scarcity (when competition for jobs and public resources becomes more intense), and this is confirmed by our result that negative perceptions of immigration have a greater impact on tax morale during economic downturns.[16]

The following policy implications arise from these results. First, as the positive evaluation of immigration on economic grounds contrasts sharply with citizens perceptions it would be advisable to comprehensively study the economic impact of immigration at country level. Second, as the media are an important channel through which perceptions are formed, the results of these studies should be widely reported through the media. This is particularly necessary during economic downturns and in the context of increasing political polarization. Finally, these information campaigns should be directed especially toward the low-educated, in whom the belief that immigration is a threat is more embedded.

3.6   Conclusions

In this paper we have analyzed the impact of citizens' stances towards immigration on tax morale. While these perceptions are fairly unrelated to existing levels and flows of immigration and its real economic impact, our results indicate that perceptions of immigration are relevant as regards voluntary tax compliance and therefore, most likely, to real tax compliance. Specifically, we find lower levels of tax morale among citizens who believe that immigrants are a strain on their country's welfare system. Consequently the false belief that immigration erodes the welfare system could turn into a self-fulfilling prophecy. A major policy implication of the results of this article is that the study of the real economic impact of immigration should continue and, most importantly, the results should be made more widely known through the mass media. Information campaigns are particularly advisable in times of economic downturn and political polarization and should be aimed especially at the low-educated, in whom the belief that immigration has negative economic consequences is more embedded. In future research we aim to use data from the next wave of the EVS to analyze how immigration perceptions in Europe have evolved over time.

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[16]Note that during the 2008 wave of the EVS, several countries in our sample had already started to suffer the economic consequences of the financial crisis.

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3.7   Appendix

This appendix contains details on variable definitions, data sources and descriptive statistics (Tables A3.1, A3.2, A3.3, A3.4 and A3.5, and Figures A3.1, A3.2, A3.3 and A3.4), robustness checks (Tables A3.6, A3.7, A3.8, A3.9 and A3.10) and the correlation matrix (Table A3.11).

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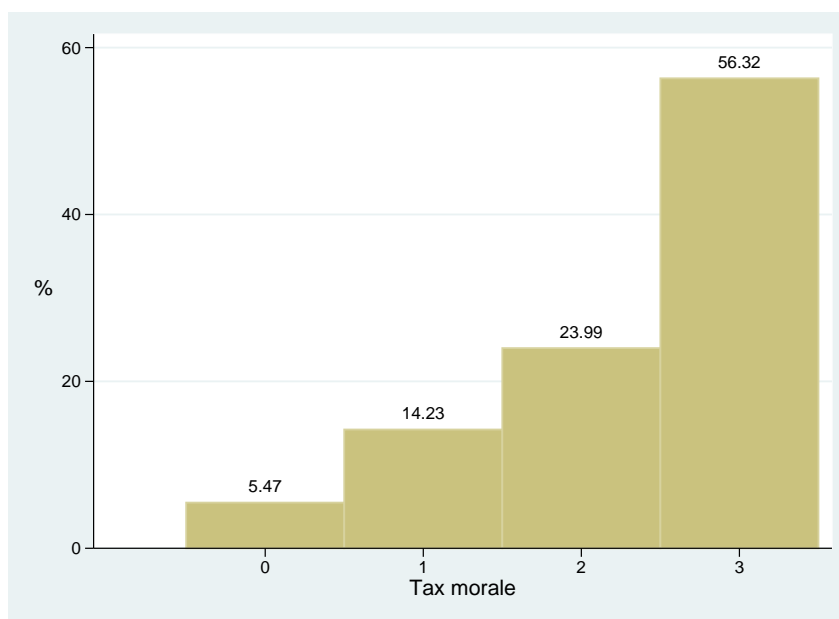

