



Innovation attitudes and religiosity

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ABSTRACT

The impact of religiosity on innovation has been a topic of great interest among scholars, yet its inherent complexity and endogeneity render empirical analysis a challenging task. In order to untangle these issues, our study employs a multi-faceted approach, drawing on various measures of religiosity and implementing an instrumental variable strategy within an individual-level innovation framework. We analyse the effect of religiosity on individual attitudes that are either favourable or unfavourable to innovation, capturing different aspects of an individual's propensity to innovate. The results strongly suggest that each measure of religiosity has a somewhat negative effect on innovation attitudes. The robustness checks and sensitivity analyses support the main findings. We propose three channels from religion to innovation: time allocation, the fear of uncertainty, and conventional roles reinforced by religion.

1. Introduction

There have been numerous studies on the economic consequences of religion since Max Weber's *The Protestant Ethic and the Spirit of Capitalism* (1905/2001), where he argues that the emergence of modern capitalism in Europe was a product of Protestant Reformation that fostered certain traits of people including work ethic and thrift. Despite Weber's thesis being more of a verbal observation rather than an empirical argument and many empirical studies challenging it (see Samuelsson, 1961; Becker and Woessmann, 2009), the idea that religion affects economic outcomes through shaping and transforming individual preferences and behaviours is far from being a myth. The most important connections between economics and religion happen through the effects of religion on economically important individual behaviours—including consumption patterns, saving patterns, time allocation decisions, marriage, fertility, and gender roles in family and society—and traits—such as trust, honesty, thriftiness, tolerance to dissimilarity, willingness to work hard, openness to strangers, and being prone to crime. The present study focuses on one dimension of this connection and explores the effect of religiosity on innovativeness at the individual level by focusing on economically important individual beliefs, behaviours, and traits that we coin innovation attitudes.

To our knowledge, Benabou et al. (2013) is the first empirical study at the intersection of religion and innovation. Following their contribution, the research in this field has begun to flourish (Perret, 2014; Chen et al., 2014; Benabou et al., 2015; Huang et al., 2016; Cinnirella and Streb, 2017; Assouad and Parboteeah, 2018; Recio-Román et al., 2019).

The existing literature has consistently demonstrated a correlation between religion and innovation. Yet, they also acknowledge that the observed associations are less likely to hold as causal links due to the potential endogeneity that might stem from several channels. For instance, the difficulty of defining and measuring all potentially non-ignorable factors related to religion and innovation favours omitted variable bias. Moreover, the process of causation is generally considered from religion to innovation. In contrast, also higher levels of innovation can affect religion through economic growth and development as conceptualised in the secularisation hypothesis (Iyer, 2016), raising the question of reverse causality.

Motivated by these premises, the present study introduces the first attempt to untangle the endogeneity of religion with respect to innovation, aiming to provide a causal interpretation by focusing on individual religiosity and innovation attitudes. In doing so, we exploit the first eight waves of the European Social Survey (ESS) from 2002 to 2016. The ESS is an academically driven, cross-sectional, and individual-level data set containing observations for 36 European countries. To our knowledge, prior studies on innovation and religion have not used the ESS. We define four different measures of religiosity—the degree of being religious, the frequency of attending religious activities, the frequency of praying, and a religiosity index, which is the latent factor of the first three measures—since prior work has shown that different religiosity measures are likely to have distinct effects on economic outcomes (Barro and McCleary, 2006). By relying on prior studies, innovation attitudes are defined at the individual level with

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self-reported personal traits and beliefs that are shown to be positively or negatively related to innovativeness. Accordingly, creativity, being free, being different, and being adventurous are identified as positive innovation attitudes (PIA), while negative innovation attitudes (NIA) are following traditions and following rules. Using attitudes instead of an aggregate measure of innovation output such as patents per capita¹ allows the influence of institutional level confounding factors to be mitigated. In addition, a large set of fixed effects is used to minimise the impact of (1) country-level economic and institutional confounding factors, (2) individual-level unobservables such as human capital and ability, and (3) global shocks. Finally, we instrument each measure of religiosity with the average religiosity of people of the same sex, age range, and religious affiliation who live in countries with the same dominant religious denomination. In other words, the religiosity of individual i from country c who belongs to a given religion (does not belong to any religion) is instrumented by the average religiosity of people who belong to the same religion (do not belong to any religion), share the same age range and gender with i , and live in countries that have the same dominant religious denomination as country c . We aim to eliminate the effect of individual-level unobservables by constructing instrumental variables (IV) for religiosity. Furthermore, we use religious affiliation along with religious intensity to mitigate reverse causality since religious affiliation is inherited and thus is less likely to be responsive to changes in innovation-related factors.

The relationship between religiosity and innovation attitudes is first explored with a linear model estimated by using OLS. The findings indicate a positive correlation between each measure of religiosity and NIA, suggesting a statistically significant negative impact of religiosity on innovativeness, with a notable effect size. Regarding PIA, religiosity measures are positively correlated with creativity and being different, while negatively correlated with being free. When it comes to the IV strategy, the first-stage estimates show that all the excluded instruments are strongly and significantly correlated with the religiosity measures. In the second stage, the significant and positive association between the measures of religiosity and NIA remains robust. Yet the picture changes with PIA. The religiosity measures become negatively related to creativity and being different while are no longer significantly related to being adventurous. On the other hand, the negative relationship between religiosity and being free persists. Overall, the IV estimates suggest that the OLS results signalling that religiosity fosters some favourable attitudes to innovation may be driven by endogeneity.

The negative effect of religiosity is robust to a series of sensitivity analyses. First, we estimate the baseline specification with a different dependent variable. Second, we consider different instruments, estimation methods and model specifications. Third, we re-estimate the baseline model by reducing the main sample in five ways to analyse if minorities and/or outliers affect the main findings. Fourth, we examine potential violations of the exclusion restriction. All sensitivity analyses reaffirm the main findings.

In order to underpin the main findings and provide insights for future research, we discuss three possible causality channels from religiosity to innovativeness: time allocation, the fear of uncertainty, and roles reinforced by religion –individualism-collectivism and conventional gender roles. First, we consider the opportunity cost of time spent on religious activities, arguing that religious participation might negatively affect human capital formation, which is essential to innovation. Since time is scarce, if an individual allocates a certain amount of time to religious activities, then there will be a decrease in the maximum amount of potential time devoted to human capital formation. Our empirical results support this argument. *Attendance in religious services* is the most robust religiosity measure throughout the analysis. Second, we argue that for religious people, personal uncertainty is mitigated

by their faith and by the support of religious institutions such as churches, mosques, or religious social organisations. Therefore, they have less experience dealing with risks and uncertainty inherent to the innovation process. Third, we assert that high religiosity may foster a collectivist culture that highly values established rules and might leave limited space for reformist and creative endeavours, negatively affecting innovation. We also consider the long-standing argument that religions foster gender discrimination by imposing stricter rules for women, influencing the access of women to education, liberty, labour force, and social and legal rights. We empirically test these hypotheses and find supporting evidence.

The remainder of the present study unfolds as follows. Section 2.1 briefly reviews the existing literature on religion and innovation. Section 2.2 looks at innovation from a behavioural point of view and describes innovation as a mindset, establishing the theoretical foundation for the innovation attitudes. Section 3 extensively describes the estimation strategy and discusses possible endogeneity channels together with our strategies to overcome them. Section 4 reports the OLS and IV results and discusses the main findings. Section 5 presents sensitivity analyses. Section 6 discusses three possible channels from religiosity to innovativeness. Section 7 provides concluding remarks. In the Appendix, we present data summary tables and a detailed variable index (Appendix A), the first stage results for the IV estimates (Appendix B), the OLS results for each innovation attitude (Appendix C), the IV results for each innovation attitude (Appendix D), and further estimates of the heterogeneous effect of religiosity with respect to gender and age (Appendix E).

2. Related literature

The present study mainly relates to the expanding literature on the effects of religion on economic outcomes. In this regard, the first subsection briefly overviews the literature on religion and economic outcomes with a particular emphasis on innovation. The second subsection provides a concise panorama of the literature on the individual and behavioural aspects of innovation, presenting a theoretical framework for the innovation attitudes employed in this study.

2.1. Religion, economic outcomes, and innovation

The interaction of economics and religion has long been a topic of sociological analyses. Until recently, economists have not focused on the topic, possibly due to a lack of reliable data on religion and potential methodological issues such as endogeneity. Nevertheless, the recent decades have witnessed an expanding literature on the economics of religion² in which religion has been integrated into economic research in three different ways: (i) applying the methodology of economics to religion e.g., microeconomic theory to analyse religious behaviour of individuals, groups, and institutions; (ii) analysing the economic outcomes of religion e.g., the effect of religiosity on economic growth; (iii) making use of holy books and theological norms to praise or criticise economic behaviours and economic policies (Iannaccone, 1998), e.g., Islamic economics is critical about interest rates since Islamic law, *Sharia*, prohibits any interest paid on loans of money. The present study mainly contributes to the second category by examining the effect of religiosity on innovation attitudes.

The work of Benabou et al. (2013), to our knowledge, is the first empirical analysis at the intersection of religion and innovation, while qualitative studies were present before (Kalliny and Hausman, 2007; Preble and Hoffman, 2012). Using the World Intellectual Property Organization (WIPO) data, they measure innovation with patents per capita. The two religiosity measures, namely, belief in God and

¹ To support our arguments, we also provide preliminary estimates linking religiosity and patents, as presented in Table A.4 in Appendix A.

² For an in-depth literature review, please refer to Iannaccone (1998) and Iyer (2016).

being religious, are retrieved from the World Values Survey (WVS). Both cross-country and within-country (USA) analyses indicate a negative relationship between religiosity and innovativeness. In a follow-up paper, Benabou et al. (2015) enlarge the analysis by focusing on the innovation attitudes at the individual level instead of patents per capita which is an ex-post and macro-level measure. They define eleven different innovation attitudes and five alternative measures of religiosity that are retrieved from the WVS. They find an overall negative relation across 52 model specifications. Almost in every specification, greater religiosity is significantly associated with less favourable attitudes toward innovation. Despite both papers do not directly try to deal with endogeneity, the latter study aims to mitigate the influence of institutional-level confounding factors by using individual-level data.

Among other studies, Perret (2014) examines the relationship between religious affiliation and innovativeness in Russia. Innovation is measured by the number of patents issued by the Russian Federal Service for Intellectual Property (Rospatent). He finds that only Hindu, Buddhist, and Jewish faiths exhibit significant and negative effects on innovativeness. Christians, Muslims, Jews, and Atheists do not display any significant impact at all.

Chen et al. (2014)³ analyse the relation between local gambling culture and corporate innovation. “Many innovative endeavours, *i.e.*, attempts to come up with new products, services and methods, represent gambles because they promise relatively small probabilities of large success and large probabilities of failure” (Adhikari and Agrawal, 2016, pp. 229). They use religious beliefs as a measure of the gambling preferences of firms’ local communities. Taste for gambling is addressed by a higher Catholic-to-Protestant ratio assuming that Catholics are more likely to take risks. They find that the firms headquartered in areas with a higher taste for gambling tend to be more innovative.

Cinnirella and Streb (2017) analyse the effect of religious tolerance on innovation in Prussia by assuming that tolerance and diversity are conducive to technological creativity and innovation. Religious tolerance is proxied by the index of the population’s religious diversity across 1278 cities in Prussia. Innovation is measured by 1740 patents issued in Prussia between 1877 and 1890. They find that higher levels of religious tolerance had a strong positive impact on innovation during the Second Industrial Revolution. They also show that the culture of tolerance did not stem from a particular denomination but rather from the presence of different denominations and churches.

The research at the intersection of religion and innovation has begun to flourish following the aforementioned studies (Huang et al., 2016; Assouad and Parboteeah, 2018; Recio-Román et al., 2019). Nevertheless, no empirical study has considered the potential endogeneity of religion so far, despite reverse causality and identification problems that have been recognised in the literature (Guiso et al., 2003). Especially reverse causality is a potentially strong endogeneity channel since the process of causation is generally considered from religion to economic outcomes as visible in the above-mentioned studies. The mainstream assumption is that religion affects economic outcomes by playing an integral role in shaping culture, individual preferences, traits, and beliefs. However, the direction does not have to be from religion to economic outcomes. The secularisation hypothesis suggests that economic outcomes, such as individual and country-level income and growth, may affect religious behaviour, potentially creating a reverse causality pathway that must be accounted for in our analysis. The core argument of secularisation is that religiosity decreases as a nation gets richer. This assertion has been the subject of an ongoing debate within the economic literature. Although numerous economists have analysed the primary channels that may facilitate the secularisation effect, a consensus on the most salient mechanisms remains elusive. Ruiter

and Tubergen (2009) argue that modernisation reduces the need for religious reassurance because it enables the creation of more securities — whether it be financial, social, or political — for the population, thus decreasing the level of religiosity. Iannaccone (2008) provides valuable insights by analysing secularisation with retrospective questions from 30 nations that stretch from the 1920s through the 1980s. She finds that secularisation cannot explain the continued vitality of religion in the USA, one of the world’s most modernised nations. On the contrary, she finds some favourable evidence of secularisation in Britain, France, and Germany.

It is worth mentioning that there is a relatively vast literature on culture and innovation that mainly draws on the Hofstede model (1980/2001) (Shane, 1992, Shane, 1993, Shane, 1995; Gorodnichenko and Roland, 2017; Petrakis et al., 2015; Chen et al., 2017; Kostis et al., 2018). Hofstede analyses the differences in national cultures using the data of business employees from more than 50 countries. He empirically identifies and validates five independent dimensions affecting economic attitudes and outcomes — namely, power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, and long-term versus short-term orientation — on which national cultures differentiate.⁴ These five dimensions together form a model of differences among national cultures and have been pretty influential in the literature on culture and economic outcomes. For instance, Kirkman et al. (2006) review 180, and Sondergaard (1994) reviews 61 published studies that used Hofstede’s dimensions and they both confirm their relevance to the differences in national cultures. In this study, we consider uncertainty avoidance and individualism-collectivism as potential causality channels from religiosity to innovativeness (see Section 6).

2.2. Innovation as a mindset

Innovation can be defined in diverse forms. Wang and Ahmed (2004) review the innovation literature and propose five different innovation types that jointly determine the overall innovativeness of an organisation: (1) product innovativeness (newness, novelty, originality, or uniqueness of products), (2) market innovativeness (newness of approaches that companies adopt to enter and exploit the targeted market), (3) process innovativeness (introduction of new production methods, new technology, and new management approaches that can be used to improve management and production processes), (4) strategic innovativeness (an organisation’s ability to manage ambitious organisational objectives and to identify a mismatch of these ambitions and existing resources to use limited resources creatively) and (5) behavioural innovativeness (enables the formation of an innovative culture, the general internal capacity for new ideas and innovation and screens through teams, individuals, and management). Different types of innovation are expected to be related to different individual and organisational traits. Camps and Marques (2014) name these traits as innovation enablers, *i.e.*, a set of general capabilities driven by social capital that contributes to favour innovation. They associate innovation enablers and innovation types as follows: goal alignment and knowledge enhancement for product innovation; knowledge enhancement and cooperation for process innovation; cooperation and associability for strategic innovation; associability, risk-taking and creative environment for market innovation; risk-taking, creative environment, communication and information flow for behavioural innovation. Among the innovation types, behavioural innovativeness is not only crucial for overall innovativeness but also for the other types of innovation since it enables the formation of an innovative culture by being present at the various levels for individuals, teams, and management (Wang and

³ This paper follows Kumar et al. (2011) and Kumar (2009) that find a positive relationship between the propensity to gamble and risky, lottery-like financial market investments.

⁴ Hofstede initially defines four dimensions. In the second edition of the book (Hofstede, 2001), he adds *long-term versus short-term orientation* as the fifth dimension.

Ahmed, 2004). Cultivating an innovative culture through behavioural innovativeness induces other types of innovation mainly by creating an environment where new ideas are supported, failure is tolerated, creativity is promoted, and risk-taking is encouraged.

Many studies underline the importance of innovative culture and mindset by focusing on behavioural aspects of innovation. Goldstone (1987) argues that what separated the East from the West in the early modern world was not capitalism nor rationalisation of institutions; it was the willingness to innovate fostered by revolting from orthodoxy and by cultivating tolerance to internal diversity that enhanced openness to taking risks. He compares three historical crises in the 17th-century—the Stuart king crisis in England, Celali revolts in Ottoman Turkey, and revolts against the Ming dynasty in China—that have economic roots. He argues that England fostered tolerance to diversity and openness to take risks by adopting a relatively new and risk-taking path which resulted in a higher propensity to innovate. On the contrary, Ottoman Turkey and China followed cultural orthodoxy and suppressed alternatives, resulting in an unfavourable environment to innovate. England, therefore, reached dynamism and growth, while Ottoman Turkey and China had stagnation.

Dzallias and Blind (2019) review the extensive literature on organisational innovation indicators published between 1980 and 2015. They find that *innovation culture* has been one of the most used company-specific innovation indicators. Innovation culture is addressed by different indicator categories such as creativity, attitudes toward science and technology, social innovation climate and trust, support of new ideas, openness to new fields, the openness of the company toward change and innovation, resistance to change, willingness to exchange ideas, tolerance for innovation failures, et cetera. All these indicators are related to behavioural aspects of innovation.

Kahn (2018) underlines that innovation should be recognised as three different things: (1) *innovation is an outcome* (product innovation, process innovation, marketing innovation, business model innovation, supply chain innovation, organisational innovation), (2) *innovation is a process* (innovation process, product development process), and (3) *innovation is a mindset* (individual mindset, organisation culture). “Mindset aligns employees and manifests the culture needed for innovation to happen. Encompassing a mindset that predisposes individuals and organisations to be risk-taking, cross-disciplinary, and open to varied ways of thinking helps establish the state necessary for innovation; state implies something habitual and lasting. It is about instilling and ingraining a mindset that prepares the individual and organisation for innovation so that there is proper engagement in the innovation process to achieve the desired innovation outcome”. (Kahn, 2018, pp. 459).

The literature mentioned above demonstrates that innovation is strongly associated with individual traits such as tolerance to diversity, risk acceptance, creativity, and deviating from traditional paths and rules, which jointly form innovative cultures of teams, groups, and organisations. Nevertheless, previous research has generally measured innovation as an outcome by using patents, R&D expenditure and technology improvements expenditure at the country or firm level. There might be drawbacks in using patents as the sole measure of innovation especially when focusing on behavioural and/or individual level factors such as religiosity. Moser (2012) argues that almost a thousand empirical studies have used patent counts to address innovation, mostly without controlling for variation across industries and over time. However, the percentage of patents varies significantly across industries. Furthermore, relying on the historical evidence, most innovations were outside of the patent system, even in countries with a developed patent system, such as the mid-19th century USA (Moser, 2013). He uses the exhibition data of 8079 innovations between 1851 and 1915 and underlines that 89% of British innovations and 85% of American innovations were not patented. The probability of an innovation/invention being patented mainly depends on the country's patent system and law, among many other determinants. Furthermore, inventors could use other instruments different from patents to protect

their inventions, such as lead-time advantage and invention secrecy. Moreover, they may also exploit other features of knowledge such as tacitness. Hence, patents as an indicator of innovation would be a biased measure in cross-country and cross-industry studies.

Another critical issue is that patents are ex-post measures of innovation that reflect country-specific institutional constraints. In other words, patents measure some portion of occurred innovation. However, they have little to say about the propensity to innovate, mainly determined by the behavioural and cultural traits mentioned above. One cannot address unhappened, i.e., blocked by unfavourable institutional constraints or cultural and religious traits, innovation with an ex-post measure. Many papers in this regard address culture and religion by individual measures — belief in god, degree of religiosity, willingness to take a risk, tolerance to diversity, et cetera — but address innovation by country-level patents which is a macro and ex-post measure. Therefore a number of studies (Guiso et al., 2003, Guiso et al., 2006; Esteban et al., 2018) suggest using individual attitudes as a measure of innovation rather than aggregate macro outcomes such as patents especially when working with individual level explanatory variables. Based on this motivation and by drawing on the existing studies focusing on individual-level innovation traits (Wang and Ahmed, 2004; Benabou et al., 2015 Dzallias and Blind, 2019; Kahn, 2018), the present study addresses innovation via individual traits that might be seen as the behavioural antecedents of innovative outcome.

3. Empirical strategy

3.1. Data

The present study exploits pooled cross-sectional data from the European Social Survey (ESS). The ESS is a biennial, academically driven, and individual-level survey that includes large groups of observations about preferences, beliefs, and attitudes toward many different subjects including immigration, religion, political choices, trust, and markets. The ESS is available for 36⁵ countries for nine waves from 2002 to 2016. We use the first eight waves that result in more than 380,000 observations. The ESS does not homogeneously include all countries across all waves, meaning that some countries are not surveyed in certain waves and, thus, are represented in different proportions. Table A.1 displays the surveyed countries across the waves.

The main variables we are interested in are presented in different groups below. Detailed descriptions of all variables are presented in Appendix A. Descriptive statistics of the variables are presented in Table A.2.

3.2. Measuring innovation

Innovation is a complex phenomenon as religion and is challenging to measure due to its many dimensions. It is important to underline that innovation mainly occurs in two phases: initiation and implementation of innovation (Glynn, 1996; William and McGuire, 2010). The first phase is about creating ideas which is, in general, an individual task. On the other hand, the second phase might include teams, groups, and management activities, requiring an innovative organisational culture and mindset. Most papers on innovation literature focused on the second phase by using patents as the only indicator of innovation as underlined in Section 2.2. On the contrary, the innovation measures defined in this study are mainly related to the first phase. Nonetheless,

⁵ Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, and United Kingdom. We have dropped Israel from the sample since it is not located in mainland Europe and is the only dominantly Jewish country.

individual innovation measures are likely to stay vital in the second phase as well.

