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Abstract

We propose a new methodology for identifying the causal effect of Protestantism versus Catholicism on the decision to become an entrepreneur. Our quasi-experimental research design exploits religious minorities' strong attachment to religious ethics and the exogenous historical determination of religious minorities' geographical distribution in the regions of the former Holy Roman Empire in the 1500s. We analyse European Social Survey data, collected in four waves between 2002 and 2008, and find that religious background has a significant effect on the individual propensity for entrepreneurship, with Protestantism increasing the probability to be an entrepreneur by around 5 percentage points with respect to Catholicism. Our findings are stable across a number of robustness checks, including accounting for migration patterns and a placebo test. We also provide an extended discussion of the assumptions' validity at the basis of our research design. This paper is one of the first attempts to identify a causal effect, rather than a simple correlation, of religious ethics on economic outcomes.

Keywords: Entrepreneurship, Religion, Culture, Protestantism, Catholicism.
JEL Codes: Z12, J24, J21, Z13.

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1 Introduction

Religion has often been investigated as a potential driver of economic behaviour and outcomes. In "The Protestant Ethic and the Spirit of Capitalism", Weber (1904) argued that the ethical principles embodied by Protestantism were instrumental in the early development of capitalism by persuading individuals in pre-capitalistic societies to engage in secular activities. However, most of the evidence to this date has failed to confirm this hypothesis.

Becker and Woessmann (2009) dispute Weber's original stand, arguing that the prosperity of Protestant economies can be related to the increase in literacy induced by the Protestant tenet of individual reading of the Bible, with no relevant role left for ethical principles. Similarly, Cantoni (2010) find no effect of Protestant ethics on economic growth using historical German data. Contradicting these negative results, Arrunada (2010) analyses the role of Protestantism on several socio-economic outcomes and finds that Protestants work longer hours and have a stronger sense of the rule of law than Catholics do.

Nevertheless, the studies that use individually reported religious denominations suffer from an important limitation because the self-reported religious affiliations of survey participants may be a poor proxy for the canons, ethics, and codes of conduct that define a religion, since many people tend to report belonging to the denomination in which they were raised, regardless of their degree of adhesion. The striking distance between the percentage of self-declared Christians in western Europe (70 percent) and the percentage of individuals who believe in life after death (20 percent), despite the latter's being the cornerstone of all Christian denominations, demonstrates the wide gap between what people report and what they do or believe.[1] Accordingly, the use of self-reported religious denomination to account for individuals' ethical principles and beliefs could be misleading.

In addition, even when the individual's attachment to a specific religious denomination is observable, we are more interested in the causal impact of the relative ethical principles associated to that attachment than in a simple correlation between religion and outcomes.

In this contribution, we suggest a new methodology for identifying the causal effect of alternative religious ethical and social norms on a particular economic outcome, individual propensity for entrepreneurship. Our research design is based on the claim that religious mi-

[1]Source: International Social Survey Programme (ISSP) Religion II data, 1998

norities adhere more tightly to their denominations' underlying ethical principles than do larger religious groups. Three reasons support this claim: First, religion is an important component of minority identity that its adherents find worth defending from the influence of the majority. Second, ministers of minority religions must work harder to preserve their herds. Third, minorities are subject to continuous erosion by the dominant religion (or, more generally, by the dominant culture) and only the most observant can resist it. It follows that, if religious ethical principles play any role in economic outcomes, religious minorities should demonstrate it more forcefully than majorities do.

Under the assumption that the value of identity, the incentives of the clergy, and the process of erosion is common among religious minorities, we may be able to identify the causal effect of religious ethical norms on economic outcomes by comparing religious minorities. More specifically, the differential effect of the Protestant versus the Catholic ethic will emerge in a comparison of Protestant and Catholic minorities, differencing out all specificities attached to being part of a religious minority.

Our analysis focuses on the European regions that once belonged to the Holy Roman Empire of the German Nation (HRE henceforth). Focusing on the HRE has three primary advantages: First, the rise and the geographic distribution of minorities in both denominations are due entirely to the diffusion of Protestantism in Europe in the sixteenth and seventeenth centuries (Cantoni, 2010; Spenkuch, 2011); in the former HRE regions, minority distribution depends on historical local contingencies that may be considered exogenous to the individual labour market choices in current times. Second, the most common denominations, Catholicism and Protestantism, account for the largest proportion of all believers in those regions. Third, religious denominations in Europe are usually inherited from parents; individuals do not typically convert from one Christian denomination to another (Cantoni, 2010).