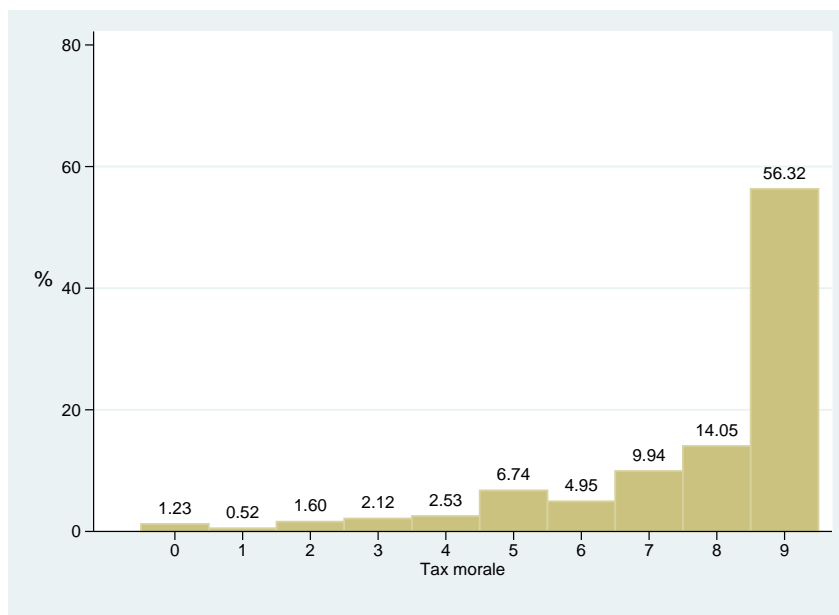Figure A3.1: Distribution of *Tax morale* on a four-point scale.

Figure A3.2: Distribution of *Tax morale* on the original ten-point scale.

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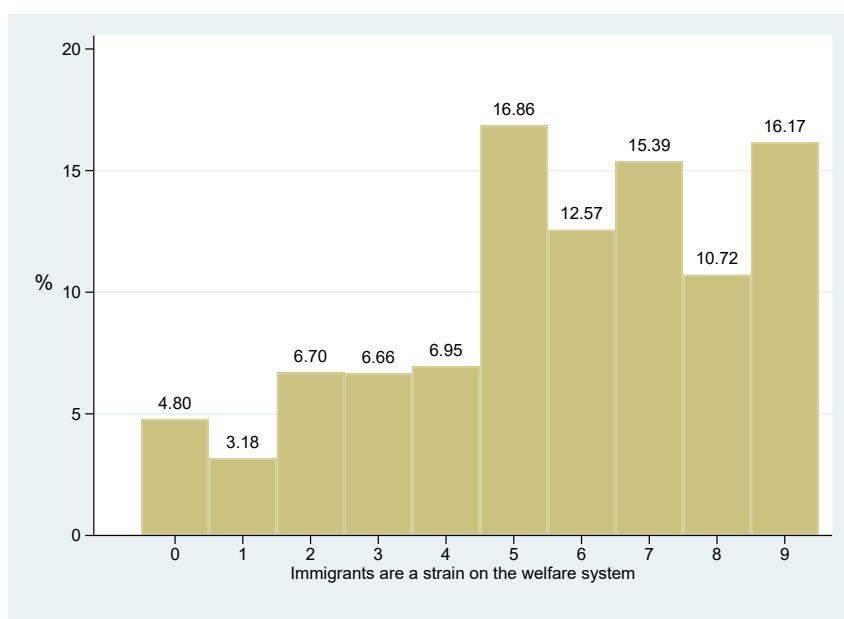