Following Guiso et al. (2003) and Benabou et al. (2015), we address innovation by the individual propensity to innovate by introducing innovation attitudes that are designated under the guidance of the literature briefly reviewed in Section 2. In this regard, we exploit several variables in the ESS: *creative* (important to be creative), *different* (important to be different), *free* (important to be free), *adventurous* (important to be adventurous), *traditions* (important to follow traditions), *rules* (important to follow rules). We categorise these variables as *positive* or *negative innovation attitudes*. Positive innovation attitudes (PIA) are essential behavioural conditions and favourable personal traits to innovate. Negative innovation attitudes (NIA) are personal traits that contradict an innovative mindset and, thus are unfavourable to innovation. We nominate four favourable —*creative, different, free, and adventurous*— and two unfavourable —*traditions and rules*— traits to innovation.

We create two average measures: *inposav* and *innegav*. The former, average positive innovation attitudes, is the mean of *creative, different, free* and *rules*; while the latter, average negative innovation attitudes, is the mean of *traditions* and *rules*. In addition, we create a summary measure of innovation attitudes (*innosum*) computed as the sum of *creative, different, free, adventurous* minus *traditions* and *rules*.

Inposav and *innegav* are the primary dependent variables in our analysis, yet we also analyse each attitude that composes them. The corresponding tables of OLS and IV estimates of each attitude are presented in Appendices C and D for the sake of brevity. Detailed information on how we construct innovation variables is presented in Appendix A.

It should be acknowledged that the variables employed in this study do not directly measure innovation outcomes. They rather account for several individual attitudes that are shown to be favourable and unfavourable to innovation by prior studies (Hofstede, 2001; Camps and Marques, 2014; Benabou et al., 2015; Kahn, 2018). Therefore, we provide additional estimates between religiosity and innovation, where innovation is measured by patents per capita, which is a more widely accepted indicator. The results are reported in Table A.4 in Appendix A. Overall, the OLS and IV estimates corroborate the negative relation between religion and innovation.

3.3. Measuring religiosity

The variables *belonging, pbelonging, denomination, pdenomination, degree, attendance, pray* are religion-related observations in the ESS. *Belonging, pbelonging* stand for respectively present and past belonging to a religion; *denomination, pdenomination* present respectively current and past denomination of an individual; *degree* is the degree of religiosity, *attendance* is the frequency of attendance to religious activities, *pray* is the frequency of praying. *Belonging, pbelonging, denomination, and pdenomination* indicate religious affiliation — belonging to a particular religion or denomination — while *degree, attendance, and pray* reveal religious intensity that we simply name religiosity. In this study, religious affiliation variables are used to construct the instruments and as fixed effects while religious intensity variables are employed as the main independent variables.

Different measures of religiosity are likely to have different effects on socioeconomic variables, reflecting the multi-dimensional nature of religion (see Barro and McCleary, 2006). For instance, the religion market model⁶ suggests that if a state has a formal religion, participation in religious services is likely to decrease because the variety of services is subject to suffer since the state religion would be imposed and other religions would be limited (Barro and McCleary, 2006). On the other hand, people might keep firm religious beliefs without attending

state-regulated formal religious services. Accordingly, low attendance may be caused by the supply side of the religion market and may not necessarily mean low religiosity. Motivated by this reasoning, we use three different measures of religious intensity (*degree, attendance, pray*) as explanatory variables. We also create an index of general religiosity, *religiosity*, with a principal component factors analysis of the three religious intensity variables. The analysis is performed using a polychoric correlation matrix since the variables are categorical.

3.4. Dealing with endogeneity

Religious beliefs are embedded in social behaviour and culture, meaning that extracting the pure effect of religion can be challenging. One, therefore, must extensively consider endogeneity when working with a model that incorporates religion. In this regard, we discuss the possible sources of endogeneity – including unobservable/unmeasurable confounding factors that might lead to omitted variable bias, reverse causality, and measurement error – below and our strategy to mitigate them.

Religion is a complex phenomenon with many dimensions. Hence, the likelihood of not being able to observe common determinants of religion and innovation is non-negligible. To minimise the effect of confounding factors, we employ a multi-way fixed effects strategy along with controls of individual characteristics.⁷ We control for the following fixed effects: country, survey year, country and survey year interaction, religious denominations, occupation categories, and income level. By incorporating fixed effects for country and time, we can mitigate the influence of institutional features and country-level economic determinants. Introducing fixed effects for religious denominations facilitates religiosity comparisons among individuals from various religious denominations. Indeed, the average religiosity of people who belong to a particular religious denomination may inherently be more intense than those who belong to another religious denomination. For instance, Muslims may be inherently more religious than Protestants.⁸ Occupation and income level fixed effects can help minimise the bias stemming from the imperfect observability of human capital and individual unobservables.

In addition to multi-way fixed effects, we use a large set of standard demographic controls; age, gender, education, paid work status, whether had a paid job before, whether have a partner or wife in the house, whether have a child in the house, and health status. We also control for the father's and mother's education levels, which are essential to human capital formation, especially at younger ages. Akcigit et al. (2017) examine a large data set on innovation and inventors collected for the period between 1880 and 1940 in the USA. They uncover many micro and macro stylised facts at the individual level. One of them is that father's education is a crucial determinant of being an inventor, especially through the channel of the child's education. Hence, we control for the father's and mother's education levels since the mother's education is likely to be equally important, if not more, given that mothers spend more time with children in most cultures. Another uncovered fact by Akcigit et al. (2017) is that inventors tend to migrate from their birth state to more eligible states in pursuit of a more innovation-friendly environment. We, therefore, control for the born-in country of the respondent.

The direction of causation may go both ways in a model that incorporates religion. We aim to measure the effect of religiosity on innovativeness. However, changes in innovation may affect one's religiosity as well, mainly through economic growth and development,

⁷ See Guimaraes and Portugal (2010) and Correia (2016) for further information on multi-way fixed effects in linear models.

⁸ The data support this proposition. For instance, Table A.3 in Appendix A shows that Muslim countries exhibit significantly higher means for religiosity measures.

⁶ Developed by Finke and Stark (1992) and Finke and Iannaccone (1993).

which is conceptualised in the secularisation hypothesis mentioned in Section 2. A promising strategy to mitigate reverse causality is to focus on economic attitudes rather than outcomes. Given that economic outcomes are partly determined by the institutional and political environment, they can be challenging to account for (Guiso et al., 2003, Guiso et al., 2006). Economic attitudes reveal *individual propensity* to something; in other words, they give insights into the possibility of a particular economic outcome being real. As Guiso et al. (2003) pointed out, asking somebody if she has ever cheated on taxes is different from asking somebody her opinion on cheating on taxes. The former is an outcome while the latter reflects an individual's attitude toward tax evasion. Motivated by this reasoning we use innovation attitudes to address innovativeness to mitigate reverse causality.

Another source of endogeneity that should be addressed is measurement error. The data source of this study is the ESS, a comparative cross-national survey that collects measures of individuals' preferences and social and political attitudes across 36 European countries. The variables of the ESS may contain errors due to differences in concepts measured across the participating countries. The ESS aims to minimise such measurement errors and improve data reliability, validity, and comparability; therefore, it undertakes a range of data quality assessment activities including the Multitrait-Multimethod (MTMM) and Survey Quality Predictor (SQP). MTMM is an experimental project in which the same respondents are asked three survey questions twice in different concepts by using different response scales each time.⁹ MTMM measures the measurement quality of individual questions, and it was implemented for all the waves of the ESS. SQP is an open-source database on which the complete set of the ESS questions is evaluated through MTMM design. Due to the rigorous approach of the ESS, we may say that it is unlikely that our independent variables suffer from measurement errors.

Furthermore, the ESS imposes a minimum target response rate of 70% in each country to minimise non-response bias which may lead to over or under-representation of some individuals with certain characteristics. To adjust for non-response bias and others, the ESS data come with three weighting variables: design weights (*dweight*), post-stratification weights (*pspwght*), and population size weights (*pweight*). Design weights correct for sample selection bias given that some countries use complex sampling designs and respondents have different probabilities of being a part of the sample. Post-stratification weights adjust for uneven representation of sub-groups and sub-populations with certain characteristics, correcting for sample and non-response biases. Population size weights are used when data from more than two countries are combined. Since each country has a different population size but a similar sample size, *pweight* corrects for over or under-representation of countries concerning their population. We analyse more than one country and total averages of countries in some cases, hence we must use a combination of either *dweight* and *pweight* or *pspwght* and *pweight*. Given that *pspwght* includes *dweight*, we use the combination of *pspwght* and *pweight* by generating a new variable $gweight = pweight * pweight$.¹⁰

Despite adopting particular strategies to address potential sources of endogeneity, a more fundamental approach is using an econometric strategy designed to deal with endogeneity. In this regard, we use the instrumental variables (IV) method. Our IV strategy is inspired by Esteban et al. (2019) where they examine the role of religiosity, along with personal liberties, in influencing the decision of labour effort. They construct an instrumental variable for religious intensity by computing the average religious intensity of people of the same sex, age bracket, and religious denomination in neighbouring countries, assuming that

religiosity is a cultural trait shared by people over national borders. By doing so, they could eliminate the possible omitted variable problem for individual unobservables, such as ability. The rationale is that since the instrument is other people's average religiosity, it is likely to be uncorrelated with individual *i*'s personal characteristics. We adopt a similar strategy to build instruments for religious intensity variables by computing the average religiosity of people of the same sex, age range, and religious affiliation who live in countries with the same dominant religious denomination. In other words, the degree of religiosity of individual *i* from country *c* who belongs to a religion (does not belong to a religion) is instrumented by the average religiosity of people—who belong to a religion (do not belong to a religion), share the same age range and gender with *i*—who live in the countries that have the same dominant religious denomination with the country *c* has. In summary, the instruments are constructed by taking into account four elements: age range, gender, religious affiliation, and dominant religious denomination. We use 11 age ranges (15–20, . . . , 60–65, 65+).¹¹ Gender is a dummy variable takes the value 0 for male and 1 for female. Religious affiliation is based on variable *belonging* which is a dummy with value 0 if the respondent does not belong to a religion and 1 if belongs to a religion. We determine dominant religious denominations with the help of variables *denomination* and *country* after weighting them with population size weights. Afterwards, the percentages of each religious denomination in each country in the sample are calculated and the religious denomination that has the highest percentage in a country is identified as *the dominant religious denomination*. The dominant religious denomination of each country and corresponding percentages are presented in Table A.1 in Appendix A. Overall, there are five dominant religious denominations in the sample: Roman Catholics, Protestants, Eastern Orthodox, Muslims, and Atheists (do not belong to a religion).

The rationale behind our IV strategy emerges from the following points. Guiso et al. (2003) show that individuals who were raised in a particular religious environment possess common preferences and beliefs even though they refuse to belong to any religion as adults. The dominant religious denomination in a country is the leading actor that forms the characteristics of the religious environment in which individual preferences and beliefs are being shaped. Some individuals inherit more, some less, but the dominant religious denomination determines the rules. Thus, instrumenting individual *i*'s religiosity by the average religiosity of people who are subject to the same dominant religious denomination in their country (along with the same age range, gender, and affiliation) means that individual *i*'s average religiosity is instrumented by the average religiosity of people who live in a similar religious environment as that of *i*. Here we assume that, as Esteban et al. (2019), religiosity is not a national trait but a cultural trait that transcends national borders. People raised in a particular religious environment are likely to share a significant part of their culture with those raised in a similar religious environment regardless of national borders. However, they do not necessarily share the same institutional environment. Hence, we use country fixed effects, alongside others, to eliminate possible country-level institutional differences. Moreover, our sample consists of European countries that share many common values and customs.

We use religious affiliation variables along with religious intensity variables when constructing instruments. Religious affiliation generally passes down from generation to generation, thus, is inherited and subject to slow change. The ESS data justify this proposition. Only 9.8% of individuals in the sample have changed their religious denomination,¹² meaning that religious affiliation is pretty stable throughout one's lifetime and does not significantly change along with changes in other factors. On the contrary, religious intensity is more likely to change

⁹ The detailed test data obtained from MTMM is available online: https://www.europeansocialsurvey.org/data/download_mtmm.html.

¹⁰ For detailed information on weighting the ESS data, please refer to the guide "Weighting European Social Survey Data".

¹¹ We have also tried 6 age ranges (15–25, 25–35...55–65, 65+). The estimation results were pretty similar to those estimated with 11 age ranges.

¹² Calculated by using the observations of *denomination* and *pdomination*.

over one's lifetime, making it more vulnerable to reverse causality.¹³ Another aspect is that preferences and beliefs of an individual who belongs to a religion are likely to be more affected by the religious environment around her than a person who does not belong to a religion. Based on these arguments, we make use of both religious intensity and religious affiliation when constructing the IVs.

In our IV strategy, the exclusion restriction would be violated if belonging to a religion is not inherited from past generations but chosen during one's lifetime. In this case, belonging to a religion would be correlated with individual unobservables, therefore, cannot be considered exogenous. Nevertheless, only 9.8% of the sample have changed their religious affiliation as mentioned above. As a robustness check, we drop them from the main sample and reestimate the main specifications (Table 7, columns 7 and 8). The results are very similar to the full sample. Another scenario in which the instruments violate the exclusion restriction is that countries with the same dominant religious denomination are subject to correlated shocks. We use survey year fixed effects to capture global shocks along with country and country-survey year interaction fixed effects. Another two possible violations of the exclusion restriction stemming from diverse religious environments and neighbouring countries are considered in Section 5.4.

Based on the estimation strategy described above, the following model is first estimated with OLS. Afterwards, the religiosity measures are instrumented by using two-stage least squares (2SLS).¹⁴

$$I_i = \alpha_0 + \beta R_i + \theta X_i + \delta F_i + \varepsilon_i$$

X_i contains the following control variables for individual i : gender (*gender*), age (*age*), completed years of education (*education*), parents' highest education level (*mother*, *father*), born in country (*bornc*), paid work status (*paidwork*), whether had a paid job before (*pwbefore*), whether a partner or spouse is living in the same house (*partner*), whether a child is living in the same house (*child*), and subjective health status (*health*). F_i indicates the full set of fixed effects: country dummies (*country*), survey year (*essround*), country and survey year interactions (*cness*), religious denominations (*denomination*), occupation categories (*occupation*), and income level (*income1* & *income2*). I_i denotes one of the innovation attitudes considered (*creative*, *different*, *free*, *adventurous*, *traditions*, *rules*, *inposav*, *innegav*). R_i stands for one of the religiosity variables considered (*degree*, *attendance*, *pray*, *religiosity*), therefore, β is the main coefficient of interest. Finally, ε_i is the error term.

Considering the grouped structure of the data, within-cluster observations are likely to be correlated. Since it is well-known that ignoring within-group correlations leads to understated standard errors (Shepard, 1996), we report the estimates with clustered standard errors at the instrument level.¹⁵

4. Main results

4.1. OLS estimates

We begin by examining the relationship between religiosity and innovation attitudes estimated with OLS. All specifications include the full set of fixed effects (F) described above. We gradually control for the individual characteristics contained in X .

¹³ Botticini and Eckstein (2005) and Guiso et al. (2006) underline that not only religious affiliation but also religious practices are modified only over centuries; thus any aspect of religion can largely be assumed invariant over one's lifetime.

¹⁴ We use "ivreghdfe" command of Stata which allows IV/2SLS estimation with multi-way fixed effects.

¹⁵ We also performed OLS estimates with robust standard errors and found very little difference so that the significance levels of the coefficients did not change. However, we prefer to report the clustered version due to the unity of the analyses throughout the study.

Table 1 presents the variations in *inposav* concerning different measures of religiosity. *Religiosity* is the independent variable in the first three specifications. The first specification, column 1, includes control variables for gender, age, education, and the complete set of fixed effects. The insignificant coefficient of *religiosity* in column 1 endures in column 3 after adding other controls. However, other measures of religiosity display different patterns. *Degree* is statistically significant at the 99% level in column 4 and stays robust to the further controls in column 5 despite a decrease in the significance level. In any case, the size effect of *degree* is modest. Indeed, we find that increasing *degree* from its observed 20th percentile (i.e., 0.1) to the 80th percentile (i.e., 0.7) is associated with an increase in *inposav* of about 0.004 (i.e., 0.007×0.6). If we compare this effect with the observed sample average value of *inposav* (i.e., 0.612), this represents approximately a 0.7 per cent increase. On the contrary to the other religiosity measures, *attendance* shows a negative relationship with *inposav* in column 6. It stays statistically significant when we add further controls in column 7. The effect size, however, is relatively small. Indeed, we find that increasing *attendance* from its observed 20th percentile (i.e., 0) to the 80th percentile (i.e., 0.5) is associated with a variation in *inposav* of about -0.007 (i.e., -0.013×0.5). If we compare this effect with the observed sample average value of *inposav*, this represents approximately a 1.1 per cent decrease. The estimated coefficient associated with *pray* is positive and significant at the 99% level in column 8 and stays robust to the further controls, yet the significance level decreases in column 9. Also in this case, the effect size is notably modest. Increasing *pray* from its observed 20th percentile (i.e., 0) to the 80th percentile (i.e., 0.833) is associated with an increase in *inposav* of about 0.005 (i.e., 0.006×0.833), which represents approximately a 0.8 percentage increase.

The detailed OLS estimates broken down into each measure of innovation attitudes are presented in Appendix C. Table C.1 reports a positive and significant relation between *importance of creativity* and the religiosity measures, except for *attendance*, which has insignificant coefficients. In Table C.2, all religiosity measures are positively and significantly associated with *importance of being different*, except for *attendance*. Differently, *importance of being free* is negatively related to all religiosity measures in Table C.3. As Table C.4 displays, *importance of being adventurous* is negatively related to all religiosity measures with statistically lower significance levels. When compared to Table 1, the positive coefficients for *degree* (0.007) and *pray* (0.006) seem to be driven by *importance of creativity* and *importance of being different* as evidenced in Tables C.1 and C.2. On the other hand, the negative relation between *attendance* and *inposav* is likely to be fostered by the negative relation between *attendance* and *importance of being free* in Table C.3 and *importance of being adventurous* in Table C.4.

Overall, the OLS results show that higher values of *degree* and *pray* have a somewhat positive relationship with innovation-related traits through *importance of creativity* and *importance of being different*, while *attendance* is negatively related. Nevertheless, the estimated effect sizes are rather modest. *Religiosity* shows no significant relationship with *inposav*, which is expected to some degree, given that *religiosity* is an index based on other three measures (*degree*, *attendance*, *pray*) that exhibit both negative and positive relationships, yielding to cancel out each effect when the measures combined.

In contrast with Table 1, Table 2 displays a pretty stable relationship between different measures of religiosity and *innegav*. In each specification, the parameter associated with the religiosity measures is positive and statistically significant at the 99% level, regardless of the gradual inclusion of controls. Another salient result is that all coefficients are substantially higher in absolute value than those in Table 1, suggesting that religiosity is more strongly associated with NIA than with PIA. In other words, religiosity seems to foster individual traits that are unfavourable to innovation and affect much less those favouring innovation. Indeed, for instance, we find that increasing *religiosity* from its observed 20th percentile (i.e., 0.06) to the 80th

Table 1
OLS estimates: Religiosity and average positive innovation attitudes.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>
<i>religiosity</i>	0.003 (0.003)	0.006* (0.003)	0.005 (0.003)						
<i>degree</i>				0.008*** (0.003)	0.007** (0.003)				
<i>attendance</i>						-0.011*** (0.004)	-0.013*** (0.004)		
<i>pray</i>								0.007*** (0.002)	0.006** (0.002)
<i>gender</i>	-0.026*** (0.003)	-0.024*** (0.002)	-0.023*** (0.002)	-0.024*** (0.002)	-0.023*** (0.002)	-0.023*** (0.002)	-0.023*** (0.002)	-0.024*** (0.002)	-0.024*** (0.002)
<i>age</i>	-0.003*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>education</i>	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)
<i>paidwork</i>		0.000 (0.002)	0.001 (0.002)	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)	0.001 (0.002)
<i>pwbefore</i>		-0.045*** (0.013)	-0.047*** (0.016)	-0.044*** (0.013)	-0.046*** (0.016)	-0.047*** (0.015)	-0.049*** (0.019)	-0.046*** (0.013)	-0.048*** (0.016)
<i>partner</i>		-0.019*** (0.002)	-0.018*** (0.002)	-0.019*** (0.002)	-0.018*** (0.002)	-0.018*** (0.002)	-0.018*** (0.002)	-0.019*** (0.002)	-0.018*** (0.002)
<i>health</i>		0.017*** (0.001)	0.017*** (0.001)	0.017*** (0.001)	0.017*** (0.001)	0.018*** (0.001)	0.017*** (0.001)	0.018*** (0.001)	0.017*** (0.001)
<i>child</i>		-0.022*** (0.002)	-0.021*** (0.002)	-0.022*** (0.002)	-0.021*** (0.002)	-0.022*** (0.002)	-0.021*** (0.002)	-0.022*** (0.002)	-0.021*** (0.002)
<i>bornc</i>			-0.009*** (0.003)		-0.009*** (0.003)		-0.010*** (0.003)		-0.008*** (0.003)
<i>fathere</i>			0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)
<i>mothere</i>			0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)
<i>constant</i>	0.701*** (0.006)	0.684*** (0.014)	0.667*** (0.017)	0.681*** (0.014)	0.664*** (0.017)	0.689*** (0.016)	0.673*** (0.020)	0.685*** (0.014)	0.667*** (0.017)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>Adj. R²</i>	0.134	0.147	0.151	0.147	0.151	0.147	0.151	0.147	0.151

Notes: OLS estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

percentile (i.e., 0.7) is associated with an increase in *innegav* of about 0.1 (i.e., $0.64 \cdot 0.156$) that, compared with the observed sample average value of *innegav* (i.e., 0.615), represents approximately a 16 per cent increase.