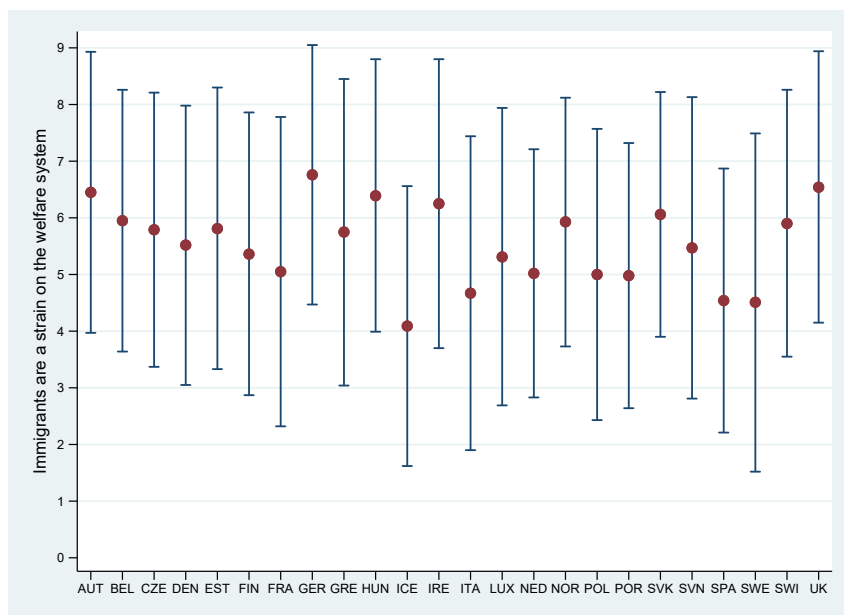Figure A3.3: Distribution of *Immigrants are a strain on the welfare system.*

Figure A3.4: Cross-country dispersion of *Immigrants are a strain on the welfare system* (country means and standard deviations).

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Table A3.1: Data definitions and sources.

Variable	Measurement	Source
Tax morale	Ordinal variable rescaled into a four-point scale: responses 7 through 10 were combined into a value 0 (Low), responses 4, 5 and 6 were recoded as 1 (Medium low); responses 2 and 3 recoded as 2 (Medium high); and 1 is recoded as 3 (High).	EVS (2016)
Immigrants are a strain on the welfare system	Ordinal variable that ranges from 0 (immigrants are not a strain on the welfare system) to 9 (immigrants are a strain on the welfare system).	EVS (2016)
Native	Dichotomic variable taking value 1 if the individual was born in the country and 0 if otherwise.	EVS (2016)
Age	Respondent's age calculated using the year of birth.	EVS (2016)
Gender	Dichotomous variable taking value 1 for female and 0 for male.	EVS (2016)
Children in the household	Dichotomous variable taking value 1 if the respondent has children at home and 0 if otherwise.	EVS (2016)
Educational level	Three dummy variables (low, medium and high) accounting for whether the respondent has adequately or inadequately completed primary (compulsory), secondary or tertiary education respectively.	EVS (2016)
Income level	Three dummy variables (Low, Medium and High) accounting for the household income level before taxes and deductions.	EVS (2016)
Ideology	Respondents' ideological stance on a ten-point scale taking values from 0 (left) to 9 (right).	EVS (2016)
Religious	Dichotomous variable taking value 1 if the respondent declares to be a religious person and 0 if otherwise (not religious or convinced atheist).	EVS (2016)
Patriotic	Dichotomous variable taking value 1 if the respondent declares to be very or quite proud of being a citizen of the country and 0 if otherwise (not very or not at all proud).	EVS (2016)
Occupational status	Five dummy variables (Employed, Unemployed, Self-employed, Retired and Other) accounting for the respondent's occupational status.	EVS (2016)
Marital status	Four dummy variables (Never married, Married/partnership, Divorced/separated and Widowed) accounting for the respondent's marital status.	EVS (2016)
Welfare system generosity	Continuous variable calculated as the sum of public spending on education, health and social protection measured as a share of GDP.	OECD (2019)
Extreme-right party support	Continuous variable measured as the total vote share of far-right parties in the most recent elections, where parties are considered as being extreme right if party ideology scores above 8 on a 0-10 point scale.	Döring and Manow (2018)
Immigration flow	Measured as the average growth rate of immigration over the period 2003 to 2008.	OECD (2019)
GDP growth	Continuous variable calculated as the growth rate of GDP in the year the respondent was surveyed, i.e. either 2008 or 2009.	OECD (2019)

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Table A3.2: Descriptive statistics of categorical variables.

Variable	Value	Frequency	Percent
Tax morale	0 (Low)	1,082	5.47
	1 (Medium low)	2,814	14.23
	2 (Medium high)	4,744	23.99
	3 (High)	11,138	56.32
Immigrants are a strain on the welfare system	0 (Are not a strain)	949	4.80
	1	628	3.18
	2	1,325	6.70
	3	1,318	6.66
	4	1,374	6.95
	5	3,334	16.86
	6	2,487	12.57
	7	3,044	15.39
	8	2,121	10.72
	9 (Are a strain)	3,198	16.17
Native	0 (No)	851	4.30
	1 (Yes)	18,927	95.70
Gender	0 (Male)	9,506	48.06
	1 (Female)	10,272	51.94
Children in the household	0 (No)	11,908	60.21
	1 (Yes)	7,870	39.79
Educational level	0 (Low)	5,592	28.27
	1 (Medium)	8,961	45.31
	2 (High)	5,225	26.42
Income level	0 (Low)	6,362	32.17
	1 (Medium)	7,300	36.91
	2 (High)	6,116	30.92
Religious	0 (No)	8,160	41.26
	1 (Yes)	11,618	58.74
Patriotic	0 (No)	2,123	10.73
	1 (Yes)	17,655	89.27
Occupational status	0 (Employed)	10,069	50.91
	1 (Unemployed)	919	4.65
	2 (Self-employed)	1,154	5.83
	3 (Retired)	5,092	25.75
	4 (Other)	2,544	12.86
Marital status	0 (Never married)	4,687	23.70
	1 (Married / partnership)	11,081	56.03
	2 (Divorced / separated)	2,119	10.71
	3 (Widowed)	1,891	9.56

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Table A3.3: Descriptive statistics of continuous variables.

Variable	Obs	Mean	SD	Min	Max
Individual-level variables					
Immigrants are a strain on the welfare system	19,778	5.631	2.558	0	9
Age	19,778	49.394	17.268	16	108
Ideology	19,778	4.307	2.064	0	9
Country-contextual variables					
Welfare system generosity	24	0.276	0.040	0.184	0.356
Extreme-right party support	24	0.055	0.065	0	0.221
Immigration flow	23	0.078	0.088	-0.023	0.274
GDP growth	24	-0.008	0.037	-0.083	0.056

Table A3.4: Data definitions and sources of the variables introduced in Section 3.4.2.

Variable	Measurement	Source
Immigrants as neighbors	Dichotomous variable taking value 1 for individuals that have mentioned ìmmigrants/foreign workers' as persons they would not like as neighbors and 0 if otherwise.	EVS (2016)
Confidence in the government	Ordinal variable that ranges from 0 (None at all) to 3 (A great deal).	EVS (2016)
Confidence in the EU	Ordinal variable that ranges from 0 (None at all) to 3 (A great deal).	EVS (2016)

Table A3.5: Descriptive statistics of the categorical variables introduced in Section 3.4.2.

Variable	Value		Frequency	Percent
Immigrants as neighbors	0 (Mentioned)		16,650	86.82
	1 (Not mentioned)		2,528	13.18
		Total	19,178	100
Confidence in the government	0 (None at all)		4,000	21.22
	1 (Not very much)		7,976	42.31
	2 (Quite a lot)		6,154	32.65
	3 (A great deal)		721	3.82
		Total	18,851	100
Confidence in the EU	0 (None at all)		2,476	13.13
	1 (Not very much)		7,114	37.74
	2 (Quite a lot)		8,058	42.75
	3 (A great deal)		1,203	6.38
		Total	18,851	100

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Table A3.6: Tax morale on a ten-point scale.