Tables C.5 and C.6 display detailed results for the two NIA. All religiosity measures are positively and significantly (at the 99% level) associated with both *following traditions* and *following rules*, but the coefficients are almost three times higher for *following traditions*.

4.2. Instrumental variables estimates

The OLS estimates reported above indicate both negative and positive associations between religiosity and innovation attitudes, though the negative relation is more substantial. Nevertheless, the potential endogeneity of religion makes it challenging to interpret the results as causal links. Therefore, we use instruments to ease the endogeneity concerns. Tables 3 and 4 report the main results estimated with IV. The first stage results of each specification can be found in the corresponding columns of Tables B.1 and B.2 in Appendix B. The OLS version of each specification is presented in the corresponding columns of Tables 1 and 2, meaning that, for instance, column 4 in Table 1 is the OLS version of the specification in column 4 in Table 3. All specifications include the complete set of fixed effects.

We report four post-estimation diagnostic tests on the first stage strength. Kleibergen–Paap rk LM test is for under-identification (*idp* represents the corresponding p -value). Kleibergen–Paap rk Wald F statistic (*widstat*), that is F test of excluded instruments, and Cragg–Donald Wald F statistic (*cdf*) are diagnostics for weak identification. *Widstat* is equivalent to the first stage F statistic. Anderson-Rubin Wald F test (*AR test* represents its corresponding p -value), which is weak-instrument-robust, evaluates if the coefficients of endogenous variables are equal to zero in the reduced form estimation. The heteroscedasticity-robust option is applied for all the tests reported.

Table 3 displays the IV results for *inposav* with respect to different measures of religiosity. The first stage results in Table B.1 show that all the excluded instruments are strongly and positively related to the corresponding religiosity measures with a regression coefficient between 0.580 and 0.707. P-values of Kleibergen–Paap rk LM test (*idp*) show that the null of under-identification is rejected and the full rank condition is satisfied in all estimates. For all IV estimates, the first stage F statistics (*widstat*) are well above Stock–Yogo critical values of weak identification. The *AR test* results indicate that the instruments are relevant, except for *degree*, which we will discuss later.

The IV results for *inposav* exhibit a somewhat different pattern than the corresponding OLS results in Table 1. First of all, all religiosity measures display substantial increases in the coefficients, which is

Table 2
OLS estimates: Religiosity and average negative innovation attitudes.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>
<i>religiosity</i>	0.156*** (0.004)	0.155*** (0.004)	0.152*** (0.004)						
<i>degree</i>				0.137*** (0.005)	0.134*** (0.005)				
<i>attendance</i>						0.135*** (0.005)	0.133*** (0.005)		
<i>pray</i>								0.081*** (0.003)	0.078*** (0.003)
<i>gender</i>	-0.010*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.000 (0.003)	-0.000 (0.003)	-0.006** (0.003)	-0.006** (0.003)
<i>age</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>paidwork</i>		0.001 (0.002)	0.000 (0.002)	0.000 (0.002)	-0.001 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)
<i>pwbefore</i>		-0.215*** (0.017)	-0.215*** (0.016)	-0.197*** (0.021)	-0.198*** (0.020)	-0.206*** (0.019)	-0.207*** (0.018)	-0.230*** (0.025)	-0.230*** (0.024)
<i>partner</i>		0.023*** (0.002)	0.022*** (0.002)	0.023*** (0.002)	0.022*** (0.002)	0.022*** (0.002)	0.021*** (0.002)	0.024*** (0.002)	0.023*** (0.002)
<i>health</i>		0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
<i>child</i>		-0.002 (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.002 (0.002)
<i>bornc</i>			-0.032*** (0.003)		-0.035*** (0.003)		-0.037*** (0.003)		-0.035*** (0.003)
<i>fathere</i>			-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
<i>mothere</i>			-0.004*** (0.001)		-0.004*** (0.001)		-0.004*** (0.001)		-0.003*** (0.001)
<i>constant</i>	0.512*** (0.006)	0.703*** (0.018)	0.749*** (0.018)	0.672*** (0.021)	0.722*** (0.021)	0.711*** (0.019)	0.763*** (0.019)	0.740*** (0.025)	0.789*** (0.024)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>Adj. R²</i>	0.238	0.240	0.242	0.238	0.240	0.233	0.235	0.231	0.233

Notes: OLS estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

also the case in other studies using a more aggregated instrument than the endogenous variable (Iyer et al., 2017; Cutler and Gruber, 1996). *Religiosity* becomes significant and negative while it is positive and insignificant with OLS. *Degree* gets negative in columns 5 and 6. *Attendance* keeps the sign of OLS estimates, which is negative. *Pray* in columns 8 and 9 changes the sign to be negative as well. To shed light on the practical significance of the estimated effects, we concentrate on the estimated effect of the *religiosity* variable reported in column (3), which contains the most complete specification in terms of control variables. We find that increasing *religiosity* from its observed 20th percentile (i.e., 0.06) to the 80th percentile (i.e., 0.7) is associated with a variation in *inposav* of about -0.11 (i.e., -0.166*0.64) that, compared with the observed sample average value of *inposav* (i.e., 0.612), represents approximately an 18 per cent decrease.

The IV results for *Innegav* are reported in Table 4. They display a pretty stable and consistent pattern with respect to the corresponding OLS estimates presented in Table 2. All religiosity measures have a positive and statistically significant effect on *innegav*, with a slight increase in effect sizes. For instance, if we consider the results of column 3, we find that increasing *religiosity* from its observed 20th percentile to the 80th percentile is associated with a variation in *Innegav* of about 0.11 (i.e., 0.175*0.64) that, compared with the observed sample average value of *innegav* (i.e., 0.615), represents approximately an 18 per cent increase. The corresponding first stage results, reported in Table B.2,

show that all the excluded instruments are strongly correlated to the religiosity measures in each specification, with a coefficient between 0.583 and 0.707.

Appendix D provides the IV estimates broken down into each measure of innovation attitudes. Table D.1 shows that *importance of creativity* is negatively affected by all religiosity measures. In Table D.2, *importance of being different* is negatively related to all measures apart from *attendance*. Table D.3 shows that all religiosity measures are negatively related to *importance of being free*, yielding the highest coefficients among the IV estimates. Religiosity does not affect *importance of being adventurous* as demonstrated in Table D.4. These results signal that the estimated positive associations between religiosity and PIA in OLS Table C.1 (*importance of creativity*) and Table C.2 (*importance of being different*) are driven by endogeneity. Tables D.5 and D.6 show that religiosity measures positively affect NIA, similar to the OLS estimates. Overall, it is plausible to argue that higher degrees of religiosity are not advantageous for innovativeness since it fosters some personal traits uncondusive to an innovative mindset. Moreover, it falls away from conducive personal traits such as freedom and creativity.

Apart from the main coefficients of interest, the control variables also provide insightful results. Regarding *gender*, being male has a higher effect on *importance of creativity*, *importance of being adventurous*, and *following rules*; while being female has a higher effect on *importance of being different* and *following traditions*. *Age* is negatively related

Table 3
IV estimates: Religiosity and average positive innovation attitudes.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>
<i>religiosity</i>	-0.087 (0.058)	-0.141*** (0.052)	-0.166*** (0.049)						
<i>degree</i>				-0.176* (0.105)	-0.207** (0.098)				
<i>attendance</i>						-0.159*** (0.048)	-0.175*** (0.046)		
<i>pray</i>								-0.088** (0.037)	-0.108*** (0.035)
<i>gender</i>	-0.020*** (0.005)	-0.013*** (0.004)	-0.011*** (0.004)	-0.013** (0.006)	-0.011* (0.006)	-0.020*** (0.002)	-0.019*** (0.002)	-0.014*** (0.004)	-0.011** (0.004)
<i>age</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>education</i>	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)
<i>paidwork</i>		-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
<i>pwbefore</i>		-0.053 (0.035)	-0.057 (0.043)	-0.079* (0.044)	-0.088* (0.051)	-0.066* (0.039)	-0.070 (0.044)	-0.038 (0.028)	-0.039 (0.035)
<i>partner</i>		-0.017*** (0.002)	-0.016*** (0.002)	-0.017*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.015*** (0.003)	-0.018*** (0.002)	-0.018*** (0.002)
<i>health</i>		0.017*** (0.001)	0.017*** (0.001)	0.018*** (0.001)	0.017*** (0.001)	0.019*** (0.001)	0.018*** (0.001)	0.017*** (0.001)	0.016*** (0.001)
<i>child</i>		-0.020*** (0.002)	-0.019*** (0.002)	-0.020*** (0.002)	-0.020*** (0.002)	-0.020*** (0.002)	-0.020*** (0.002)	-0.020*** (0.002)	-0.019*** (0.002)
<i>bornc</i>			-0.022*** (0.005)		-0.022*** (0.007)		-0.017*** (0.004)		-0.020*** (0.005)
<i>fathere</i>			0.006*** (0.001)		0.005*** (0.001)		0.006*** (0.001)		0.006*** (0.001)
<i>mothere</i>			0.004*** (0.001)		0.004*** (0.001)		0.005*** (0.001)		0.004*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179
<i>AR test</i>	0.125	0.005	0.000	0.075	0.023	0.000	0.000	0.015	0.002

Notes: IV estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. Kleibergen–Paap rk LM statistic (*idp*), Kleibergen–Paap rk Wald F statistic (*widstat*), Cragg–Donald Wald F statistic (*cdf*), and Anderson–Rubin Wald F statistic (*AR test*) are reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

to importance of creativity, importance of being different, importance of being adventurous and positively related to following rules and following traditions. Education seems to foster PIA (see Tables D.1–D.4) and mitigate NIA (see Tables D.5 and D.6). Having a paid work in the last seven days (*paidwork*) is mostly insignificant. Having paid work before (*pwbefore*) is significant and negative for importance of creativity, following traditions, and following rules. Living with a partner (*partner*) is negatively related to PIA except for importance of creativity, while they are positively related NIA. Health and bornc do not introduce heterogeneous effects for PIA and NIA. Health is positively related to all innovation attitudes while bornc is negative in all specifications. Interestingly, living with a child (*child*) is negatively related to PIA and following rules, while it does not matter for following traditions. Both mother’s (*mothere*) and father’s education (*fathere*) are positively related to PIA, while only (*mothere*) significantly and negatively relates with NIA.

Overall, the negative effect of religiosity on innovation attitudes is in line with the findings of prior studies (Benabou et al., 2013, Benabou et al., 2015). Using OLS estimates, Benabou et al. (2015) find that religiosity is positively related to creativity, which they describe as “puzzling”. Since we find a negative relationship once we apply the IV strategy, we show that the positive relationship between religiosity and creativity may be driven by endogeneity.

The question is that, compared to the OLS estimates, why does *inposav* change its behaviour with respect to the religiosity measures while *innegav* stays stable? A possible answer is hidden in the relationship between religious belonging (*belonging*) and other religiosity measures which are summarised in Tables C.7 and C.8 in Appendix C.

In the ESS, a respondent answers the questions regarding *degree*, *attendance* and *pray* regardless of belonging to a religion. In other words, even though the respondent does not believe in a religion, she still answers questions such as “How religious are you?”, “How frequently do you pray?”, and “How frequently do you attend religious services?”. Interestingly, the answers are generally not zero. Table C.7 displays the mean values of all religiosity measures, broken down into religious belonging. For instance, the mean value of *religiosity* is 0.50 for believers —people who belong to a religion at present and past (*belonging*=1 & *belongingp*=1)— while it is 0.14 for never-believers —people who have never belonged to a religion (*belonging*=0 & *belongingp*=0)— and is 0.19 for once-believers —people who do not belong to a religion at present but used to belong at past (*belonging*=0 & *belongingp*=1).

Table C.8 shows disaggregated OLS results for religious belonging. For each sub-sample, all religiosity measures are positively and significantly associated with *innegav*. This pattern disappears when we look at *inposav*. For the sub-sample of believers, only *religiosity* and

Table 4
IV estimates: Religiosity and average negative innovation attitudes.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>	<i>innegav</i>
<i>religiosity</i>	0.110** (0.048)	0.162*** (0.047)	0.175*** (0.048)						
<i>degree</i>				0.178** (0.074)	0.188** (0.074)				
<i>attendance</i>						0.188*** (0.044)	0.195*** (0.045)		
<i>pray</i>								0.104*** (0.037)	0.115*** (0.037)
<i>gender</i>	-0.006 (0.004)	-0.009** (0.004)	-0.010** (0.004)	-0.007 (0.005)	-0.008* (0.005)	-0.001 (0.003)	-0.002 (0.003)	-0.009* (0.005)	-0.010** (0.005)
<i>age</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)
<i>paidwork</i>		0.001 (0.002)	0.001 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.001 (0.002)	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)
<i>pwbefore</i>		-0.214*** (0.017)	-0.214*** (0.015)	-0.189*** (0.022)	-0.187*** (0.021)	-0.199*** (0.016)	-0.199*** (0.015)	-0.232*** (0.022)	-0.233*** (0.019)
<i>partner</i>		0.023*** (0.002)	0.022*** (0.002)	0.022*** (0.002)	0.021*** (0.002)	0.021*** (0.002)	0.020*** (0.002)	0.024*** (0.002)	0.023*** (0.002)
<i>health</i>		0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003** (0.001)	0.003** (0.001)	0.005*** (0.001)	0.005*** (0.001)
<i>child</i>		-0.002 (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)
<i>bornc</i>			-0.030*** (0.004)		-0.032*** (0.005)		-0.034*** (0.004)		-0.031*** (0.005)
<i>fathere</i>			-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
<i>mothere</i>			-0.003*** (0.001)		-0.004*** (0.001)		-0.004*** (0.001)		-0.003*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179
<i>AR test</i>	0.020	0.000	0.000	0.018	0.014	0.000	0.000	0.004	0.002

Notes: IV estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. Kleibergen–Paap rk LM statistic (*idp*), Kleibergen–Paap rk Wald F statistic (*widstat*), Cragg–Donald Wald F statistic (*cdf*), and Anderson–Rubin Wald F statistic (*AR test*) are reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

attendance are significantly and negatively related to *inposav*. On the contrary, all religiosity measures of never-believers and once-believers are positively and significantly related to *inposav* with much higher coefficients. Under the light of this disaggregation, one can see that the OLS results in Table 1, namely, the positive associations between *degree*, *pray*, and *inposav* seem to be driven by the sub-sample of non-believers, raising the concerns for a spurious correlation. We, therefore, consider religious belonging in our IV strategy and construct the instruments by taking it into account. We instrument the religiosity of a believer with the average religiosity of believers, along with other measures explained in Section 3. By doing so, we address the differences between the religiosities of believers and non-believers. Therefore, the IV results for *inposav* in Table 3 display different signs than the OLS results in Table 1.

5. Sensitivity analyses

5.1. Alternative dependent variable

We have analysed innovation attitudes separately so far, concluding that higher religiosity is negatively related to PIA and positively correlated to NIA, which means that being religious is not a catalyser for innovation-related traits and is possibly an obstacle. In order to assess

the robustness of this empirical regularity, we introduce a summary measure of innovation attitudes: *innosum* = *creative* + *free* + *different* + *adventurous* - *traditions* - *rules*, which is inspired by Tabellini (2005).¹⁶ *Innosum* is rescaled to be between 0 (low propensity to innovate) and 1 (high propensity to innovate); thus, higher values favour innovation.

We re-estimate the baseline specifications with OLS and IV by identifying *innosum* as the dependent variable. The results are presented in Table 5. Columns 1–4 are estimated with OLS, while columns 5–8 are estimated with IV. All specifications include the complete set of control variables and fixed effects. The OLS results favour the negative association between religiosity and innovation attitudes through each measure of religiosity. The IV results are also in line with the previous results.

5.2. Alternative independent variable and estimators

Religiosity is defined as the latent factor of three measures: *degree*, *attendance*, and *pray*. However, *degree* differs from the other two in one

¹⁶ Tabellini (2005) introduces a summary variable of cultural traits which is the sum of the three positive beliefs (control, respect, trust) minus the negative belief (obedience).

Table 5
Religiosity and summary innovation attitudes.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>innosum</i>	<i>innosum</i>	<i>innosum</i>	<i>innosum</i>	<i>innosum</i>	<i>innosum</i>	<i>innosum</i>	<i>innosum</i>
<i>religiosity</i>	-0.047*** (0.003)				-0.169*** (0.036)			
<i>degree</i>		-0.040*** (0.003)				-0.201*** (0.065)		
<i>attendance</i>			-0.053*** (0.003)				-0.182*** (0.035)	
<i>pray</i>				-0.022*** (0.002)				-0.111*** (0.026)
<i>gender</i>	-0.013*** (0.002)	-0.014*** (0.002)	-0.015*** (0.002)	-0.014*** (0.002)	-0.004 (0.003)	-0.004 (0.004)	-0.012*** (0.002)	-0.004 (0.003)
<i>age</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>education</i>	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
<i>paidwork</i>	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.000 (0.002)	-0.001 (0.001)	-0.001 (0.002)
<i>pwbefore</i>	0.037*** (0.011)	0.035*** (0.008)	0.036*** (0.010)	0.045*** (0.007)	0.033 (0.027)	0.004 (0.033)	0.019 (0.030)	0.052*** (0.020)
<i>partner</i>	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.020*** (0.002)	-0.018*** (0.002)	-0.018*** (0.002)	-0.017*** (0.002)	-0.020*** (0.001)
<i>health</i>	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.011*** (0.001)	0.009*** (0.001)
<i>child</i>	-0.013*** (0.001)	-0.013*** (0.001)	-0.013*** (0.001)	-0.013*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)
<i>bornc</i>	0.005** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	-0.004 (0.003)	-0.004 (0.005)	-0.000 (0.003)	-0.003 (0.003)
<i>fathere</i>	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
<i>mothere</i>	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
<i>constant</i>	0.534*** (0.012)	0.536*** (0.010)	0.528*** (0.011)	0.515*** (0.008)				
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,409	235,409	235,409	235,409	235,409	235,409	235,409	235,409
<i>idp</i>					0.000	0.000	0.000	0.000
<i>cdf</i>					2528.328	784.106	2879.161	2064.270
<i>widstat</i>					168	71	139	179
<i>AR test</i>					0.000	0.001	0.000	0.000

Notes: OLS and IV estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. Kleibergen–Paap rk LM statistic (*idp*), Kleibergen–Paap rk Wald F statistic (*widstat*), Cragg-Donald Wald F statistic (*cdf*), and Anderson-Rubin Wald F statistic (*AR test*) are reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

important dimension. *Pray* and *attendance* are measures of an activity, an action, while *degree* is self-evaluation of a belief, a value. It is plausible to think that one cannot easily overestimate or underestimate the frequency of an activity but can do so to evaluate a belief. Therefore an interpersonal comparison of *degree* might be biased since some individuals may overvalue or undervalue their religiosity. This point is especially crucial to our instruments since individual *i*'s *degree* is instrumented by the average *degree* of other people. If many respondents tend to misvalue their *degree*, then this self-report bias could potentially lead to a weak instrument problem. Indeed, the diagnostic tests for *degree* in Tables 3 and 4 support this conjecture. Furthermore, *degree* is a component of *religiosity*, thus, this problem may contaminate also the instrument for *religiosity*.

In order to test if the results are sensitive to the possible self-report bias of *degree*, we modify the IV strategy and report the results in Table 6. The first column is estimated with 2SLS and *religiosity* is instrumented with *attendance* and *pray*. Columns 2 and 3 follow the specification of column 1 but are estimated with *k*-class estimators. Prior studies suggest that Limited Information Maximum Likelihood Method (LIML) and Fuller-edited LIML have a better finite-sample performance than 2SLS in the presence of weak instruments (Baum

et al., 2007). Accordingly, in the case of strong instruments, the estimates of 2SLS, LIML, and Fuller should yield very similar results. Motivated by this reasoning, column 2 is estimated with LIML. Column 3 is estimated with Fuller edited LIML with a Fuller parameter $k = 1$. Column 4 is estimated with 2SLS, but the dependent variable is *innosum* and the instruments are *attendance* and *pray*. In specification 5, we add *iv_degree* as the third instrument for *religiosity*. The results of 2SLS, LIML, and Fuller estimates are the same, suggesting that our instruments are strong. The coefficients of *religiosity* in columns 1, 2, and 3 are qualitatively and quantitatively similar to the corresponding coefficient of *religiosity* in column 3 in Table 3, indicating that the initial instrument of *religiosity* (*iv_religiosity*) is not significantly affected by the potential self-report bias of *degree*.

5.3. Reduced sample estimates

The present study uses pooled cross-sectional data from a cross-country survey. Therefore, it is plausible to think that some outliers might lead to biased estimates. To assess the sensitivity of main results, Table 7 displays the estimates from five different sub-samples. Each

Table 6
Alternative independent variable and estimators.