	(I)	(II)	(III)
Immigrants are a strain on welfare system (Ref.: Are not a strain)			
1	-0.143**	-0.183***	
	(0.034)	(0.004)	
2	-0.165**	-0.188***	
	(0.011)	(0.001)	
3	-0.287***	-0.308***	
	(0.000)	(0.000)	
4	-0.257***	-0.291***	
	(0.002)	(0.000)	
5	-0.186**	-0.233***	
	(0.014)	(0.000)	
6	-0.317***	-0.348***	
	(0.000)	(0.000)	
7	-0.249***	-0.303***	
	(0.002)	(0.000)	
8	-0.268***	-0.332***	
	(0.000)	(0.000)	
Are a strain	-0.189*	-0.246***	
	(0.051)	(0.001)	
Immigrants are a strain on welfare system			-0.017***
			(0.003)
Native		-0.131**	-0.136**
		(0.016)	(0.012)
Age		0.008***	0.008***
		(0.000)	(0.000)
Gender (Ref.: Male)		0.184***	0.183***
		(0.000)	(0.000)
Children in the household (Ref.: No)		0.041*	0.042*
		(0.082)	(0.075)
Educational level (Ref.: Low)			
Medium		0.013	0.008
		(0.646)	(0.773)
High		0.079**	0.072*
		(0.046)	(0.075)
Income level (Ref.: Low)			
Medium		-0.014	-0.016
		(0.675)	(0.628)
High		-0.055	-0.058
		(0.291)	(0.266)
Ideology		-0.024***	-0.024***
		(0.002)	(0.002)
Religious (Ref.: Not religious)		0.150***	0.145***
		(0.000)	(0.000)
Patriotic (Ref.: Not patriotic)		0.234***	0.224***
		(0.000)	(0.000)
Occupational status (Ref.: Employed)			
Unemployed		0.031	0.036
		(0.570)	(0.522)
Self-employed		-0.152***	-0.148***
		(0.000)	(0.000)
Retired		0.136***	0.138***
		(0.000)	(0.000)
Other		0.079***	0.078**
		(0.009)	(0.011)
Marital status (Ref.: Never married)			
Married		0.085***	0.085***
		(0.001)	(0.001)
Divorced		-0.048	-0.047
		(0.145)	(0.157)
Widowed		-0.017	-0.019
		(0.744)	(0.713)
(*Constant cuts omitted*)			
Observations	19,778	19,778	19,778
Pseudo R-squared	0.0139	0.0305	0.0295

Ordered probit with clustered standard errors by country (24 clusters) and *Tax morale* on the original ten-point scale. All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Table A3.7: Tax morale using GLM.

	(I)	(II)	(III)
Immigrants are a strain on welfare system (Ref.: Are not a strain)			
1	-0.054	-0.091	
	(0.378)	(0.117)	
2	-0.042	-0.063	
	(0.407)	(0.128)	
3	-0.118**	-0.138***	
	(0.045)	(0.004)	
4	-0.105	-0.135**	
	(0.130)	(0.021)	
5	-0.079	-0.118**	
	(0.193)	(0.014)	
6	-0.150**	-0.176***	
	(0.013)	(0.000)	
7	-0.115*	-0.157***	
	(0.080)	(0.003)	
8	-0.124**	-0.171***	
	(0.027)	(0.000)	
Are a strain	-0.143*	-0.183***	
	(0.051)	(0.000)	
Immigrants are a strain on welfare system			-0.016***
			(0.001)
Native		-0.102**	-0.102**
		(0.019)	(0.018)
Age		0.006***	0.006***
		(0.000)	(0.000)
Gender (Ref.: Male)		0.154***	0.154***
		(0.000)	(0.000)
Children in the household (Ref.: No)		0.037*	0.037*
		(0.062)	(0.060)
Educational level (Ref.: Low)			
Medium		0.031	0.030
		(0.199)	(0.223)
High		0.094***	0.092***
		(0.002)	(0.004)
Income level (Ref.: Low)			
Medium		0.001	0.000
		(0.981)	(0.994)
High		-0.033	-0.034
		(0.462)	(0.456)
Ideology		-0.021***	-0.021***
		(0.000)	(0.001)
Religious (Ref.: Not religious)		0.117***	0.116***
		(0.000)	(0.000)
Patriotic (Ref.: Not patriotic)		0.208***	0.206***
		(0.000)	(0.000)
Occupational status (Ref.: Employed)			
Unemployed		0.018	0.019
		(0.673)	(0.652)
Self-employed		-0.129***	-0.129***
		(0.000)	(0.000)
Retired		0.106***	0.107***
		(0.000)	(0.000)
Other		0.061**	0.061**
		(0.026)	(0.026)
Marital status (Ref.: Never married)			
Married		0.061***	0.061***
		(0.004)	(0.004)
Divorced		-0.060**	-0.059**
		(0.029)	(0.027)
Widowed		-0.018	-0.019
		(0.674)	(0.661)
Constant	1.316***	0.877***	0.829***
	(0.000)	(0.000)	(0.000)
Observations	19,778	19,778	19,778
AIC	0.66097	0.64507	0.64484
BIC	-188425.8	-188630	-188666