	(1)	(2)	(3)	(4)	(5)
	<i>inposav</i>	<i>inposav</i>	<i>inposav</i>	<i>innosum</i>	<i>inposav</i>
<i>religiosity</i>	-0.191*** (0.051)	-0.191*** (0.051)	-0.191*** (0.051)	-0.197*** (0.038)	-0.191*** (0.052)
<i>gender</i>	-0.012*** (0.003)	-0.012*** (0.003)	-0.012*** (0.003)	-0.005* (0.003)	-0.012*** (0.003)
<i>age</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>education</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.002*** (0.000)
<i>paidwork</i>	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
<i>pwbefore</i>	-0.066 (0.046)	-0.066 (0.046)	-0.066 (0.046)	0.024 (0.031)	-0.066 (0.046)
<i>partner</i>	-0.016*** (0.002)	-0.016*** (0.002)	-0.016*** (0.002)	-0.018*** (0.002)	-0.016*** (0.002)
<i>health</i>	0.017*** (0.001)	0.017*** (0.001)	0.017*** (0.001)	0.010*** (0.001)	0.017*** (0.001)
<i>child</i>	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.012*** (0.001)	-0.019*** (0.002)
<i>bornc</i>	-0.022*** (0.005)	-0.022*** (0.005)	-0.022*** (0.005)	-0.005 (0.003)	-0.022*** (0.005)
<i>fathere</i>	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.004*** (0.000)	0.006*** (0.001)
<i>mothere</i>	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes
<i>N</i>	235,409	235,409	235,409	235,409	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	1289	1289	1289	1289	863
<i>widstat</i>	88	88	88	88	62
<i>AR test</i>	0.000	0.000	0.000	0.000	0.000
<i>Hansen J</i>	0.480	0.480	0.480	0.195	0.612

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. Kleibergen–Paap rk LM statistic (*idp*), Kleibergen–Paap rk Wald F statistic (*widstat*), Cragg-Donald Wald F statistic (*cdf*), Anderson-Rubin Wald F statistic (*AR test*), and Sargan-Hansen test *Hansen J* are reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

coefficient comes from a different IV estimate. The number of observations is below standard errors, which is followed by Cragg-Donald Wald F statistic (*cdf*), Kleibergen–Paap rk Wald F statistic (*widstat*), and Anderson-Rubin Wald F statistic (*AR test*) results.

First, we drop Muslim countries. Turkey, Albania, and Kosovo are the only dominantly Muslim countries in the ESS. The rest of the sample consists of dominantly Christian countries, if not dominantly Atheist.¹⁷ Despite controlling for country and denomination fixed effects, combining Muslim and Christian countries may complicate the interpretation. Moreover, Muslim countries exhibit outlier values for religiosity. For instance, *degree* takes an average of 0.7–0.73 (see Table A.3) which is pretty considering its overall cross-country average (0.46). Therefore, we exclude Muslim countries from the sample and re-estimate the baseline specification as a robustness check. Columns 1 and 2 report the results. The overall negative effect of *attendance* increases compared to the full sample results; from -0.175 to -0.218 on *inposav* and from 0.195 to 0.240 on *innegav*. On the other hand, the effect of *degree* on *innegav* becomes less significant which is not surprising since the Muslim countries exhibit outlier values of *degree*. All in all, the overall picture stays robust.

Second, we exclude Russia and Norway from the main sample. In both countries, the percentages of the first and the second dominant

¹⁷ The second dominant religion is Christianity in each dominantly Atheist country.

denominations among respondents are less than 1%. The majority of respondents from Norway are Atheists with 47.02%; Protestants come second with 46.36%. For Russia, the majority is Eastern Orthodox with 46.03%; Atheists come second with 45.83%. We, thus, drop Russia and Norway and re-estimate the baseline specifications to assess the difference. Columns 3 and 4 in Table 7 report the results. Column 3 shows that the coefficient of each religiosity measure, except for *attendance*, increases for *inposav*. In addition, *degree* becomes more significant at the 99% level compared to the full sample results in Table 3.

Third, we exclude Muslim countries along with Russia and Norway to obtain a relatively homogeneous sample. Columns 5 and 6 display the results. Coefficients of all religiosity measures increase for *inposav* and *degree* becomes more significant compared to Table 3. For *innegav*, *degree* and *pray* become less significant compared to the full sample.

Fourth, we exclude once-believers. Non-believers are split into two categories among themselves: never-believers and once-believers. Table C.7 shows that the latter exhibit slightly higher religiosity means. The reason behind is that religiosity tends to be an absorbed value. Even though a person has stopped believing in a religion, there might be persistent effects, let alone the fact that personal values and traits might have been mostly grown when the person was a believer. To examine whether the higher religiosity of once-believers substantially affects the overall results, we drop once-believers from the full sample and leave the respondents who have been either always-believers or never-believers. The corresponding results are presented in columns 7 and 8 in Table 7. Column 8 shows that the overall results for *innegav* do not change substantially compared to Table 4. However, the coefficient of each religiosity measure somewhat decreases in column 7 compared to Table 3.

Lastly, we exclude second-generation immigrants¹⁸ since the descendants of immigrants¹⁹ might possess peculiar traits due to different cultural and institutional environments of their origin country. Columns 9 and 10 report the results. The coefficients for *inposav* decrease and *degree* turn out to be insignificant compared to Table 3. On the contrary, the results of *innegav* are more stable and similar to Table 4.

All in all, the reduced sample estimates indicate that the overall findings are representative and not significantly affected by the minority groups.

5.4. Possible violations of exogeneity

The dominant denomination is one of the factors by which we construct the instruments. As Table A.1 indicates, a very high percentage of the population belongs to the dominant religion in many countries. However, some countries have relatively low percentages of the dominant religion. For instance, the prevailing denomination is atheism in Switzerland (34%) and Germany (38%), yet they comprise roughly one-third of the population. The significant presence of religions that are different from the dominant religion of a country, as well as their combination, might introduce some unobservable traits related to innovation attitudes. Suppose the instruments for religiosity are computed on a group of individuals that exhibit some peculiar values of the unobservable traits (that stem from the presence of different religion combinations in the country) related to innovation attitudes. In that case, the exogeneity condition may not be met.

Another potential source of unobservable endogeneity might be the historical evolution of the dominant religion. As Schulz et al. (2019)

¹⁸ Second-generation immigrants are detected by exploiting the variables *facntr*: father born in country and *moctr*: mother born in country. A respondent is codified as a second-generation immigrant if her mother or father was born in a different country than the one she lives in.

¹⁹ Note that immigration status of the respondent is controlled for in the baseline specifications with variable *bornc*: born-in country of the respondent.

Table 7
Reduced sample estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	<i>inposav</i>	<i>innegav</i>	<i>inposav</i>	<i>innegav</i>	<i>inposav</i>	<i>innegav</i>	<i>inposav</i>	<i>innegav</i>	<i>inposav</i>	<i>innegav</i>
<i>religiosity</i>	-0.192*** (0.056)	0.187*** (0.052)	-0.204*** (0.053)	0.210*** (0.059)	-0.211*** (0.054)	0.189*** (0.061)	-0.157*** (0.053)	0.203*** (0.049)	-0.144*** (0.056)	0.187*** (0.052)
	232,479	232,479	216,910	216,910	213,980	213,980	211,542	211,542	203,616	203,616
	2,471	2,470	1,922	1,921	1,872	1,872	2,450	2,450	2,222	2,222
	167	167	108	108	105	105	168	168	141	141
	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.007	0.000
<i>degree</i>	-0.205** (0.093)	0.133* (0.070)	-0.274*** (0.095)	0.292*** (0.111)	-0.275*** (0.090)	0.179* (0.100)	-0.174** (0.084)	0.211*** (0.067)	-0.164 (0.105)	0.180** (0.078)
	232,479	232,479	216,910	216,910	213,980	213,980	211,542	211,542	203,616	203,616
	919	919	341	341	410	410	973	973	628	628
	98	98	36	36	50	50	92	92	55	55
	0.017	0.070	0.003	0.008	0.001	0.084	0.027	0.002	0.104	0.027
<i>attendance</i>	-0.218*** (0.057)	0.240*** (0.054)	-0.154*** (0.043)	0.186*** (0.046)	-0.199*** (0.053)	0.231*** (0.057)	-0.147*** (0.046)	0.189*** (0.045)	-0.152*** (0.049)	0.169*** (0.047)
	232,479	232,479	216,910	216,910	213,980	213,980	211,542	211,542	203,616	203,616
	2,075	2,075	2,587	2,587	1,808	1,808	2,540	2,540	2,523	2,523
	120	120	108	108	90	90	125	125	110	110
	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000
<i>pray</i>	-0.102*** (0.035)	0.102*** (0.037)	-0.135*** (0.037)	0.113*** (0.043)	-0.128*** (0.037)	0.093** (0.043)	-0.089*** (0.034)	0.123*** (0.037)	-0.068* (0.035)	0.118*** (0.037)
	232,479	232,479	216,910	216,910	213,980	213,980	211,542	211,542	203,616	203,616
	2,122	2,122	1,681	1,681	1,734	1,734	1,976	1,976	1,980	1,980
	183	183	125	125	127	127	178	178	171	171
	0.003	0.006	0.000	0.007	0.000	0.026	0.006	0.001	0.049	0.001

Notes: Robust standard errors clustered at the level of instruments are in parentheses and followed by the number of observations, Cragg-Donald Wald F statistic (*cdf*), Kleibergen-Paap rk Wald F statistic (*widstat*), and Anderson-Rubin Wald F statistic (*AR test*). All specifications include the full set of control variables and fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

underline, individual traits, including individualism and independence, can be outcomes of the Western Church reform. Correspondingly, the individual traits observed today might be partially formed by historically dominant religion(s). Despite the impact of such historical events likely to be captured by country and denomination fixed effects, the combination of historically dominant religion and current dominant religion may introduce some unobservable effects.

Based on the motivations highlighted above, we perform a robustness check by including fixed effects for each pair of individual religious denominations and dominant religious denomination of the country to account for diverse religious environments resulting from different combinations of religions (historically) existing in a country. The results are presented in Table 8. Despite moderate decreases in the majority of coefficients, the results are pretty similar to the baseline specifications reported in Tables 3 and 4. Correspondingly, it can be said that the instruments are relevant and representative of various religious environments.

Another possible violation of exogeneity might stem from using neighbouring countries when computing the instruments. We argue that religiosity is a transnational trait; therefore, one’s religiosity can be instrumented by other people’s religiosity who live in a similar religious environment. However, suppose there are substantial similarities in the institutional environments of countries that share the same dominant denomination. In that case, individual innovation attitudes could be affected by these similarities in a particular way, violating the exogeneity assumption. We, therefore, use a large set of fixed effects to eliminate the institutional-level factors. Nevertheless, using neighbouring countries when computing instruments might introduce another channel of institutional similarity since sharing a border and spatial proximity can reinforce a similar institutional environment. Motivated by this possibility, we change the definition of the instruments as a robustness check. We build instruments for religious intensity variables by computing the average religiosity of people of the same sex, age range, and religious affiliation who live in countries with the same dominant religious denomination that are not neighbours, *i.e.*, do not share a border. Table 9 presents the results. All coefficients for *inposav* and *innegav* are increased compared to the main results in Tables 3 and 4. The negative effect of religion on innovation attitudes persists.

6. Potential channels of causality

6.1. Time allocation

Starting from Gary Becker’s pioneering work “A Theory of the Allocation of Time” (Becker, 1965), numerous papers have analysed agents’ time allocation among various activities. The work of Azzi and Ehrenberg (1975) is the first study that considers religious participation in the context of household members’ time allocation, presenting the first model of consumer choice in religious markets. They use a microeconomic approach to examine the demand of religion by introducing a multi-period utility-maximising model of household behaviour. In the model, religious participation is a part of household members’ utility function and is a time-consuming activity as well as an investment in after-life consumption. Household members are man and woman who have different opportunity costs of time due to the different wages they are subject to in the labour market. They allocate their time by considering not only their wage but also the marginal utilities of after-life and in-life consumption. Suppose household members allocate more time for religious participation by favouring after-life consumption. In that case, they will have less time for productive activities for in-life consumption, resulting in lower total household production.

The point we are interested in the model of Azzi and Ehrenberg is the opportunity cost of time spent on religious activities, given that religious participation is a time-consuming activity and time is scarce. The concept of *opportunity cost of religious participation* can also be considered for other relevant time-consuming activities such as human capital formation which requires many years of education, a lifelong habit of reading, and attending scientific and intellectual activities. All these activities demand time and time is limited. If an individual is religious and allocates a certain amount of time to religious activities, then there will be a decrease in the maximum amount of potential time that could be devoted to human capital formation. It is well-known that human capital is one of the most critical drivers of innovation. Thus, any unfavourable activity to human capital formation can be plausibly assumed unfavourable to innovation.

On the contrary, the social capital approach is a perspective that contrasts with the negative effect of time spent on religious activities.

Table 8
IV estimates with fixed effects for religion combinations.

	(1) <i>inposav</i>	(2) <i>inposav</i>	(3) <i>inposav</i>	(4) <i>inposav</i>	(5) <i>innegav</i>	(6) <i>innegav</i>	(7) <i>innegav</i>	(8) <i>innegav</i>
<i>religiosity</i>	-0.182*** (0.067)				0.163*** (0.058)			
<i>degree</i>		-0.264** (0.125)				0.157* (0.085)		
<i>attendance</i>			-0.139*** (0.054)				0.138*** (0.049)	
<i>pray</i>				-0.104*** (0.039)				0.105*** (0.041)
<i>gender</i>	-0.012*** (0.004)	-0.007 (0.007)	-0.020*** (0.002)	-0.011** (0.005)	-0.007 (0.004)	-0.007 (0.006)	-0.001 (0.003)	-0.009* (0.005)
<i>age</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>paidwork</i>	-0.001 (0.002)	-0.001 (0.002)	-0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)
<i>pwbefore</i>	-0.064 (0.044)	-0.099* (0.060)	-0.065* (0.038)	-0.037 (0.032)	-0.213*** (0.020)	-0.197*** (0.027)	-0.211*** (0.022)	-0.238*** (0.025)
<i>partner</i>	-0.016*** (0.002)	-0.015*** (0.003)	-0.015*** (0.003)	-0.018*** (0.002)	0.021*** (0.002)	0.021*** (0.002)	0.020*** (0.002)	0.022*** (0.002)
<i>health</i>	0.017*** (0.001)	0.017*** (0.001)	0.018*** (0.001)	0.016*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.005*** (0.001)
<i>child</i>	-0.019*** (0.002)	-0.019*** (0.002)	-0.020*** (0.002)	-0.019*** (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.003 (0.002)
<i>bornc</i>	-0.021*** (0.005)	-0.025*** (0.007)	-0.016*** (0.004)	-0.020*** (0.004)	-0.030*** (0.004)	-0.031*** (0.005)	-0.034*** (0.004)	-0.029*** (0.005)
<i>fathere</i>	0.006*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
<i>mother</i>	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,408	235,408	235,408	235,408	235,408	235,408	235,408	235,408
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2102	592	2718	1856	2102	592	2718	1856
<i>widstat</i>	138	48	124	157	138	48	124	157
<i>AR test</i>	0.003	0.018	0.006	0.006	0.005	0.078	0.004	0.009

Notes: IV estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. Kleibergen–Paap rk LM statistic (*idp*), Kleibergen–Paap rk Wald F statistic (*widstat*), Cragg–Donald Wald F statistic (*cdf*), and Anderson–Rubin Wald F statistic (*AR test*) are reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

The main idea is that participating in religious services is a form of networking and helps the attendant build social capital. Barro and McCleary (2006) underline that social capital formation through religious participation is favourable for the economy only if it fosters economically relevant individual traits such as work ethic, thriftiness, honesty, and trust.

“The social capital and cultural aspects of religion (communal services, rituals, religious schools) are significant only to the extent that they influence beliefs and, hence, behaviour. In fact, for given beliefs, more time spent on communal activities would tend to be an economic drag, at least as measured by market output (GDP)”. (Barro and McCleary, 2006, pp. 51).

Consequently, the net effect of religious participation, positive or negative, on economic outcomes would be determined by taking into account the comparative consequences of the two approaches mentioned: the opportunity cost of time spent on religious activities and the social capital formation through religious participation. In our case, it is somewhat arguable to claim that social capital formation fosters favourable individual traits for innovation. As mentioned in Section 2.2, taking risks, being different, adventurous, and creative are the main individual traits that are considered favourable to innovation. However, as shown by the analyses above, religious participation does not seem to foster any of them. Moreover, it is likely to impose traditional values

and rules. The results throughout the present paper support this argument. Attendance has been the most robust religiosity measure across different specifications and it negatively affects innovation attitudes.

6.2. The fear of uncertainty

As mentioned in Section 2, Hofstede (1980/2001) identifies uncertainty avoidance as one of the five dimensions on which national cultures differ. Innovation requires newness and risk tolerance, thus, is related to uncertainty which hints at unpredictability and a lack of structure and information (Rogers, 1983). Individuals or the decision-making unit involved in the first stages of the innovation process would be naturally unsure of the new idea’s results and face the inherent uncertainty of newness. Therefore, an individual’s propensity to innovate is expected to be positively related to the ability to deal with uncertainty.²⁰ Low levels of the fear of uncertainty refer to more

²⁰ Uncertainty and risk are initially different concepts. Risk is the perceived probability that a particular event will happen. Uncertainty is about ambiguity. Any event may happen, and there is no probability attached to it (Hofstede et al., 2010). However, for simplicity, we use uncertainty as inclusive of risk since any degree of uncertainty contains risk, whether with a known or

Table 9
IV estimates with instruments of non-neighbouring countries.

	(1) <i>inposav</i>	(2) <i>inposav</i>	(3) <i>inposav</i>	(4) <i>inposav</i>	(5) <i>innegav</i>	(6) <i>innegav</i>	(7) <i>innegav</i>	(8) <i>innegav</i>
<i>religiosity</i>	-0.232*** (0.064)				0.263*** (0.060)			
<i>degree</i>		-0.269** (0.124)				0.270*** (0.096)		
<i>attendance</i>			-0.227*** (0.059)				0.244*** (0.056)	
<i>pray</i>				-0.119*** (0.038)				0.156*** (0.042)
<i>gender</i>	-0.009** (0.004)	-0.007 (0.007)	-0.018*** (0.003)	-0.010** (0.005)	-0.013*** (0.004)	-0.013** (0.006)	-0.003 (0.003)	-0.015*** (0.005)
<i>age</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>paidwork</i>	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
<i>pwbefore</i>	-0.070 (0.053)	-0.100 (0.061)	-0.077 (0.053)	-0.038 (0.037)	-0.198*** (0.018)	-0.171*** (0.026)	-0.192*** (0.017)	-0.237*** (0.016)
<i>partner</i>	-0.016*** (0.002)	-0.015*** (0.003)	-0.014*** (0.003)	-0.018*** (0.002)	0.020*** (0.002)	0.020*** (0.002)	0.019*** (0.002)	0.023*** (0.002)
<i>health</i>	0.017*** (0.001)	0.017*** (0.001)	0.019*** (0.001)	0.016*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.002** (0.001)	0.005*** (0.001)
<i>child</i>	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.004* (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.004* (0.002)
<i>bornc</i>	-0.025*** (0.006)	-0.025*** (0.009)	-0.020*** (0.004)	-0.021*** (0.005)	-0.026*** (0.005)	-0.027*** (0.006)	-0.032*** (0.004)	-0.027*** (0.005)
<i>fathere</i>	0.006*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
<i>mother</i>	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,399	235,399	235,399	235,399	235,399	235,399	235,399	235,399
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	1873	499	2044	1703	1873	499	2044	1703
<i>widstat</i>	122	42	92	161	122	42	92	161
<i>AR test</i>	0.000	0.019	0.000	0.001	0.000	0.007	0.000	0.000

Notes: IV estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. Kleibergen–Paap rk LM statistic (*idp*), Kleibergen–Paap rk Wald F statistic (*widstat*), Cragg–Donald Wald F statistic (*cdf*), and Anderson–Rubin Wald F statistic (*AR test*) are reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

openness toward new ideas and change, more willingness to take risks, and less fear of novelty.

Shane (1993) shows that uncertainty avoidance is one of the values that have a negative impact on a country’s overall innovativeness, and it explains, to some degree, the variation in national rates of innovativeness across countries. Shane (1995) uses the data of 4405 individuals in 43 organisations from 68 different countries and examines the relationship between uncertainty avoidance and individual preferences for four innovation championing roles: the organisational maverick, the network facilitator, the transformational leader, and the organisational buffer. He shows that individuals from uncertainty-avoiding cultures are less likely to prefer championing roles. “One might argue that uncertainty-accepting societies are more innovative (Shane, 1993) because championing roles which overcome organisational inertia to innovation are more likely to be accepted in those societies”. (Shane, 1995, pp. 64).

Chen et al. (2014) find that higher levels of uncertainty avoidance have negative effects on corporate innovation. Firms located in countries with higher levels of uncertainty avoidance generate fewer

unknown probability. Hence, we use the term “the fear of uncertainty” instead of “uncertainty avoidance” to distinguish it from Hofstede’s concept.

and less critical patents, and their R&D expenditures are less efficient. William and McGuire (2010) show that uncertainty avoidance has a negative effect on economic creativity which facilitates innovation implementation.

Religion is one of the ways to cope with uncertainty (Hofstede, 2001). It can be argued that religious people tend to fear uncertainty more than irreligious people. The first empirical study that used risk analysis in the context of religiosity is that of Miller and Hoffmann (1995). They consider religious acceptance a risk-averse behaviour and the rejection of religious beliefs as risk-taking behaviour. One salient feature of religion is to provide a sort of protection, both materially and mentally. Religion mitigates the uncertainties and risks of daily life by providing spiritually rewarding networks of welfare activities for the community, such as charity for the poor, assistance for individuals who experience personal disasters, elder care, medical assistance, orphanages, and education (Gill and Lundsgaarde, 2004; Barro and McCleary, 2006; Scheve and Stasavage, 2006). Those activities are provided by religious organisations (e.g., churches, temples, mosques, or synagogues) and may be crucial in encouraging individuals to attend religious activities and be a part of religious organisations. Religion also helps one deal with uncertainty and fear mentally by introducing the salvation motive and after-life rewards. Religious people are used to believing they are protected by divine power and religious organisations.

Table 10
IV estimates: The fear of uncertainty.

	(1) <i>unemployed</i>	(2) <i>securejob</i>	(3) <i>trust</i>	(4) <i>safe</i>	(5) <i>government</i>
<i>religiosity</i>	-0.162*** (0.032) 234,896 0.000	0.019* (0.011) 50,981 0.086	0.026*** (0.008) 235,001 0.002	0.107*** (0.010) 234,949 0.000	0.100*** (0.009) 233,675 0.000
<i>degree</i>	-0.128*** (0.030) 234,896 0.000	0.019* (0.010) 50,981 0.061	0.025*** (0.008) 235,001 0.002	0.102*** (0.009) 234,949 0.000	0.092*** (0.008) 233,675 0.000
<i>attendance</i>	-0.244*** (0.040) 234,896 0.000	0.024* (0.013) 50,981 0.072	0.034*** (0.010) 235,001 0.001	0.132*** (0.012) 234,949 0.000	0.126*** (0.011) 233,675 0.000
<i>pray</i>	-0.127*** (0.027) 234,896 0.000	0.013 (0.009) 50,981 0.149	0.020*** (0.007) 235,001 0.004	0.086*** (0.008) 234,949 0.000	0.081*** (0.008) 233,675 0.000

Notes: Robust standard errors clustered at the level of instruments are in parentheses, followed by sample size and Anderson-Rubin Wald F statistic (AR test). All specifications include the full set of control variables and fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

They have preset answers for the unknown, meaning they have less experience dealing with uncertainty than irreligious people. In order to test this hypothesis, we examine the relationship between religiosity and the fear of uncertainty as follows.

We nominate five indicators from the ESS that are related to the fear of uncertainty; then, we examine their relation with religiosity measures. Each indicator corresponds to one or more differences between weak and strong uncertainty avoidance societies in Hofstede’s model. For instance, societies with strong uncertainty avoidance exhibit the following behaviours: “The uncertainty inherent in life is felt like a continuous threat that must be fought”, “Higher stress, emotionality, anxiety, neuroticism”, and “Staying in jobs even if disliked”. (Hofstede, 2011, pp.10). More broadly, Hofstede defines three components of uncertainty avoidance: rule orientation, employment stability, and stress. The variables *unemployed* (ever been unemployed and seeking job more than 3 months) and *securejob* (important when choosing job: secure job) refer to employment stability; *trust* (most people can be trusted), *safe* (important to live in secure surroundings) and *government* (important: government ensures safety) refer to stress. Apart from these measures, *following rules*, one of the NIA, also refers to rule orientation.

The results are presented in Table 10. *Unemployed* is negatively, *securejob* is positively related to the religiosity measures. It can be said that religiosity and employment stability are associated. The variables referring to stress are positively and significantly correlated with religiosity measures, suggesting that religious people do not necessarily feel stressed. The IV results for *following rules* (Table D.6) are positively and significantly correlated with all religiosity measures. Thus, rule orientation relates positively to religiosity. Overall, there are signals that religiosity and the fear of uncertainty are related, but further evidence is needed.

6.3. Roles reinforced by religion

Roles reinforced by religion can be read through various concepts. Yet, we consider two of them: individualism-collectivism and conventional gender roles.²¹

²¹ Masculinity-femininity is one of the five dimensions of Hofstede’s model and it is a combination of conventional gender roles and the degree of orientation to material achievement (William and McGuire, 2010). However, there is no consensus in the literature that masculinity or femininity favours innovation. We, therefore, simplify this dimension and take only conventional gender roles into account.

In Hofstede’s work, individualism-collectivism is one of the five dimensions on which national cultures differ and has been widely used in the empirical literature related to culture (Sondergaard, 1994). In individualist societies, the interests of individuals come before the interests of the group. On the other hand, the group’s interests come first in collectivist societies so individuals work for the group, not for themselves. Therefore, complying with the group’s rules and staying loyal to the group are crucial behaviours in collectivist societies that require one to follow the established rules and traditions, leaving limited space for reformist and creative endeavours. Nevertheless, creativity, which is one of the main ingredients of innovation, is said to be the act of an individual, at times in contradiction with the norms and values of the group (Amabile, 1996; William and McGuire, 2010).

Individualism may facilitate innovation by fostering a tendency to accept novelty (Steenkamp et al., 1999), giving courage to individuals to defend new ideas in the face of resistance, and enabling the emergence of champion roles (Shane, 1995). Collectivism, on the contrary, may damage innovation by fostering ideas that are acceptable to all interested parties (William and McGuire, 2010).

William and McGuire (2010) show that individualism positively influences economic creativity which facilitates innovation implementation. Chen et al. (2017) show that higher levels of individualism foster corporate innovation by generating more and higher impact patents and by being more efficient in converting R&D into innovative output. Taylor and Wilson (2012) find that most measures of individualism have a strong and positive effect on national innovation rates. They also find that certain types of collectivism, such as patriotism and nationalism, may foster innovation at the country level; while other types of collectivism, such as familism and localism, harm national innovation rates.

Gorodnichenko and Roland (2017) examine the effect of individualism and collectivism on long-run economic growth. They find that individualism has a strong and positive effect on economic growth. The main reason is that higher degrees of individualism lead to more innovation since innovation is associated with higher personal and social rewards in an individualistic culture. In this regard, individualist countries are generally more prosperous than collectivist societies (Hofstede et al., 2010).

Religion is likely to favour collectivist culture since following rules and staying loyal to the group, church, and god are inherent to religion. One cannot modify religion to best self-interest, as an individualistic approach would require. Some denominations are said to be more individualistic than others, such as Protestantism, yet we do not compare denominations and only discriminate between being religious and irreligious.

We examine the relationship between individualism-collectivism and religiosity based on the insights and literature above. We define four indicators from the ESS data that are somewhat related to individualism and collectivism: *devote* (important to devote himself to people close to him), *family* (family should be priority in life), *success* (important: being successful and recognised achievements), and *lookafter* (everyone should look after himself). *Lookafter* is related to personal freedom and self-care, *success* is related to personal achievement, which both are stronger in individualistic cultures than they are in collectivist cultures (Gorodnichenko and Roland, 2017). *Devote* and *family* refer to *we consciousness* and the superiority of the group over the individual, thus, is expected to be stronger in collectivist cultures.

Table 11 presents the results. *Devote* and *family* are positively and significantly related to the religiosity measures, suggesting that higher religiosity favours a collectivist culture. On the other hand, *success* and *lookafter* show contrasting results, leaving the question open whether religiosity and individualism negatively relate.

When it comes to gender differences and traditional roles, there is a vast literature (Miller and Stark, 2002) and a lot to say, yet we only discuss the matter non-exhaustively for the sake of clarity. Higher degrees of religiosity may cause individuals to be more submissive,

Table 11
IV estimates: Individualism-collectivism.

	(1) <i>devote</i>	(2) <i>success</i>	(3) <i>lookafter</i>	(4) <i>family</i>
<i>religiosity</i>	0.037*** (0.006) 234,987 0.000	0.044*** (0.012) 234,730 0.000	-0.021 (0.021) 25,368 0.310	0.125*** (0.015) 25,452 0.000
<i>degree</i>	0.033*** (0.006) 234,987 0.000	0.039*** (0.011) 234,730 0.001	-0.021 (0.020) 25,368 0.311	0.117*** (0.014) 25,452 0.000
<i>attendance</i>	0.048*** (0.007) 234,987 0.000	0.060*** (0.014) 234,730 0.000	-0.024 (0.025) 25,368 0.332	0.152*** (0.017) 25,452 0.000
<i>pray</i>	0.030*** (0.005) 234,987 0.000	0.034*** (0.010) 234,730 0.001	-0.017 (0.017) 25,368 0.313	0.099*** (0.012) 25,452 0.000

Notes: Robust standard errors clustered at the level of instruments are in parentheses, followed by sample size and Anderson-Rubin Wald F statistic (*AR test*). All specifications include the full set of control variables and fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

obedient, and passive regardless of gender. Women are said to be more inclined toward those characteristics than men, mainly because of two reasons. Firstly, religions can foster gender differences since many major denominations impose strict rules on women, such as wifely submission, veiling, et cetera. Therefore, women are taught to be homemakers, fulfil childcare duties, and be committed to men and family, rather than being encouraged to work outside the home. Secondly, women are generally more religious than men because women have lower labour force participation rates and greater responsibility for housework and childcare, leading them to greater (time-wise) involvement in religion²² (Miller and Hoffmann, 1995).

Being taught to be submissive and obedient is expected to restrain novelty, creativity, and innovative endeavours, thus, is a potential negative channel from religion to innovation for both genders. Yet, it can be expected to be more influential for women. Conventional gender roles empowered by religion are a significant drawback for innovation and the economy, allegedly a major reason for the lower female labour supply. If nothing, half of a given population is being treated differently regarding access to education, liberty, and social and legal rights means that up to 50% of the capacity to create and produce cannot be properly used.

Correspondingly, we define three variables from the ESS that could reflect the strong connection between traditional gender roles and religiosity: *lgbt* (gay men and lesbians should be free), *womenwork* (a woman should be prepared to cut down on her paid work for the sake of her family), and *menwork* (when jobs are scarce, men should have more right to a job than women). Table 12 displays the results. The variable *lgbt* is negatively and significantly correlated, while *womenwork* and *menwork* are positively correlated with all measures of religiosity, supporting the hypothesis that religiosity favours conventional gender roles.

7. Conclusion

Religion is a multi-dimensional and complex phenomenon, thus, its effect is embedded in social and economic behaviour. The present study provides the first attempt to tackle the inherent endogeneity of religion with respect to innovation by focusing on the individual

²² See Miller and Stark (2002) and Vaus and McAlliste (1987) for gender differences and religiosity.

Table 12
IV estimates: Gender roles.

	(1) <i>lgbt</i>	(2) <i>womenwork</i>	(3) <i>menwork</i>
<i>religiosity</i>	-0.202*** (0.011) 228,249 0.000	0.181*** (0.018) 91,478 0.000	0.136*** (0.020) 122,104 0.000
<i>degree</i>	-0.184*** (0.011) 228,249 0.000	0.166*** (0.017) 91,478 0.000	0.127*** (0.019) 122,104 0.000
<i>attendance</i>	-0.249*** (0.014) 228,249 0.000	0.236*** (0.021) 91,478 0.000	0.166*** (0.025) 122,104 0.000
<i>pray</i>	-0.261*** (0.014) 228,249 0.000	0.226*** (0.022) 91,478 0.000	0.161*** (0.024) 122,104 0.000

Notes: Robust standard errors clustered at the level of instruments are in parentheses, followed by sample size and Anderson-Rubin Wald F statistic (*AR test*). All specifications include the full set of control variables and fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

traits that are found to be favourable or unfavourable to innovation output by the related literature. To do so, we use different measures of religiosity, adopt an individual-level approach to innovation traits, and use multi-way fixed effects together with using an instrumental variables strategy. The results show that higher religiosity negatively affects positive innovation attitudes and positively affects negative innovation attitudes, implying that being religious is not a catalyser for innovation-related traits and is possibly an obstacle. This finding is in line with the literature (Benabou et al., 2013, Benabou et al., 2015). Using OLS estimates, Benabou et al. (2015) find that religiosity is positively related to creativity, which they describe as “puzzling”. We contribute to this literature by uncovering that the positive relationship between religiosity and creativity is probably driven by endogeneity. We find a negative relationship between religiosity and creativity once we apply an IV strategy.

Finally, we empirically examine and discuss three possible channels from religion to innovation: time allocation, the fear of uncertainty, and roles reinforced by religion, such as traditional roles and gender roles.

Although we see our paper as an additional step in disentangling the causal effect of religion on innovation, the present results should be approached with caution due to the observational and survey-based nature of the data. Indeed, as Iannaccone (1998) points out, nothing less than a genuine experiment will demonstrate the true causal effect of religion. Given that an experiment is probably unfeasible, we think that further research on observational data is needed. First, the negative effect of religion on innovation should be tested with different instruments or alternative empirical strategies. Second, different data sources, panel data and especially not self-reported attendance data could be useful to rule out the potential heterogeneity and self-report bias. Third, the causal channels from religion to innovation and their underlying mechanisms should be more deeply examined.

CRedit authorship contribution statement

Duygu Buyukyazici: Conceptualization, Data curation, Formal analysis, Methodology, Software, Validation, Writing – original draft, Writing – review & editing. **Francesco Serti:** Conceptualization, Methodology, Supervision, Writing – review & editing, Software.

Declaration of competing interest

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

Data availability

No data was used for the research described in the article.

Appendix A. Variables index and data summary

Innovation Variables

All innovation variables listed below are based on self-reported assessments on the following statements, where the options are; *very much like me* (1), *like me* (2), *somewhat like me* (3), *a little like me* (4), *not like me* (5), *not like me at all* (6). All variables are recoded as to be increasing in a scale from 0 (*not like me at all*) to 1 (*very much like me*) for the sake of easier interpretation.

We distinguish innovation attitudes as *positive innovation attitudes* (PIA) and *negative innovation attitudes* (NIA). PIA include creativity, being different, being free, and being adventurous, while NIA include following rules and following traditions.

adventurous: being adventurous, based on the statement “*He looks for adventures and likes to take risks. He wants to have an exciting life*”..

creative: creativity, based on the statement “*Thinking up new ideas and being creative is important to him. He likes to do things in his own original way*”..

different: being different, based on the statement “*He likes surprises and is always looking for new things to do. He thinks it is important to do lots of different things in life*”..

free: being free, based on the statement “*It is important to him to make his own decisions about what he does. He likes to be free and not depend on others*”..

innegav: average negative innovation attitudes. Computed as the simple mean of *rules* and *traditions*.

inposav: average positive innovation attitudes. Computed as the simple mean of *creative*, *different*, *free*, and *adventurous*.

innosum: summary innovation attitudes. Computed as the sum of positive innovation attitudes minus the sum of negative innovation attitudes: $innosum = (creative + different + free + adventurous) - (traditions + rules)$. Rescaled to be between 0 (low propensity to innovate) and 1 (high propensity to innovate).

rules: following rules, based on the statement “*He believes that people should do what they're told. He thinks people should follow rules at all times, even when no one is watching*”..

traditions: following traditions, based on the statement “*Tradition is important to him. He tries to follow the customs handed down by his religion or his family*”..

Religion Variables

attendance: frequency of attendance to religious activities, based on the question “*Apart from special occasions such as weddings and funerals, about how often do you attend religious services nowadays?*” where the options are; *every day* (1), *more than once a week* (2), *once a week* (3), *at least once a month* (4), *only on special holy days* (5), *less often* (6), *never* (7). The variable is rescaled to be between 0 (*never*) and 1 (*every day*) to ease the interpretation.

belonging: religious affiliation, belonging to a religion or denomination. A dummy variable based on the question “*Do you consider yourself as belonging to any particular religion or denomination?*” 0 is *no*, and 1 is *yes*.

belongingp: past belonging to a religion or domination. A dummy variable based on the question “*Have you ever considered yourself as belonging to any particular religion or denomination?*” 0 is *no*, and 1 is *yes*.

degree: the degree of being religious, based on the question “*Regardless of whether you belong to a particular religion, how religious would you say you are?*” where 0 is *not religious at all*, 10 is *very religious*. The variable is rescaled to be between 0 (*not religious at all*) and 1 (*very religious*) to ease the interpretation.

denomination: belonging to a particular denomination based on the question “*If you consider yourself as belonging to any particular religion or denomination, which one is it?*” where the options are; *Roman Catholic* (1), *Protestant* (2), *Eastern Orthodox* (3), *Other Christian denominations* (4), *Jewish* (5), *Islamic* (6), *Eastern religions* (7), *Other non-Christian religions* (8), *not declare which religion* (9), *not belong to a religion* (10).

denominationp: past belonging to a particular denomination, based on the question “*If you have ever considered yourself as belonging to any particular religion or denomination, which one was it?*” where the options are the same as those of *denomination*.

pray: frequency of praying based on the question “*Apart from when you are at religious services, how often, if at all, do you pray?*” where the options are the same as those of *attendance*. The variable is rescaled to be between 0 (*never*) and 1 (*every day*) to ease the interpretation.

religiosity: religiosity index, i.e. the latent factor, computed with the principal component factors analysis of *degree*, *attendance*, and *pray*. Rescaled to be between 0 *not religious on average*, and 1 *very religious on average*.

Instrumental Variables

iv_attendance: instrumental variable for *attendance*. Frequency of attendance to religious activities of individual *i*, instrumented by the average frequency of attendance to religious activities of people who have the same age, gender, and religious affiliation with *i* and live in a country with the same dominant denomination as the country of *i*. Takes values between 0 (*low frequency of attendance to religious activities*) and 1 (*high frequency of attendance to religious activities*).

iv_degree: instrumental variable for *degree*. The degree of religiosity of individual *i*, is instrumented by the average degree of religiosity of people who have the same age, gender, and religious affiliation with *i* and live in a country with the same dominant denomination as the country of *i*. Takes values between 0 (*not religious*) and 1 (*very religious*).

iv_pray: instrumental variable for *pray*. Frequency of praying of individual *i*, instrumented by the average frequency of praying of people who have the same age, gender, and religious affiliation with *i* and live in a country that has the same dominant denomination as the country of *i*. Takes values between 0 (*low frequency of pray*) and 1 (*high frequency of pray*).

iv_religiosity: instrumental variable for *religiosity*. religiosity index of individual *i*, instrumented by the average of religiosity index of people who have the same age, gender and religious affiliation with *i* and live in a country with the same dominant denomination as the country of *i*. Takes values between 0 (*low religiosity*) and 1 (*high religiosity*).

Control Variables

age: age of respondent.

bornc: born-in country of respondent. A standard dummy variable, 0 is *no* which means that the respondent was born in a different country than the country where she takes the survey; and 1 is *yes*, meaning that the respondent was born in the same country where she takes the survey.

child: whether the respondent lives with children at home or not. A standard dummy variable with 0 is *no* which means that the respondent does not live with children, and 1 is *yes* meaning that the respondent lives with children.

education: completed years of education of respondent, based on the question “*About how many years of education have you completed, whether full-time or part-time? Please report these in full-time equivalents and include compulsory years of schooling*”.

fathere: completed level of education of respondent's father. The same classification problem, as of *mother*, stands for *fathere* as well. The variable is, therefore, constructed by grouping two variables (*escedf*, *edulvlf*) from ESS data. The values are the same as those of *mother*.

gender: a standard dummy variable for the gender of respondent, 0 is *male*, and 1 is *female*.

health: subjective general health of respondent where the values are: *very bad* (1), *bad* (2), *fair* (3), *good* (4), *very good* (5).

mother: completed level of education of respondent's mother. The variable is constructed by grouping two variables (*escedm*, *edulvlma*) from ESS data. The variable *edulvlma* is classified by ISCED 1997 and only exists for ESS rounds 1,2,3,4; while *escedm* is classified by ISCED 2011 and only exists for ESS rounds 4,5,6,7,8. *mother* thus a grouped version²³ of these two variables and the values are: *less than lower secondary education completed* (1), *lower secondary education completed* (2), *upper secondary education completed* (3), *post-secondary non-tertiary education completed* (4), *tertiary education completed* (5).

paidwork: paid work status of respondent based on the question "Have paid work in last seven days?" where 0 is *not marked* which means the respondent does not have a paid job, and 1 is *marked* meaning that the respondent has a paid job. The variable is controlled with the help of the variable *crpdwk* (control for paid work).

partner: whether the respondent lives with a husband/wife/partner at home. A standard dummy variable with 0 is *no* which means that the respondent does not live with a partner, and 1 is *yes* meaning that the respondent lives with a partner.

pwbefore: whether the respondent has ever had a paid job. A standard dummy variable with 0 is *no* which means that the respondent has never had a paid job before; 1 is *yes* meaning that the respondent has had a paid job before.