Generalized linear model with clustered standard errors by country (24 clusters) and $Tax\ morale \in [0, 1]$. All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Table A3.8: Tax morale and *Immigrants as neighbors*.

	(I)	(II)	(III)
Immigrants are a strain on the welfare system			
(Ref.: Are not a strain)			
1	-0.141**	-0.178***	
	(0.042)	(0.006)	
2	-0.171***	-0.192***	
	(0.009)	(0.001)	
3	-0.294***	-0.313***	
	(0.000)	(0.000)	
4	-0.259***	-0.291***	
	(0.002)	(0.000)	
5	-0.195**	-0.240***	
	(0.013)	(0.000)	
6	-0.326***	-0.355***	
	(0.000)	(0.000)	
7	-0.255***	-0.308***	
	(0.002)	(0.000)	
8	-0.268***	-0.328***	
	(0.000)	(0.000)	
Are a strain	-0.171*	-0.227***	
	(0.070)	(0.001)	
Immigrants are a strain on the welfare system			-0.016***
			(0.005)
Immigrants as neighbors	-0.105**	-0.103**	-0.084*
	(0.022)	(0.019)	(0.068)
Native		-0.132**	-0.138**
		(0.022)	(0.015)
Age		0.008***	0.008***
		(0.000)	(0.000)
Gender (Ref.: Male)		0.180***	0.179***
		(0.000)	(0.000)
Children in the household (Ref.: No)		0.038	0.039*
		(0.110)	(0.099)
Educational level (Ref.: Low)			
Medium		0.014	0.009
		(0.628)	(0.759)
High		0.073*	0.066*
		(0.063)	(0.098)
Income level (Ref.: Low)			
Medium		-0.019	-0.020
		(0.554)	(0.522)
High		-0.056	-0.059
		(0.297)	(0.276)
Ideology		-0.025***	-0.025***
		(0.001)	(0.001)
Religious (Ref.: Not religious)		0.152***	0.146***
		(0.000)	(0.000)
Patriotic (Ref.: Not patriotic)		0.238***	0.226***
		(0.000)	(0.000)
Occupational status (Ref.: Employed)			
Unemployed		0.023	0.028
		(0.681)	(0.626)
Self-employed		-0.141***	-0.138***
		(0.000)	(0.000)
Retired		0.142***	0.143***
		(0.000)	(0.000)
Other		0.080***	0.079***
		(0.005)	(0.006)
Marital status (Ref.: Never married)			
Married		0.090***	0.089***
		(0.001)	(0.001)
Divorced		-0.056	-0.054
		(0.104)	(0.116)
Widowed		-0.022	-0.024
		(0.697)	(0.671)
(Constant cuts omitted)			
Observations	19,178	19,178	19,178
Pseudo R-squared	0.0143	0.0307	0.0297

Ordered probit with clustered standard errors by country (24 clusters) and *Tax morale* on the original ten-point scale. All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Table A3.9: Tax morale and trust in public institutions.