Fixed Effects

country: country of respondent. The ESS has observations for 36 European countries.

denomination: please refer to Religion Variables.

essround: survey dummies for eight rounds (2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016) of the ESS.

income1 & *income2*: both variables stand for the net income of households from all sources. *income1* only exists for the ESS rounds 1,2,3; while *income2* exists for the ESS rounds 4,5,6,7,8 due to a change of classification. But they cannot be grouped because *income1* takes values with (12) ranges, while *income2* with (10) deciles. Thus we use them separately.

occupation: occupation of respondent. Constructed by grouping the two occupation variables with different classifications (*iscoco* and *isco08*) from the ESS data. *iscoco* exists for the ESS rounds 1,2,3,4,5 and takes values of *International Standard Classification of Occupations 1988* (ISCO-88); while *isco08* only exists for the ESS rounds 6,7,8 and takes values of *International Standard Classification of Occupations 2008* (ISCO-08). The values of *occupation* are relabelled in accordance with ISCO-08²⁴ classification. Occupation variable includes 582 different values (between 0 and 9999) that refer to different occupation labels. We consider only the main categories, which are 9, as fixed effects; armed forces occupations (0–1000), managers (1000–2000), professionals (2000–3000), technicians, and associate prof. (3000–4000), clerical support workers (4000–5000), services and sales workers (5000–6000), skilled agricultural, forestry, and fishery workers (6000–7000), plant and machine operators and assemblers (7000–8000), elementary occupations (8000–9000), no answer (9000–9999).

Other Variables

devote: Based on the statement "It is important to him to be loyal to his friends. He wants to devote himself to people close to him". Takes the same values as *safe*.

family: Based on the statement "A person's family ought to be his or her main priority in life". Takes the same values as *lookafter*.

government: Based on the statement "It is important to him that the government ensures his safety against all threats. He wants the state to be strong so it can defend its citizens". Takes the same values as *safe*.

lgbt: Based on the statement "Gay men and lesbians should be free to live their own life as they wish". Takes the same values as *lookafter*.

lookafter: Based on the statement "Society would be better off if everyone just looked after themselves". where the options are *agree strongly* (1), *agree* (2), *neither agree or disagree* (3), *disagree* (4), *disagree strongly* (5). Recoded as to be increasing in a scale from 0 (*disagree strongly*) to 1 (*agree strongly*) for the sake of easier interpretation.

menwork: Based on the statement "When jobs are scarce men should have more right to a job than women". Takes the same values as *lookafter*.

safe: Based on the statement "It is important to him to live in secure surroundings. He avoids anything that might endanger his safety". where the options are *very much like me* (1), *like me* (2), *somewhat like me* (3), *a little like me* (4), *not like me* (5), *not like me at all* (6). Recoded as to be increasing in a scale from 0 (*not like me at all*) to 1 (*very much like me*) for the sake of easier interpretation.

securejob: Based on the statement "How important do you think each of the following would be if you were choosing a job: a secure job" where the options are *not important at all* (1), *not important* (2), *neither important nor unimportant* (3), *important* (4), *very important* (5). Recoded as to be increasing in a scale from 0 (*not important at all*) to 1 (*very important*) for the sake of easier interpretation.

success: Based on the statement "Being very successful is important to him. He hopes people will recognise his achievements". Takes the same values as *safe*.

trust: Based on the statement "Using this card, generally speaking, would you say that most people can be trusted, or that you cannot be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you cannot be too careful and 10 means that most people can be trusted". Normalised to be between 0 (*cannot be too careful*) and 1 (*most people can be trusted*).

unemployed: A dummy based on the question "Have you ever been unemployed and seeking work for a period of more than three months?" 0 is *no*, and 1 is *yes*.

womenwork: Based on the statement "A woman should be prepared to cut down on her paid work for the sake of her family". Takes the same values as *lookafter*.

Table A.4 provides preliminary evidence on the relationship between religiosity and patents as innovation outcomes. The number of patent publications per capita (log), by filing country and 36 patent classes (technology fields), is the dependent variable while four religiosity measures used in the main analyses above are the independent variables. The patent data are obtained from the World Intellectual Property Organization (WIPO) IP Statistics Data Center²⁵ and divided by country population to obtain patents per capita. The sample covers the period from 2002 to 2016 in accordance with the ESS data. It should be noted that the estimates are limited to the countries that have religiosity data in the ESS survey across the waves. Since the surveyed countries change from wave to wave (see Table A.1), the sample does not have a balanced panel structure. Standard control variables (GDP per capita based on purchasing power parity, population density, and the share of the population enrolled on tertiary education) are added to the analysis. Data for control variables are obtained from the World Bank World Development Indicators. The first four columns are estimated with OLS while the last four are estimated with IV where religiosity measures are instrumented by the variables constructed in the main analyses. Since the instruments are originally designed at the individual level, they are averaged by country and year before the estimates. Therefore the results should be interpreted with caution. Overall, Table A.4 confirms the negative relationship between religion and innovation.

²³ For detailed information about ISCED classifications please refer to the guide *International Standard Classification of Education (ISCED)* by Eurostat. The related link:

<https://ec.europa.eu/eurostat/statistics-explained/pdfscache/44322.pdf>

²⁴ The correspondences between the classifications of ISCO-88 and ISCO-08 are taken from the guide: *International Standard Classification of Occupations: ISCO-08*. (2012) Volume I: Structure Group Definitions and Correspondence Tables by International Labour Organization.

²⁵ Patent data and technology fields can be reached via the following url: <https://www3.wipo.int/ipstats/ips-search/patent>.

Table A.1
The ESS data, countries and dominant denominations.

COUNTRY	Ess 1	Ess 2	Ess 3	Ess 4	Ess 5	Ess 6	Ess 7	Ess 8
Albania (AL) Muslim (57%)						•		
Austria (AT) Catholic (62%)	•	•	•				•	•
Belgium (BE) Not belong (56%)	•	•	•	•	•	•	•	•
Bulgaria (BG) Orthodox (51%)			•	•	•	•		
Croatia (HR) Catholic (76%)				•	•			
Cyprus (CY) Orthodox (75%)			•	•	•	•		
Czech Republic (CZ) Not belong (78%)	•	•		•	•	•	•	•
Denmark (DK) Protestant (52%)	•	•	•	•	•	•	•	•
Estonia (EE) Not belong (74%)		•	•	•	•	•	•	•
Finland (FI) Protestant (55%)	•	•	•	•	•	•	•	•
France (FR) Not belong (51%)	•	•	•	•	•	•	•	•
Germany (DE) Not belong (38%)	•	•	•	•	•	•	•	•
Great Britain (GB) Not belong (53%)	•	•	•	•	•	•	•	•
Greece (GR) Orthodox (89%)	•	•		•	•			
Hungary (HU) Not belong (45%)	•	•	•	•	•	•	•	•
Iceland (IS) Not belong (57%)		•				•		•
Ireland (IE) Catholic (72%)	•	•	•	•	•	•	•	•
Italy (IT) Catholic (71%)	•					•		•
Kosovo (XK) Muslim (88%)						•		
Lithuania (LT) Catholic (79%)					•	•	•	•
Latvia (LV) Not belong (53%)				•				
Luxemburg (LU) Catholic (53%)	•	•						
Netherlands (NL) Not belong (61%)	•	•	•	•	•	•	•	•
Norway (NO) Not belong (47%)	•	•	•	•	•	•	•	•
Poland (PL) Catholic (90%)	•	•	•	•	•	•	•	•
Portugal (PT) Catholic (80%)	•	•	•	•	•	•	•	•
Romania (RO) Orthodox (81%)				•				
Russia (RU) Orthodox (46%)			•	•	•	•		•
Slovakia (SK) Catholic (63%)		•	•	•	•	•		
Slovenia (SI) Catholic 50%	•	•	•	•	•	•	•	•
Spain (ES) Catholic (65%)	•	•	•	•	•	•	•	•

(continued on next page)

Table A.1 (continued).

Sweden (SE)	•	•	•	•	•	•	•	•
Not belong (68%)								
Switzerland (CH)	•	•	•	•	•	•	•	•
Not belong (34%)								
Turkey(TR)		•		•				
Muslim (96%)								
Ukraine(UA)		•	•	•	•	•		
Orthodox (58%)								

Notes: Surveyed countries across the ESS waves are reported. First column displays countries and their alphabetical codes. Dominant denomination and its percentage among respondents are presented below each country.

Table A.2
Summary statistics.

	obs.	mean	sd	min	max
creative	237,100	0.69	0.25	0	1
different	237,100	0.60	0.27	0	1
free	237,100	0.76	0.22	0	1
adventurous	237,100	0.41	0.28	0	1
traditions	237,100	0.67	0.27	0	1
rules	237,100	0.58	0.27	0	1
inposav	237,100	0.62	0.18	0	1
innegav	237,100	0.62	0.22	0	1
innosum	237,100	0.54	0.14	0	1
belonging	237,100	0.61	0.49	0	1
belonginge	91,994	0.26	0.44	0	1
denomination	237,100	5.16	4.10	1	10
denominations	23,302	1.65	1.10	1	8
religiosity	237,100	0.38	0.29	0	1
iv_religiosity	237,100	0.45	0.23	0	1
degree	237,100	0.47	0.30	0	1
iv_degree	237,100	0.47	0.18	0	1
attendance	237,100	0.26	0.25	0	1
iv_attendance	237,100	0.34	0.19	0	1
pray	237,100	0.39	0.40	0	1
iv_pray	237,100	0.39	0.24	0	1
age	237,100	48.89	17.23	15	114
education	235,831	12.71	4.05	0	56
gender	237,100	0.52	0.50	0	1
health	237,100	3.79	0.90	1	5
paidwork	237,100	0.61	0.49	0	1
pwbefore	237,100	0.99	0.01	0	1
child	236,817	0.40	0.49	0	1
partner	237,100	0.56	0.50	0	1
bornc	236,960	0.92	0.27	0	1
fathere	237,100	2.55	1.44	1	5
mothere	237,100	2.35	1.36	1	5
essround	237,100	4.69	2.18	1	8
occupation	237,100	4.72	2.49	0	9
income1	61,693	6.31	2.63	1	12
income2	137,576	5.38	2.77	1	10
lgbt	229,835	0.70	0.30	0	1
womenwork	92,220	0.54	0.29	0	1
menwork	123,013	0.33	0.31	0	1
devote	236,669	0.82	0.18	0	1
success	236,408	0.57	0.27	0	1
lookafter	25,620	0.35	0.28	0	1
family	25,705	0.79	0.20	0	1
unemployed	236,563	0.28	0.45	0	1
trust	236,678	0.51	0.25	0	1
safe	236,633	0.73	0.24	0	1
securejob	51,374	0.84	0.20	0	1
government	235,346	0.73	0.24	0	1
N	237,100				

Notes: Summary statistics for all variables are reported. All are weighted by gweight.

Appendix B. First stage results

See Tables B.1 and B.2.

Appendix C. Detailed OLS results

Table C.9 shows the OLS estimates separately for each religious denomination. The dependent variables are PIA for the first four columns, NIA for columns 5 and 6, and average innovation attitudes for the last two columns. The complete set of control variables (including fixed effects) is introduced in all specifications. Briefly, Roman Catholics, Protestants and Other Christians tend to have lower values of *inposav*, while Jewish, Other Christian and Eastern religions tend to have higher values. When it comes to *innegav*, there is a consistent relationship across denominations: belonging to any of them is positively and significantly associated with *innegav*.

Appendix D. Detailed IV results

See Tables D.1–D.6.

Appendix E. Heterogeneous effects of religiosity: Gender and age

We reestimate the baseline specifications to examine whether the main findings hold for different sub-samples of age and gender. Table E.1 presents the results. Columns 1–12 show OLS and IV estimates disaggregated by six age brackets.²⁶ The last four columns (13–16) display the baseline OLS and IV estimates disaggregated by gender. The dependent variable is *inposav* on the upper part of the table and *innegav* on the lower part. Each coefficient comes from a different regression and includes the complete set of control variables which are not reported due to space constraints. The number of observations is reported below standard errors, followed by adjusted R^2 for OLS and AR test for IV estimates.

Considering age, OLS results show that the religiosity measures, when statistically significant, are negatively related to *inposav* in early and lower-middle ages, *i.e.*, 15–25 and 35–45, but are positively related in middle and upper-middle ages, *i.e.*, 45–55 and 55–65. On the other hand, IV results are always negatively related to *inposav*, regardless of age bracket. The OLS and IV results in the lower part of Table E.1 shows that the religiosity measures are always positively associated with *innegav* for each age bracket except for the 15–25, which is the only negative association between religiosity measures and *innegav* throughout this paper. One explanation is that young adults are generally open to questioning the values and beliefs they inherited from their parents as well as from the culture in which they live, assuming that in the early ages of life, people make up their minds, see the world from

²⁶ The instruments are built with eleven age brackets. Here we only consider six age brackets for brevity. The model is estimated also with eleven age brackets, but the overall results do not change significantly.

Table A.3
Means by country.

	<i>religiosity</i>	<i>degree</i>	<i>attendance</i>	<i>pray</i>	<i>creative</i>	<i>different</i>	<i>free</i>	<i>advent.</i>	<i>trad.</i>	<i>rules</i>	<i>inposav</i>	<i>innegav</i>	<i>innosum</i>
AL	0.48	0.73	0.24	0.50	0.70	0.69	0.76	0.42	0.77	0.67	0.64	0.72	0.53
AT	0.42	0.49	0.30	0.43	0.71	0.60	0.79	0.44	0.65	0.52	0.64	0.59	0.56
BE	0.30	0.47	0.17	0.30	0.67	0.63	0.77	0.43	0.66	0.56	0.62	0.61	0.55
BG	0.36	0.43	0.27	0.32	0.59	0.60	0.71	0.47	0.76	0.67	0.59	0.71	0.49
CH	0.42	0.51	0.25	0.45	0.74	0.64	0.84	0.42	0.63	0.50	0.66	0.57	0.59
CY	0.63	0.69	0.44	0.70	0.78	0.63	0.80	0.47	0.81	0.55	0.67	0.68	0.55
CZ	0.18	0.24	0.14	0.15	0.68	0.58	0.73	0.41	0.64	0.63	0.60	0.64	0.52
DE	0.31	0.44	0.23	0.36	0.70	0.60	0.80	0.35	0.62	0.51	0.61	0.57	0.55
DK	0.27	0.41	0.19	0.22	0.73	0.58	0.77	0.48	0.66	0.61	0.64	0.63	0.55
EE	0.25	0.35	0.19	0.19	0.60	0.59	0.75	0.41	0.59	0.53	0.59	0.56	0.54
ES	0.35	0.44	0.25	0.39	0.71	0.61	0.78	0.40	0.66	0.58	0.62	0.62	0.54
FI	0.37	0.51	0.21	0.38	0.67	0.63	0.76	0.43	0.59	0.60	0.62	0.60	0.55
FR	0.28	0.41	0.17	0.26	0.68	0.61	0.69	0.36	0.54	0.43	0.59	0.49	0.56
GB	0.33	0.40	0.20	0.33	0.69	0.62	0.76	0.46	0.62	0.53	0.63	0.58	0.56
GR	0.61	0.68	0.42	0.70	0.74	0.65	0.79	0.48	0.81	0.64	0.67	0.73	0.54
HR	0.55	0.62	0.42	0.62	0.64	0.51	0.72	0.33	0.74	0.55	0.55	0.64	0.49
HU	0.32	0.41	0.20	0.33	0.71	0.65	0.79	0.42	0.70	0.51	0.64	0.61	0.56
IE	0.56	0.52	0.43	0.63	0.71	0.64	0.77	0.49	0.67	0.57	0.65	0.62	0.56
IS	0.36	0.53	0.18	0.36	0.66	0.58	0.76	0.50	0.52	0.49	0.62	0.51	0.58
IT	0.47	0.59	0.37	0.54	0.69	0.66	0.75	0.39	0.75	0.65	0.62	0.70	0.52
LT	0.47	0.54	0.35	0.40	0.58	0.52	0.69	0.45	0.67	0.52	0.56	0.60	0.51
LU	0.35	0.43	0.25	0.31	0.70	0.66	0.74	0.40	0.64	0.60	0.62	0.62	0.54
LV	0.34	0.38	0.23	0.31	0.68	0.68	0.82	0.52	0.71	0.53	0.67	0.62	0.58
NL	0.33	0.46	0.19	0.33	0.71	0.63	0.79	0.47	0.63	0.60	0.65	0.62	0.56
NO	0.27	0.38	0.19	0.25	0.69	0.54	0.70	0.45	0.61	0.64	0.60	0.63	0.52
PL	0.63	0.64	0.53	0.71	0.63	0.62	0.77	0.41	0.77	0.71	0.61	0.74	0.50
PT	0.51	0.54	0.34	0.56	0.65	0.57	0.70	0.40	0.64	0.55	0.58	0.59	0.52
RO	0.61	0.68	0.39	0.67	0.66	0.61	0.67	0.43	0.74	0.70	0.59	0.72	0.49
RU	0.34	0.44	0.21	0.31	0.63	0.55	0.73	0.44	0.70	0.58	0.59	0.64	0.51
SE	0.23	0.33	0.18	0.20	0.70	0.57	0.73	0.43	0.57	0.52	0.61	0.54	0.56
SI	0.35	0.47	0.29	0.32	0.71	0.70	0.81	0.46	0.69	0.58	0.67	0.64	0.57
SK	0.52	0.59	0.37	0.52	0.67	0.62	0.73	0.40	0.71	0.67	0.60	0.69	0.51
TR	0.70	0.70	0.40	0.87	0.71	0.68	0.76	0.48	0.81	0.75	0.65	0.78	0.52
UA	0.49	0.50	0.32	0.49	0.55	0.53	0.69	0.37	0.69	0.61	0.53	0.65	0.48
XK	0.60	0.73	0.33	0.62	0.82	0.77	0.83	0.52	0.85	0.73	0.73	0.79	0.57
Total	0.38	0.48	0.27	0.40	0.68	0.60	0.76	0.42	0.67	0.58	0.62	0.62	0.54

Notes: Country means of dependent and independent variables are reported. All are weighted by gweight. See Appendix A for definitions.

Table A.4
Religiosity and innovation as outcome: Patents.

	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>religiosity</i>	-0.583*** (0.163)				-2.065*** (0.316)			
<i>degree</i>		-0.733*** (0.191)				-1.874*** (0.350)		
<i>attendance</i>			-0.184 (0.199)				-2.806*** (0.424)	
<i>pray</i>				-0.505*** (0.125)				-2.155*** (0.316)
<i>GDP (log)</i>	0.365*** (0.048)	0.375*** (0.048)	0.358*** (0.049)	0.369*** (0.048)	0.373*** (0.049)	0.397*** (0.049)	0.300*** (0.050)	0.391*** (0.049)
<i>pop. density</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>education</i>	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)
<i>constant</i>	-16.377*** (0.515)	-16.387*** (0.515)	-16.473*** (0.526)	-16.430*** (0.512)				
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	5,541	5,541	5,541	5,541	5,541	5,541	5,541	5,541
<i>Adj. R²</i>	0.414	0.414	0.413	0.414				
<i>idf</i>					0.000	0.000	0.000	0.000
<i>cdf</i>					1884	2225	1586	961
<i>widstat</i>					1985	2403	2203	809
<i>AR</i>					0.000	0.000	0.000	0.000

Notes: Table provides OLS and IV estimates between religiosity measures and country-level patent numbers per capita by patent classes (36). Robust standard errors are in parentheses. Regressions include the dominant denomination, time, and patent class fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table B.1
Religiosity and innovation attitudes: First stage results of Table 4.

	(1) <i>religiosity</i>	(2) <i>religiosity</i>	(3) <i>religiosity</i>	(4) <i>degree</i>	(5) <i>degree</i>	(6) <i>attendance</i>	(7) <i>attendance</i>	(8) <i>pray</i>	(9) <i>pray</i>
<i>iv_religiosity</i>	0.592*** (0.045)	0.609*** (0.045)	0.610*** (0.046)						
<i>iv_degree</i>				0.606*** (0.071)	0.605*** (0.072)				
<i>iv_attendance</i>						0.586*** (0.049)	0.583*** (0.049)		
<i>iv_pray</i>								0.701*** (0.051)	0.707*** (0.053)
<i>gender</i>	0.012** (0.005)	0.009* (0.005)	0.009* (0.005)	0.015*** (0.005)	0.015*** (0.005)	-0.006 (0.004)	-0.007 (0.004)	0.023*** (0.007)	0.022*** (0.007)
<i>age</i>	0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)	0.001*** (0.000)
<i>education</i>	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.001)
<i>paidwork</i>		-0.008*** (0.002)	-0.009*** (0.002)	-0.007*** (0.002)	0.007*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.011*** (0.003)	-0.012*** (0.003)
<i>pwbefore</i>		-0.039 (0.159)	-0.043 (0.160)	-0.185 (0.147)	-0.188 (0.148)	-0.112 (0.160)	-0.115 (0.161)	0.101 (0.171)	0.097 (0.171)
<i>partner</i>		0.013*** (0.003)	0.011*** (0.003)	0.013*** (0.002)	0.011*** (0.002)	0.022*** (0.002)	0.021*** (0.002)	0.024*** (0.002)	0.005 (0.004)
<i>health</i>		-0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.009*** (0.001)	0.008*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)
<i>child</i>		0.014*** (0.002)	0.012*** (0.002)	0.009*** (0.002)	0.007*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.020*** (0.003)	0.017*** (0.003)
<i>bornc</i>			-0.077*** (0.004)		-0.061*** (0.004)		-0.048*** (0.004)		-0.106*** (0.007)
<i>fathere</i>			0.001 (0.001)		-0.000 (0.001)		0.001 (0.001)		0.002** (0.001)
<i>mothere</i>			-0.001 (0.001)		-0.000 (0.001)		0.000 (0.001)		-0.003** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409

Notes: The first stage results are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table B.2
Religiosity and innovation attitudes: First stage results of Table 5.