	(I)	(II)	(III)
Immigrants are a strain on the welfare system (Ref.: Are not a strain)			
1	-0.154**	-0.189***	
	(0.030)	(0.006)	
2	-0.156**	-0.173***	
	(0.020)	(0.003)	
3	-0.277***	-0.291***	
	(0.000)	(0.000)	
4	-0.252***	-0.277***	
	(0.003)	(0.000)	
5	-0.173**	-0.211***	
	(0.025)	(0.001)	
6	-0.306***	-0.327***	
	(0.000)	(0.000)	
7	-0.237***	-0.281***	
	(0.004)	(0.000)	
8	-0.245***	-0.298***	
	(0.001)	(0.000)	
Are a strain	-0.163*	-0.216***	
	(0.099)	(0.004)	
Confidence in the government (Ref.: None at all)			
Not very much	0.058*	0.032	
	(0.082)	(0.263)	
Quite a lot	0.070	0.017	
	(0.176)	(0.733)	
A great deal	0.231***	0.171***	
	(0.001)	(0.009)	
Confidence in the EU (Ref.: None at all)			
Not very much	0.036	0.024	
	(0.308)	(0.443)	
Quite a lot	0.035	0.041	
	(0.432)	(0.318)	
A great deal	0.156***	0.166***	
	(0.009)	(0.002)	
Immigrants are a strain on the welfare system			-0.014**
			(0.016)
Confidence in the government			0.015
			(0.496)
Confidence in the EU			0.034**
			(0.033)
Ideology		-0.027***	-0.026***
		(0.000)	(0.000)
Religious (Ref.: Not religious)		0.155***	0.150***
		(0.000)	(0.000)
Patriotic (Ref.: Not patriotic)		0.232***	0.218***
		(0.000)	(0.000)
(*Socio-demographic controls omitted*)			
(*Constant cuts omitted*)			
Observations	18,851	18,851	18,851
Pseudo R-squared	0.0150	0.0311	0.0298

Ordered probit with clustered standard errors by country (24 clusters) and *Tax morale* on the original ten-point scale. All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

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Table A3.10: Tax morale, *Immigrants as neighbors* and trust in public institutions.

	(I)	(II)	(III)
Immigrants are a strain on the welfare system			
(Ref.: Are not a strain)			
1	-0.159**	-0.190***	
	(0.030)	(0.007)	
2	-0.164**	-0.178***	
	(0.015)	(0.002)	
3	-0.286***	-0.299***	
	(0.000)	(0.000)	
4	-0.256***	-0.280***	
	(0.003)	(0.000)	
5	-0.185**	-0.222***	
	(0.020)	(0.001)	
6	-0.316***	-0.337***	
	(0.000)	(0.000)	
7	-0.245***	-0.288***	
	(0.004)	(0.000)	
8	-0.248***	-0.299***	
	(0.001)	(0.000)	
Are a strain	-0.148	-0.201***	
	(0.128)	(0.007)	
Confidence in the government (Ref.: None at all)			
Not very much	0.048	0.021	
	(0.151)	(0.457)	
Quite a lot	0.068	0.015	
	(0.191)	(0.775)	
A great deal	0.218***	0.157**	
	(0.003)	(0.017)	
Confidence in the EU (Ref.: None at all)			
Not very much	0.036	0.024	
	(0.313)	(0.452)	
Quite a lot	0.032	0.039	
	(0.470)	(0.346)	
A great deal	0.153**	0.165***	
	(0.012)	(0.003)	
Immigrants are a strain on the welfare system			-0.013**
			(0.024)
Confidence in the government			0.013
			(0.556)
Confidence in the EU			0.033**
			(0.044)
Immigrants as neighbours	-0.107**	-0.104**	-0.083*
	(0.021)	(0.018)	(0.068)
Ideology		-0.027***	-0.027***
		(0.000)	(0.000)
Religious (Ref.: Not religious)		0.157***	0.152***
		(0.000)	(0.000)
Patriotic (Ref.: Not patriotic)		0.236***	0.221***
		(0.000)	(0.000)
(*Socio-demographic controls omitted*)			
(*Constant cuts omitted*)			
Observations	18,305	18,305	18,305
Pseudo R-squared	0.0153	0.0313	0.0298

Ordered probit with clustered standard errors by country (24 clusters) and *Tax morale* on the original ten-point scale. All estimations include country fixed effects. Robust p-values in parentheses where ***, ** and * indicate $p < 0.01$, $p < 0.05$ and $p < 0.1$, respectively.