	(1) <i>religiosity</i>	(2) <i>religiosity</i>	(3) <i>religiosity</i>	(4) <i>degree</i>	(5) <i>degree</i>	(6) <i>attendance</i>	(7) <i>attendance</i>	(8) <i>pray</i>	(9) <i>pray</i>
<i>iv_religiosity</i>	0.592*** (0.045)	0.609*** (0.045)	0.610*** (0.046)						
<i>iv_degree</i>				0.606*** (0.071)	0.605*** (0.072)				
<i>iv_attendance</i>						0.586*** (0.049)	0.583*** (0.049)		
<i>iv_pray</i>								0.701*** (0.051)	0.707*** (0.053)
<i>gender</i>	0.012** (0.005)	0.009* (0.005)	0.009* (0.005)	0.015*** (0.005)	0.015*** (0.005)	-0.006 (0.004)	-0.006 (0.004)	0.023*** (0.007)	0.022*** (0.007)
<i>age</i>	0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	0.001*** (0.000)	0.001*** (0.000)
<i>education</i>	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.001)
<i>paidwork</i>		-0.008*** (0.002)	-0.009*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.011*** (0.003)	-0.012*** (0.003)
<i>pwbefore</i>		-0.039 (0.159)	-0.043 (0.160)	-0.185 (0.147)	-0.188 (0.148)	-0.112 (0.160)	-0.115 (0.161)	0.101 (0.171)	0.097 (0.171)
<i>partner</i>		0.013*** (0.003)	0.011*** (0.003)	0.013*** (0.002)	0.011*** (0.002)	0.007* (0.002)	0.021*** (0.002)	0.001 (0.004)	0.005 (0.004)

(continued on next page)

Table B.2 (continued).

<i>health</i>	-0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.009*** (0.001)	0.008*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)
<i>child</i>	0.014*** (0.002)	0.012*** (0.002)	0.009*** (0.002)	0.007*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.020*** (0.003)	0.017*** (0.003)
<i>bornc</i>		-0.077*** (0.004)		-0.061*** (0.004)		-0.049*** (0.004)		-0.106*** (0.007)
<i>fathere</i>		0.001 (0.001)		-0.000 (0.001)		0.001 (0.001)		0.002** (0.001)
<i>mothere</i>		-0.001 (0.001)		-0.000 (0.001)		0.001 (0.001)		-0.003** (0.001)
Full FE	yes	yes	yes	yes	yes	yes	yes	yes
N	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549

Notes: The first stage results are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the following fixed effects: country, survey year, country-survey year, religious denomination, occupation, and income level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.1
OLS estimates: Religiosity and creativity.

<i>creative</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.030*** (0.005)	0.031*** (0.005)	0.029*** (0.005)						
<i>degree</i>				0.027*** (0.004)	0.026*** (0.004)				
<i>attendance</i>						0.001 (0.005)	-0.001 (0.005)		
<i>pray</i>								0.023*** (0.003)	0.022*** (0.003)
<i>gender</i>	-0.019*** (0.003)	-0.016*** (0.003)	-0.015*** (0.003)	-0.015*** (0.003)	-0.014*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)	-0.016*** (0.003)	-0.015*** (0.003)
<i>age</i>	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
<i>education</i>	0.006*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.004*** (0.000)	0.005*** (0.000)	0.004*** (0.000)
<i>paidwork</i>		0.006** (0.002)	0.007*** (0.002)	0.006** (0.002)	0.007*** (0.002)	0.005** (0.002)	0.006*** (0.002)	0.006** (0.002)	0.007*** (0.002)
<i>pwbefore</i>		-0.304*** (0.072)	-0.306*** (0.068)	-0.300*** (0.071)	-0.302*** (0.068)	-0.305*** (0.068)	-0.308*** (0.065)	-0.307*** (0.071)	-0.309*** (0.067)
<i>partner</i>		0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)	0.009*** (0.003)	0.008*** (0.003)	0.009*** (0.003)
<i>health</i>		0.015*** (0.002)	0.015*** (0.001)	0.015*** (0.002)	0.015*** (0.001)	0.015*** (0.002)	0.015*** (0.001)	0.015*** (0.002)	0.015*** (0.001)
<i>child</i>		-0.012*** (0.002)	-0.011*** (0.002)	-0.012*** (0.002)	-0.011*** (0.002)	-0.012*** (0.002)	-0.011*** (0.002)	-0.012*** (0.002)	-0.011*** (0.002)
<i>bornc</i>			-0.011*** (0.004)		-0.012*** (0.004)		-0.013*** (0.004)		-0.011*** (0.004)
<i>fathere</i>			0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)
<i>mothere</i>			0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)
<i>constant</i>	0.672*** (0.007)	0.908*** (0.073)	0.892*** (0.069)	0.902*** (0.072)	0.886*** (0.069)	0.917*** (0.069)	0.903*** (0.066)	0.914*** (0.072)	0.898*** (0.068)
Full FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	235 831	235 549	235 409	235 549	235 409	235 549	235 409	235 549	235 409
Adj. R ²	0.074	0.077	0.079	0.077	0.079	0.077	0.079	0.078	0.079

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

their own eyes, form their own beliefs and values. Moreover, fulfilling religious duties — such as going to church or mosque — to meet the expectations of parents and society is not uncommon at the early ages, yet, being exposed to religion by doing so might make them question traditions and rules more, which can explain the negative association between *attendance* and *innegav*.

Regarding gender, the OLS results for *inposav* show that *attendance* is negatively and *pray* is positively correlated for women, while higher religiosity favours *inposav* for men. In the IV results, only *attendance* is significant for both genders, introducing a higher negative effect for men. The overall picture changes when we consider *innegav* as

the dependent variable. Considering OLS estimates, each measure of religiosity is positively and significantly correlated to *innegav* with relatively high coefficients for both genders. IV results suggest that this pattern stays the same for women except for *degree*, while *degree* is the only significant effect for men. These findings are consistent with the existing literature on gender. Religions, generally, have different approaches and prescribed behavioural rules for men and women, imposing various restrictions on women's liberty and rights. In contrast, men face very little of them, if not none. Therefore, the results are reasonable, suggesting that higher values of *attendance* and *pray* cause women to follow traditions and established rules more.

Table C.2
OLS estimates: Religiosity and being different.

<i>different</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.028*** (0.005)	0.031*** (0.005)	0.028*** (0.005)						
<i>degree</i>				0.031*** (0.004)	0.029*** (0.004)				
<i>attendance</i>						0.010** (0.005)	0.008 (0.005)		
<i>pray</i>								0.019*** (0.003)	0.017*** (0.003)
<i>gender</i>	0.001 (0.004)	0.005 (0.003)	0.006* (0.003)	0.005* (0.003)	0.006* (0.003)	0.007** (0.003)	0.007** (0.003)	0.005 (0.003)	0.006* (0.003)
<i>age</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>education</i>	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
<i>paidwork</i>		-0.004* (0.003)	-0.004 (0.003)	-0.004* (0.003)	-0.004 (0.003)	-0.005* (0.003)	-0.004 (0.003)	-0.004* (0.003)	-0.004 (0.003)
<i>pwbefore</i>		0.034 (0.120)	0.032 (0.122)	0.038 (0.121)	0.036 (0.123)	0.034 (0.123)	0.032 (0.125)	0.031 (0.122)	0.029 (0.123)
<i>partner</i>		-0.005* (0.003)	-0.005* (0.003)	-0.006* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)
<i>health</i>		0.024*** (0.001)	0.023*** (0.001)	0.024*** (0.001)	0.023*** (0.001)	0.024*** (0.001)	0.023*** (0.001)	0.024*** (0.001)	0.023*** (0.001)
<i>child</i>		-0.024*** (0.002)	-0.024*** (0.002)	-0.024*** (0.002)	-0.023*** (0.002)	-0.024*** (0.002)	-0.023*** (0.002)	-0.024*** (0.002)	-0.024*** (0.002)
<i>bornc</i>			-0.017*** (0.004)		-0.017*** (0.004)		-0.018*** (0.004)		-0.017*** (0.004)
<i>fathere</i>			0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)
<i>mothere</i>			0.002* (0.001)		0.002* (0.001)		0.002* (0.001)		0.002** (0.001)
<i>constant</i>	0.715*** (0.008)	0.595*** (0.121)	0.593*** (0.123)	0.586*** (0.122)	0.585*** (0.124)	0.601*** (0.124)	0.601*** (0.126)	0.601*** (0.122)	0.600*** (0.124)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235 831	235 549	235 409	235 549	235 409	235 549	235 409	235 549	235 409
<i>Adj. R²</i>	0.073	0.080	0.081	0.080	0.081	0.079	0.081	0.080	0.081

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.3
OLS estimates: Religiosity and being free.

<i>free</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	-0.031*** (0.004)	-0.028*** (0.004)	-0.028*** (0.004)						
<i>degree</i>				-0.024*** (0.004)	-0.024*** (0.004)				
<i>attendance</i>						-0.046*** (0.005)	-0.047*** (0.005)		
<i>pray</i>								-0.009*** (0.003)	-0.009*** (0.003)
<i>gender</i>	-0.013*** (0.003)	-0.012*** (0.003)	-0.012*** (0.003)	-0.013*** (0.003)	-0.012*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)
<i>age</i>	-0.000*** (0.000)	0.000 (0.000)	0.000** (0.000)	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000* (0.000)
<i>education</i>	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
<i>paidwork</i>		0.003 (0.002)	0.004 (0.002)	0.003 (0.002)	0.004 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.004 (0.002)
<i>pwbefore</i>		-0.077 (0.125)	-0.079 (0.123)	-0.080 (0.126)	-0.082 (0.124)	-0.082 (0.123)	-0.084 (0.120)	-0.075 (0.128)	-0.077 (0.125)
<i>partner</i>		-0.038*** (0.003)	-0.037*** (0.003)	-0.038*** (0.003)	-0.037*** (0.003)	-0.037*** (0.003)	-0.036*** (0.003)	-0.038*** (0.003)	-0.037*** (0.003)
<i>health</i>		0.011*** (0.001)	0.010*** (0.001)	0.011*** (0.001)	0.010*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.010*** (0.001)
<i>child</i>		-0.017*** (0.003)	-0.016*** (0.003)	-0.017*** (0.003)	-0.017*** (0.003)	-0.017*** (0.003)	-0.016*** (0.003)	-0.017*** (0.003)	-0.017*** (0.003)
<i>bornc</i>			-0.004 (0.004)		-0.003 (0.004)		-0.004 (0.004)		-0.003 (0.004)
<i>fathere</i>			0.003*** (0.001)		0.003*** (0.001)		0.003*** (0.001)		0.003*** (0.001)
<i>mothere</i>			0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)

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Table C.3 (continued).

<i>constant</i>	0.748*** (0.006)	0.792*** (0.126)	0.775*** (0.123)	0.797*** (0.127)	0.780*** (0.125)	0.797*** (0.123)	0.780*** (0.121)	0.784*** (0.128)	0.766*** (0.126)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235 831	235 549	235 409	235 549	235 409	235 549	235 409	235 549	235 409
<i>Adj. R²</i>	0.061	0.072	0.073	0.072	0.073	0.073	0.074	0.071	0.073

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.4
OLS estimates: Religiosity and being adventurous.

<i>adventurous</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	-0.014** (0.005)	-0.009 (0.005)	-0.010 (0.005)						
<i>degree</i>				-0.003 (0.005)	-0.003 (0.005)				
<i>attendance</i>						-0.010* (0.005)	-0.012** (0.005)		
<i>pray</i>								-0.006* (0.003)	-0.007** (0.003)
<i>gender</i>	-0.076*** (0.004)	-0.073*** (0.003)	-0.072*** (0.003)	-0.073*** (0.003)	-0.073*** (0.003)	-0.073*** (0.003)	-0.072*** (0.003)	-0.073*** (0.003)	-0.072*** (0.003)
<i>age</i>	-0.005*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)
<i>education</i>	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)
<i>paidwork</i>		-0.003 (0.003)	-0.001 (0.003)	-0.003 (0.003)	-0.001 (0.003)	-0.003 (0.003)	-0.001 (0.003)	-0.003 (0.003)	-0.001 (0.003)
<i>pwbefore</i>		0.166 (0.112)	0.163 (0.117)	0.166 (0.111)	0.163 (0.116)	0.165 (0.112)	0.163 (0.117)	0.167 (0.112)	0.165 (0.117)
<i>partner</i>		-0.039*** (0.003)	-0.038*** (0.003)	-0.039*** (0.003)	-0.038*** (0.003)	-0.039*** (0.003)	-0.038*** (0.003)	-0.039*** (0.003)	-0.038*** (0.003)
<i>health</i>		0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)
<i>child</i>		-0.035*** (0.003)	-0.034*** (0.003)	-0.035*** (0.003)	-0.034*** (0.003)	-0.035*** (0.003)	-0.034*** (0.003)	-0.035*** (0.003)	-0.034*** (0.003)
<i>bornc</i>			-0.003 (0.004)		-0.002 (0.004)		-0.003 (0.004)		-0.003 (0.004)
<i>fathere</i>			0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)
<i>mother</i>			0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)
<i>constant</i>	0.668*** (0.010)	0.441*** (0.113)	0.408*** (0.118)	0.440*** (0.112)	0.406*** (0.117)	0.442*** (0.114)	0.408*** (0.119)	0.439*** (0.113)	0.406*** (0.118)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235 831	235 549	235 409	235 549	235 409	235 549	235 409	235 549	235 409
<i>Adj. R²</i>	0.164	0.176	0.179	0.176	0.178	0.176	0.179	0.176	0.179

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.5
OLS estimates: Religiosity and following traditions.

<i>traditions</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.240*** (0.005)	0.239*** (0.005)	0.236*** (0.005)						
<i>degree</i>				0.217*** (0.006)	0.215*** (0.006)				
<i>attendance</i>						0.195*** (0.006)	0.193*** (0.006)		
<i>pray</i>								0.125*** (0.003)	0.123*** (0.003)
<i>gender</i>	-0.000 (0.003)	0.001 (0.003)	0.001 (0.003)	0.006** (0.003)	0.006** (0.003)	0.014*** (0.003)	0.014*** (0.003)	0.005 (0.003)	0.005 (0.003)
<i>age</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>paidwork</i>		0.000 (0.003)	-0.000 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.001 (0.003)

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Table C.5 (continued).

<i>pwbefore</i>	-0.171*** (0.014)	-0.171*** (0.014)	-0.142*** (0.014)	-0.143*** (0.013)	-0.159*** (0.014)	-0.159*** (0.014)	-0.194*** (0.022)	-0.194*** (0.021)
<i>partner</i>	0.026*** (0.002)	0.025*** (0.002)	0.026*** (0.002)	0.025*** (0.002)	0.025*** (0.002)	0.024*** (0.002)	0.028*** (0.002)	0.027*** (0.002)
<i>health</i>	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003** (0.001)	0.003*** (0.001)	0.006*** (0.001)	0.006*** (0.001)
<i>child</i>	0.001 (0.002)	0.000 (0.002)	0.002 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.002)
<i>bornc</i>		-0.022*** (0.004)		-0.027*** (0.004)		-0.031*** (0.004)		-0.027*** (0.004)
<i>fathere</i>		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
<i>mother</i>		-0.003*** (0.001)		-0.003*** (0.001)		-0.004*** (0.001)		-0.003*** (0.001)
<i>constant</i>	0.518*** (0.007)	0.663*** (0.015)	0.697*** (0.016)	0.612*** (0.015)	0.651*** (0.016)	0.680*** (0.015)	0.724*** (0.016)	0.720*** (0.022)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235 831	235 549	235 409	235 549	235 409	235 549	235 409	235 549
<i>Adj. R²</i>	0.227	0.229	0.229	0.227	0.228	0.214	0.216	0.215

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.6

OLS Estimates: Religiosity and following rules.

<i>rules</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.073*** (0.006)	0.072*** (0.006)	0.067*** (0.006)						
<i>degree</i>				0.056*** (0.005)	0.053*** (0.005)				
<i>attendance</i>						0.076*** (0.006)	0.073*** (0.006)		
<i>pray</i>								0.036*** (0.004)	0.033*** (0.004)
<i>gender</i>	-0.020*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.016*** (0.003)	-0.016*** (0.004)	-0.014*** (0.003)	-0.015*** (0.003)	-0.017*** (0.003)	-0.017*** (0.003)
<i>age</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)
<i>paidwork</i>		0.002 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.002 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)
<i>pwbefore</i>		-0.258*** (0.030)	-0.260*** (0.029)	-0.251*** (0.032)	-0.253*** (0.031)	-0.253*** (0.029)	-0.254*** (0.028)	-0.265*** (0.033)	-0.266*** (0.032)
<i>partner</i>		0.020*** (0.002)	0.018*** (0.002)	0.020*** (0.002)	0.018*** (0.002)	0.019*** (0.002)	0.017*** (0.002)	0.020*** (0.002)	0.019*** (0.002)
<i>health</i>		0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003** (0.001)	0.003** (0.001)	0.004*** (0.001)	0.004*** (0.001)
<i>child</i>		-0.005* (0.002)	-0.006** (0.002)	-0.004* (0.002)	-0.005** (0.002)	-0.004* (0.002)	-0.006** (0.002)	-0.004* (0.002)	-0.006** (0.002)
<i>bornc</i>			-0.042*** (0.004)		-0.044*** (0.004)		-0.043*** (0.004)		-0.043*** (0.004)
<i>fathere</i>			-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
<i>mother</i>			-0.004*** (0.001)		-0.004*** (0.001)		-0.004*** (0.001)		-0.004*** (0.001)
<i>constant</i>	0.505*** (0.007)	0.743*** (0.031)	0.800*** (0.031)	0.733*** (0.034)	0.793*** (0.033)	0.743*** (0.030)	0.802*** (0.030)	0.761*** (0.034)	0.818*** (0.034)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235 831	235 549	235 409	235 549	235 409	235 549	235 409	235 549	235 409
<i>Adj. R²</i>	0.130	0.131	0.132	0.130	0.132	0.130	0.132	0.129	0.131

Notes: Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.7
Summary statistics for religious belonging.

	obs	mean	std dev	min	max
		Believers			
<i>religiosity</i>	144,792	0.52	0.26	0	1
<i>degree</i>	144,792	0.60	0.24	0	1
<i>attendance</i>	144,792	0.37	0.24	0	1
<i>pray</i>	144,792	0.56	0.39	0	1
		Never-believers			
<i>religiosity</i>	67,791	0.14	0.17	0	1
<i>degree</i>	67,791	0.24	0.25	0	1
<i>attendance</i>	67,791	0.09	0.14	0	1
<i>pray</i>	67,791	0.10	0.23	0	1
		Once-believers			
<i>religiosity</i>	24,011	0.19	0.21	0	1
<i>degree</i>	24,011	0.31	0.27	0	1
<i>attendance</i>	24,350	0.10	0.15	0	1
<i>pray</i>	24,011	0.18	0.30	0	1

Table C.8
Disaggregate OLS results for religious belonging.

	Believers		Never-believers		Once-believers	
	(<i>inposav</i>)	(<i>innegav</i>)	(<i>inposav</i>)	(<i>innegav</i>)	(<i>inposav</i>)	(<i>innegav</i>)
<i>religiosity</i>	-0.006* (0.004) 143,738 0.154	0.154*** (0.004) 143,738 0.179	0.049*** (0.008) 67,301 0.140	0.168*** (0.013) 67,301 0.162	0.043*** (0.008) 23,872 0.134	0.140*** (0.013) 23,872 0.152
<i>degree</i>	-0.001 (0.004) 143,738 0.154	0.156*** (0.005) 143,738 0.177	0.017*** (0.005) 67,301 0.138	0.107*** (0.009) 67,301 0.160	0.023*** (0.006) 23,872 0.133	0.104*** (0.010) 23,872 0.152
<i>attendance</i>	-0.020*** (0.004) 143,738 0.155	0.127*** (0.005) 143,738 0.169	0.032*** (0.010) 67,301 0.139	0.176*** (0.012) 67,301 0.159	0.022* (0.012) 23,872 0.132	0.177*** (0.017) 23,872 0.150
<i>pray</i>	-0.001 (0.002) 143,738 0.154	0.082*** (0.003) 143,738 0.168	0.040*** (0.007) 67,301 0.140	0.081*** (0.008) 67,301 0.154	0.028*** (0.006) 23,872 0.134	0.059*** (0.009) 23,872 0.144

Notes: OLS estimates for alternative measures of religiosity are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table C.9
OLS estimates: Religious denominations and innovation attitudes.

	(1) <i>creative</i>	(2) <i>different</i>	(3) <i>free</i>	(4) <i>adventurous</i>	(5) <i>traditions</i>	(6) <i>rules</i>	(7) <i>inposav</i>	(8) <i>innegav</i>
Roman Catholic	-0.008** (0.003)	-0.009*** (0.003)	-0.017*** (0.003)	-0.025*** (0.003)	0.170*** (0.004)	0.050*** (0.004)	-0.015*** (0.002)	0.110*** (0.003)
Protestant	-0.011*** (0.004)	-0.018*** (0.004)	-0.018*** (0.004)	-0.027*** (0.003)	0.149*** (0.005)	0.060*** (0.006)	-0.018*** (0.003)	0.104*** (0.005)
Eastern Orthodox	0.010 (0.009)	0.012 (0.008)	0.005 (0.008)	0.005 (0.007)	0.114*** (0.006)	0.036*** (0.007)	0.008 (0.006)	0.075*** (0.005)
Other Christian	0.005 (0.008)	-0.002 (0.010)	-0.032*** (0.008)	-0.026*** (0.009)	0.115*** (0.010)	0.065*** (0.010)	-0.014** (0.006)	0.090*** (0.008)
Jewish	0.036 (0.030)	0.067** (0.029)	0.001 (0.025)	0.059* (0.032)	0.197*** (0.031)	-0.035 (0.040)	0.041* (0.024)	0.081*** (0.019)
Muslim	-0.005 (0.009)	0.009 (0.009)	0.001 (0.010)	-0.011 (0.008)	0.227*** (0.010)	0.094*** (0.008)	-0.002 (0.007)	0.161*** (0.007)
Eastern Religions	0.014 (0.014)	0.016 (0.014)	0.015 (0.012)	0.038** (0.015)	0.143*** (0.014)	-0.001 (0.018)	0.021** (0.010)	0.071*** (0.013)
Other Non-Christian	0.071*** (0.016)	0.021 (0.017)	-0.005 (0.016)	0.044* (0.023)	0.127*** (0.019)	-0.034* (0.018)	0.033*** (0.012)	0.046*** (0.014)

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Table C.9 (continued).

	(1) <i>creative</i>	(2) <i>different</i>	(3) <i>free</i>	(4) <i>adventurous</i>	(5) <i>traditions</i>	(6) <i>rules</i>	(7) <i>inposav</i>	(8) <i>innegav</i>
Not declared	0.011 (0.011)	0.012 (0.009)	-0.015* (0.008)	-0.010 (0.013)	0.150*** (0.012)	0.042*** (0.011)	-0.001 (0.008)	0.096*** (0.009)
<i>N</i>	235,409	235,409	235,409	235,409	235,409	235,409	235,409	235,409
<i>Adj. R²</i>	0.079	0.080	0.072	0.178	0.196	0.130	0.151	0.222

Notes: OLS estimates for religious denominations are reported. Robust standard errors clustered at the level of instruments are in parentheses. All regressions include controls for age, age squared, gender, education, paid work status, children, health, mother's and father's, education, born-in country and the following fixed effects: country, survey year, country-survey year, religious denomination, occupation and income level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table D.1

IV estimates: Religiosity and creativity.

<i>creative</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	-0.192** (0.093)	-0.165* (0.085)	-0.192** (0.083)						
<i>degree</i>				-0.265* (0.160)	-0.299* (0.153)				
<i>attendance</i>						-0.213*** (0.079)	-0.230*** (0.078)		
<i>pray</i>								-0.085 (0.059)	-0.106* (0.058)
<i>gender</i>	-0.002 (0.006)	-0.001 (0.005)	0.001 (0.005)	0.002 (0.009)	0.005 (0.008)	-0.008*** (0.003)	-0.007** (0.003)	-0.004 (0.006)	-0.001 (0.006)
<i>age</i>	-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
<i>education</i>	0.005*** (0.000)	0.005*** (0.000)	0.004*** (0.000)	0.005*** (0.000)	0.004*** (0.000)	0.005*** (0.000)	0.004*** (0.000)	0.005*** (0.000)	0.004*** (0.000)
<i>paidwork</i>		0.003 (0.003)	0.004 (0.003)	0.003 (0.003)	0.004 (0.003)	0.003 (0.003)	0.004 (0.003)	0.004 (0.003)	0.005* (0.003)
<i>pwbefore</i>		-0.314*** (0.050)	-0.318*** (0.045)	-0.356*** (0.051)	-0.366*** (0.047)	-0.332*** (0.047)	-0.337*** (0.043)	-0.298*** (0.059)	-0.299*** (0.053)
<i>partner</i>		0.009*** (0.003)	0.010*** (0.003)	0.011*** (0.004)	0.011*** (0.003)	0.012*** (0.003)	0.012*** (0.003)	0.008*** (0.003)	0.008*** (0.003)
<i>health</i>		0.015*** (0.002)	0.014*** (0.001)	0.016*** (0.002)	0.015*** (0.002)	0.017*** (0.002)	0.016*** (0.002)	0.015*** (0.002)	0.014*** (0.001)
<i>child</i>		-0.009*** (0.003)	-0.009*** (0.002)	-0.009*** (0.003)	-0.009*** (0.003)	-0.009*** (0.002)	-0.009*** (0.002)	-0.010*** (0.003)	-0.009*** (0.002)
<i>bornc</i>			-0.028*** (0.008)		-0.031*** (0.011)		-0.024*** (0.006)		-0.024*** (0.007)
<i>fathere</i>			0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)
<i>mothere</i>			0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179

Notes: Robust standard errors clustered at the instrument's level are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table D.2

IV estimates: Religiosity and being different.

<i>different</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	-0.058 (0.070)	-0.090 (0.064)	-0.109* (0.062)						
<i>degree</i>				-0.042 (0.120)	-0.067 (0.115)				
<i>attendance</i>						-0.105* (0.060)	-0.117** (0.059)		
<i>pray</i>								-0.066 (0.046)	-0.081* (0.044)
<i>gender</i>	0.008 (0.006)	0.014** (0.006)	0.015*** (0.005)	0.010 (0.008)	0.012 (0.007)	0.010*** (0.003)	0.010*** (0.003)	0.015** (0.006)	0.017*** (0.006)
<i>age</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.002*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.002*** (0.000)

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Table D.2 (continued).

<i>education</i>	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
<i>paidwork</i>		-0.006** (0.003)	-0.005** (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.006** (0.003)	-0.005** (0.003)	-0.006** (0.003)	-0.005** (0.003)
<i>pwbefore</i>		0.028 (0.138)	0.024 (0.142)	0.024 (0.133)	0.018 (0.138)	0.019 (0.140)	0.015 (0.144)	0.038 (0.135)	0.037 (0.139)
<i>partner</i>		-0.004 (0.003)	-0.004 (0.003)	-0.005 (0.003)	-0.004 (0.003)	-0.003 (0.003)	-0.003 (0.003)	-0.005* (0.003)	-0.005* (0.003)
<i>health</i>		0.024*** (0.001)	0.023*** (0.001)	0.024*** (0.001)	0.023*** (0.001)	0.024*** (0.002)	0.024*** (0.001)	0.023*** (0.001)	0.023*** (0.001)
<i>child</i>		-0.022*** (0.002)	-0.022*** (0.002)	-0.023*** (0.003)	-0.023*** (0.002)	-0.023*** (0.002)	-0.022*** (0.002)	-0.022*** (0.002)	-0.022*** (0.002)
<i>bornc</i>			-0.027*** (0.007)		-0.023** (0.009)		-0.024*** (0.005)		-0.027*** (0.006)
<i>fathere</i>			0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)		0.006*** (0.001)
<i>mother</i>			0.002* (0.001)		0.002* (0.001)		0.002** (0.001)		0.002* (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179

Notes: Robust standard errors clustered at the instrument's level are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table D.3

IV estimates: Religiosity and being free.

<i>free</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	-0.229*** (0.063)	-0.316*** (0.062)	-0.336*** (0.059)						
<i>degree</i>				-0.433*** (0.137)	-0.457*** (0.130)				
<i>attendance</i>						-0.358*** (0.061)	-0.371*** (0.060)		
<i>pray</i>								-0.192*** (0.044)	-0.207*** (0.042)
<i>gender</i>	0.002 (0.005)	0.009* (0.005)	0.011** (0.005)	0.011 (0.008)	0.013* (0.008)	-0.006* (0.003)	-0.005* (0.003)	0.007 (0.005)	0.009* (0.005)
<i>age</i>	-0.000 (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.001*** (0.000)
<i>education</i>	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
<i>paidwork</i>		-0.001 (0.003)	-0.001 (0.003)	-0.001 (0.003)	-0.000 (0.003)	-0.001 (0.003)	-0.000 (0.003)	-0.000 (0.003)	0.000 (0.003)
<i>pwbefore</i>		-0.093 (0.088)	-0.097 (0.084)	-0.159* (0.094)	-0.167* (0.092)	-0.121 (0.087)	-0.126 (0.083)	-0.059 (0.099)	-0.061 (0.094)
<i>partner</i>		-0.035*** (0.003)	-0.035*** (0.003)	-0.033*** (0.004)	-0.033*** (0.004)	-0.032*** (0.004)	-0.031*** (0.004)	-0.037*** (0.003)	-0.037*** (0.003)
<i>health</i>		0.011*** (0.001)	0.010*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.014*** (0.002)	0.013*** (0.002)	0.009*** (0.001)	0.009*** (0.001)
<i>child</i>		-0.013*** (0.003)	-0.013*** (0.003)	-0.014*** (0.003)	-0.013*** (0.003)	-0.014*** (0.003)	-0.013*** (0.003)	-0.014*** (0.003)	-0.013*** (0.003)
<i>bornc</i>			-0.027*** (0.006)		-0.030*** (0.009)		-0.020*** (0.005)		-0.023*** (0.005)
<i>fathere</i>			0.004*** (0.001)		0.003*** (0.001)		0.004*** (0.001)		0.004*** (0.001)
<i>mother</i>			0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)		0.004*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179

Notes: Robust standard errors clustered at the instrument's level are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table D.4
IV estimates: Religiosity and being adventurous.

<i>adventurous</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.132* (0.073)	0.006 (0.056)	-0.029 (0.055)						
<i>degree</i>				0.036 (0.087)	-0.005 (0.086)				
<i>attendance</i>						0.039 (0.053)	0.019 (0.053)		
<i>pray</i>								-0.011 (0.044)	-0.040 (0.043)
<i>gender</i>	-0.086*** (0.007)	-0.074*** (0.005)	-0.071*** (0.005)	-0.076*** (0.006)	-0.072*** (0.006)	-0.074*** (0.003)	-0.073*** (0.003)	-0.072*** (0.006)	-0.068*** (0.006)
<i>age</i>	-0.005*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)
<i>education</i>	0.002*** (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)
<i>paidwork</i>		-0.003 (0.003)	-0.002 (0.003)	-0.003 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.003 (0.003)	-0.002 (0.003)
<i>pwbefore</i>		0.167 (0.109)	0.162 (0.120)	0.174 (0.108)	0.163 (0.118)	0.172 (0.105)	0.167 (0.112)	0.168 (0.113)	0.167 (0.122)
<i>partner</i>		-0.039*** (0.003)	-0.038*** (0.003)	-0.040*** (0.003)	-0.038*** (0.003)	-0.040*** (0.003)	-0.039*** (0.003)	-0.039*** (0.003)	-0.038*** (0.003)
<i>health</i>		0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.020*** (0.001)	0.019*** (0.001)
<i>child</i>		-0.035*** (0.003)	-0.033*** (0.003)	-0.035*** (0.003)	-0.034*** (0.003)	-0.035*** (0.003)	-0.034*** (0.003)	-0.035*** (0.003)	-0.033*** (0.003)
<i>bornc</i>			-0.004 (0.006)		-0.002 (0.006)		-0.001 (0.005)		-0.006 (0.006)
<i>fathere</i>			0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)
<i>mothere</i>			0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)		0.007*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179

Notes: Robust standard errors clustered at the instrument's level are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table D.5
IV estimates: Religiosity and following traditions.

<i>traditions</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.082 (0.054)	0.144*** (0.051)	0.156*** (0.052)						
<i>degree</i>				0.203** (0.087)	0.212** (0.088)				
<i>attendance</i>						0.148*** (0.046)	0.154*** (0.047)		
<i>pray</i>								0.092** (0.040)	0.102** (0.041)
<i>gender</i>	0.012** (0.005)	0.008* (0.005)	0.008* (0.005)	0.007 (0.006)	0.006 (0.006)	0.015*** (0.003)	0.015*** (0.003)	0.008 (0.006)	0.007 (0.006)
<i>age</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>paidwork</i>		-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)
<i>pwbefore</i>		-0.176*** (0.020)	-0.176*** (0.018)	-0.145*** (0.022)	-0.143*** (0.021)	-0.165*** (0.020)	-0.164*** (0.019)	-0.191*** (0.026)	-0.193*** (0.024)
<i>partner</i>		0.027*** (0.002)	0.026*** (0.002)	0.026*** (0.002)	0.025*** (0.002)	0.026*** (0.002)	0.024*** (0.002)	0.028*** (0.002)	0.027*** (0.002)
<i>health</i>		0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
<i>child</i>		0.002 (0.002)	0.001 (0.002)	0.002 (0.003)	0.001 (0.003)	0.003 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.002)
<i>bornc</i>			-0.028*** (0.005)		-0.027*** (0.007)		-0.033*** (0.004)		-0.029*** (0.006)

(continued on next page)

Table D.5 (continued).

<i>fathere</i>			-0.001 (0.001)			-0.001 (0.001)			-0.001 (0.001)			-0.001 (0.001)
<i>mother</i>			-0.003*** (0.001)			-0.003*** (0.001)			-0.004*** (0.001)			-0.003*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064			
<i>widstat</i>	172	183	174	72	71	142	139	188	179			

Notes: Robust standard errors clustered at the instrument's level are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table D.6

IV estimates: Religiosity and following rules.

<i>rules</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>religiosity</i>	0.139** (0.063)	0.180*** (0.063)	0.194*** (0.064)						
<i>degree</i>				0.154 (0.095)	0.163* (0.095)				
<i>attendance</i>						0.229*** (0.061)	0.236*** (0.061)		
<i>pray</i>								0.116** (0.049)	0.128*** (0.049)
<i>gender</i>	-0.024*** (0.005)	-0.026*** (0.005)	-0.027*** (0.005)	-0.022*** (0.007)	-0.023*** (0.007)	-0.018*** (0.004)	-0.018*** (0.004)	-0.025*** (0.006)	-0.027*** (0.006)
<i>age</i>	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
<i>education</i>	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)
<i>paidwork</i>		0.003 (0.003)	0.003 (0.003)	0.002 (0.003)	0.002 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.002 (0.003)
<i>pwbefore</i>		-0.253*** (0.023)	-0.253*** (0.023)	-0.233*** (0.032)	-0.232*** (0.031)	-0.233*** (0.026)	-0.233*** (0.026)	-0.272*** (0.025)	-0.274*** (0.023)
<i>partner</i>		0.019*** (0.002)	0.017*** (0.002)	0.019*** (0.003)	0.017*** (0.002)	0.016*** (0.003)	0.015*** (0.003)	0.020*** (0.002)	0.019*** (0.002)
<i>health</i>		0.004*** (0.001)	0.004*** (0.001)	0.004** (0.001)	0.004*** (0.001)	0.002 (0.001)	0.002 (0.001)	0.005*** (0.001)	0.005*** (0.001)
<i>child</i>		-0.006** (0.003)	-0.007*** (0.003)	-0.005* (0.003)	-0.006** (0.003)	-0.006** (0.003)	-0.007*** (0.003)	-0.006** (0.003)	-0.007*** (0.003)
<i>bornc</i>			-0.032*** (0.006)		-0.037*** (0.007)		-0.036*** (0.005)		-0.034*** (0.006)
<i>fathere</i>			-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)		-0.001 (0.001)
<i>mother</i>			-0.004*** (0.001)		-0.004*** (0.001)		-0.004*** (0.001)		-0.003*** (0.001)
<i>Full FE</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	235,831	235,549	235,409	235,549	235,409	235,549	235,409	235,549	235,409
<i>idp</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>cdf</i>	2320	2404	2432	786	784	2899	2879	2022	2064
<i>widstat</i>	172	183	174	72	71	142	139	188	179

Notes: Robust standard errors clustered at the instruments level are in parentheses. All regressions include the full set of fixed effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table E.1

Disaggregate IV results for age and gender.

<i>inposav</i>	(15-25)		(25-35)		(35-45)		(45-55)		(55-65)		(65+)		(female)		(male)	
	(OLS) (1)	(IV) (2)	(OLS) (3)	(IV) (4)	(OLS) (5)	(IV) (6)	(OLS) (7)	(IV) (8)	(OLS) (9)	(IV) (10)	(OLS) (11)	(IV) (12)	(OLS) (13)	(IV) (14)	(OLS) (15)	(IV) (16)
<i>religiosity</i>	-0.005 (0.011)	-0.052 (0.154)	-0.001 (0.008)	-0.296** (0.135)	-0.007 (0.008)	-0.280* (0.143)	0.017** (0.008)	-0.221** (0.100)	0.006 (0.008)	-0.215** (0.097)	0.000 (0.007)	-0.276* (0.155)	0.002 (0.005)	-0.143* (0.075)	0.006 (0.005)	-0.159 (0.100)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.060	0.734	0.094	0.021	0.084	0.045	0.071	0.022	0.091	0.019	0.146	0.040	0.161	0.043	0.131	0.090
<i>degree</i>	0.004 (0.008)	0.126 (0.164)	0.005 (0.007)	0.257 (1.661)	0.003 (0.006)	0.001 (0.336)	0.017*** (0.006)	-0.091 (0.172)	0.013** (0.007)	-0.179 (0.118)	0.001 (0.006)	-0.240 (0.161)	0.006 (0.004)	-0.242* (0.127)	0.011*** (0.004)	-0.006 (0.134)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.060	0.396	0.095	0.830	0.084	0.998	0.072	0.598	0.092	0.164	0.146	0.081	0.161	0.024	0.131	0.962
<i>attendance</i>	-0.021** (0.011)	-0.174 (0.124)	-0.008 (0.008)	-0.208 (0.133)	-0.028*** (0.008)	-0.350** (0.175)	-0.012 (0.008)	-0.189** (0.083)	-0.015** (0.007)	-0.188** (0.093)	-0.006 (0.007)	-0.256* (0.135)	-0.015*** (0.005)	-0.152** (0.067)	-0.008* (0.005)	-0.215** (0.097)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.061	0.078	0.095	0.019	0.085	0.018	0.071	0.012	0.092	0.024	0.146	0.057	0.161	0.020	0.131	0.017

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Table E.1 (continued).

pray	0.004 (0.007)	0.072 (0.188)	-0.000 (0.005)	-0.216** (0.085)	0.004 (0.005)	-0.141 (0.089)	0.018*** (0.005)	-0.121** (0.061)	0.008* (0.005)	-0.222** (0.105)	0.003 (0.004)	-0.189 (0.168)	0.007*** (0.003)	-0.023 (0.067)	0.007** (0.003)	-0.27* (0.075)
	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.060	0.704	0.094	0.014	0.084	0.115	0.072	0.038	0.092	0.008	0.146	0.150	0.161	0.729	0.131	0.069
innegav	(15-25)		(25-35)		(35-45)		(45-55)		(55-65)		(65+)		(female)		(male)	
	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
religiosity	0.221*** (0.013)	-0.219 (0.147)	0.207*** (0.010)	0.308* (0.168)	0.188*** (0.009)	0.617*** (0.144)	0.169*** (0.008)	0.401*** (0.135)	0.149*** (0.009)	0.390*** (0.150)	0.157*** (0.008)	0.555* (0.304)	0.172*** (0.005)	0.242** (0.098)	0.185*** (0.005)	0.184* (0.106)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.236	0.158	0.237	0.054	0.238	0.000	0.241	0.000	0.214	0.001	0.164	0.014	0.247	0.012	0.245	0.084
degree	0.172*** (0.011)	-0.066 (0.140)	0.140*** (0.008)	1.920 (3.966)	0.136*** (0.007)	0.971* (0.503)	0.123*** (0.007)	0.409* (0.232)	0.117*** (0.007)	0.477** (0.237)	0.127*** (0.007)	0.493** (0.213)	0.125*** (0.005)	0.140 (0.118)	0.142*** (0.005)	0.207 (0.142)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.234	0.653	0.229	0.168	0.232	0.000	0.236	0.075	0.211	0.007	0.159	0.014	0.241	0.240	0.154	0.154
attendance	0.145*** (0.013)	-0.160 (0.106)	0.162*** (0.009)	0.227* (0.124)	0.146*** (0.008)	0.609*** (0.200)	0.141*** (0.008)	0.322** (0.124)	0.120*** (0.008)	0.350** (0.141)	0.100*** (0.007)	0.537* (0.276)	0.134*** (0.005)	0.253*** (0.080)	0.137*** (0.005)	0.172* (0.104)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.222	0.129	0.227	0.022	0.229	0.000	0.235	0.001	0.209	0.000	0.152	0.008	0.240	0.020	0.235	0.098
pray	0.105*** (0.008)	-0.285 (0.233)	0.098*** (0.006)	0.072 (0.100)	0.083*** (0.005)	0.293*** (0.089)	0.066*** (0.005)	0.197*** (0.074)	0.058*** (0.005)	0.318** (0.155)	0.074*** (0.005)	0.338 (0.364)	0.072*** (0.003)	0.210** (0.103)	0.087*** (0.003)	0.133 (0.085)
	22,131	22,131	38,517	38,517	44,575	44,575	44,159	44,159	40,438	40,438	45,589	45,589	122,036	122,036	113,373	113,373
	0.222	0.175	0.225	0.464	0.226	0.001	0.229	0.002	0.204	0.009	0.154	0.188	0.729	0.026	0.106	0.279

Notes: Disaggregated OLS and IV estimates for age and gender are reported. Robust standard errors clustered at the level of instruments are in parentheses. The observation numbers are below standard errors, followed by adjusted R squared for OLS and Anderson-Rubin Wald F statistic (AR test) for IV estimates. All regressions include controls for age, gender, education, paid work status, partner, children, health, born in country, mother's and father's, education and the following fixed effects: country, survey year, country-survey year, religious denomination, occupation and income level. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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