Table A3.11: Correlation matrix.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	Tax morale	1									
(2)	Immigrants are a strain on the welfare system	-0.02	1								
(3)	Native	-0.02	0.06	1							
(4)	Age	0.14	0.11	-0.01	1						
(5)	Gender	0.09	-0.02	-0.02	0.00	1					
(6)	Children in the household	0.00	-0.04	-0.03	-0.23	0.08	1				
(7)	Educational level	-0.02	-0.15	0.00	-0.23	-0.02	0.09	1			
(8)	Income level	-0.05	-0.09	0.02	-0.20	-0.09	0.24	0.31	1		
(9)	Ideology	-0.03	0.14	0.04	0.04	-0.05	0.00	0.00	0.06	1	
(10)	Religious	0.10	0.01	-0.03	0.18	0.13	0.03	-0.11	-0.09	0.12	1
(11)	Patriotic	0.07	0.03	0.03	0.05	0.02	0.02	-0.04	0.01	0.10	0.10
(12)	Occupational status	0.07	0.08	0.00	0.38	0.09	-0.26	-0.26	-0.28	0.03	0.13
(13)	Marital status	0.08	0.09	-0.03	0.55	0.15	0.02	-0.16	-0.19	0.02	0.13
(14)	Welfare system generosity	0.02	-0.01	0.01	-0.03	-0.04	-0.04	0.09	0.00	-0.02	-0.03
(15)	Extreme-right party support	-0.06	0.04	-0.02	-0.03	0.00	-0.02	0.01	0.00	0.01	-0.03
(16)	Immigration flow	0.04	-0.07	0.03	-0.06	-0.01	0.08	-0.06	-0.01	0.00	0.08
(17)	GDP growth	-0.05	0.05	0.02	0.04	0.01	-0.02	-0.06	0.00	-0.05	0.05
(18)	Immigrants as neighbors	-0.03	0.18	0.04	0.05	-0.01	-0.03	-0.07	-0.05	0.09	0.00
(19)	Confidence in the government	0.02	-0.08	-0.02	0.06	-0.02	-0.01	0.09	0.06	0.11	0.04
(20)	Confidence in the EU	0.01	-0.14	-0.01	-0.04	0.00	0.00	0.08	0.08	0.04	0.04

		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1)	Tax morale										
(2)	Immigrants are a strain on the welfare system										
(3)	Native										
(4)	Age										
(5)	Gender										
(6)	Children in the household										
(7)	Educational level										
(8)	Income level										
(9)	Ideology										
(10)	Religious										
(11)	Patriotic	1									
(12)	Occupational status	0.02	1								
(13)	Marital status	0.03	0.18	1							
(14)	Welfare system generosity	0.00	-0.03	-0.08	1						
(15)	Extreme-right party support	-0.01	-0.04	-0.05	0.20	1					
(16)	Immigration flow	0.07	0.02	-0.04	-0.29	-0.42	1				
(17)	GDP growth	-0.01	0.06	0.06	-0.25	-0.05	-0.27	1			
(18)	Immigrants as neighbors	0.00	0.03	0.05	-0.07	0.01	-0.01	0.01	1		
(19)	Confidence in the government	0.13	-0.01	0.02	-0.02	0.08	-0.07	-0.01	-0.04	1	
(20)	Confidence in the EU	0.09	0.00	-0.04	-0.03	0.02	0.03	0.04	-0.05	0.34	1

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