We investigate the role of religious ethics in entrepreneurship, one of the most fundamental elements of a market economy.[2] Our research question concerns whether the propensity for entrepreneurship is more or less affected by the cultural and ethical traits of Protestantism than by those of Catholicism. According to the psychological literature, entrepreneurship depends on individual psychological traits like determination, the need for achievement, resilience, self-confidence, and a sense of independence (McClelland, 1961; Cuervo, 2005). McClelland (1961)

[2]We use the words "entrepreneurs" and "the self-employed" interchangeably.

and Renneboog and Spaenjers (2012) suggest that all these attributes may be significantly influenced by the ethical principles inherent in Protestantism and Catholicism. The economic literature on entrepreneurship introduces a generic entrepreneurship ability and the level of risk aversion as the fundamental determinants of the individual decision to become an entrepreneur (see Parker, 2005 for a review). Both factors are likely to be influenced by traits like determination and self-esteem, and in turn by religious ethical principles.

In this respect, our attempt to answer this research question may be considered an indirect test of Weber's (1904) original theory. While we do not investigate the historical process that led to the development of capitalism in Europe, as Weber did, we do provide an empirical investigation of the cultural determinants of economic behaviour in contemporary economies. To this end, we use European Social Survey data from 2002 to 2008, along with other datasets, to investigate our research question and test the validity of our identification strategy. Unlike earlier contributions, we argue that religious ethics significantly affect economic behaviour and outcomes.

According to our empirical findings, after controlling for a number of regional and individual controls, such as educational attainment, family entrepreneurial background, and country or regional fixed effects, we find that adhesion to Protestant ethical principles increases the probability to be an entrepreneur by around 5 percentage points compared to adhesion to Catholic ethical principles.[3]

We discuss the validity of our research design's assumptions and provide a number of robustness checks of our findings, including a placebo test, to show that the empirical results are not spurious or driven by specificities related to areas where each denomination has been historically predominant, or by migration patterns.

The paper is organized as follows. The key differences between Catholicism and Protestantism are summarized in section 2. Section 3 presents our research design and provides a discussion of our identification strategy. Data are presented in section 4 and the empirical findings in section 5. Section 6 provides an extensive discussion of our identification assumptions, section 7 concludes, and appendices follow.

[3]Entrepreneurship is not only a matter of individual decision and preferences; it also depends on the opportunities and risks associated with self-employment, which may vary sharply across countries and sometimes even across regions of the same country. Opportunities and risks are often shaped by fiscal rules, by their degree of enforcement, and by other forms of regulation. (See Cuervo, 2005 for a detailed discussion of the determinants of entrepreneurship.) These elements are accounted for in our empirical analysis.

2 Catholicism and Protestantism

Catholicism and Protestantism share the same fundamental articles of faith but they differ substantially in terms of how the religions should be lived. According to the monumental thirteen-volume *The New Schaff-Herzog Encyclopedia of Religious Knowledge* by religious historians Johann Jakob Herzog and Phillip Shaff, Protestantism:

> retained from the Roman Catholic system all the objective doctrines of Christianity concerning the Trinity and the divine human character and work of Christ, in fact, all the articles of faith contained in the Apostles' and other ecumenical creeds of the early church. But it joined issue with the prevailing soteriology, that is, the application of the doctrines relating to Christianity [...]. It brought the believer into direct relation and union with Christ as the one and all-sufficient source of salvation, and set aside the doctrines of sacerdotal and saintly mediation and intercession. [...] From this general principle of Evangelical freedom [...] proceed the three fundamental doctrines of Protestantism - the absolute supremacy of (1) the Word and of (2) the grace of Christ, and (3) the general priesthood of believers (see the entry "Protestantism" in Herzog and Schaff, 1908, vol. IX).

The *supremacy of the Word* states that the scriptures are the only source of faith and establishes the right of individual interpretation. This approach is in contrast to Catholicism, which grounds faith both on the Bible and on tradition, and makes the decrees of Popes and Councils the only legitimate interpreter of the word of God.

The *supremacy of the grace of Christ* affirms that salvation is a "free" grace to the believer that comes directly from Christ and does not require mediation from the Church or the clergy. Catholicism, instead, says that salvation depends on both faith and good works, stressing the role of works.

The *universal priesthood of believers* states that all Christians have the right to read and proclaim the Bible in public, and to participate to the government of the Church. However, Catholicism is based on the exclusive authority of priesthood, and priests are considered necessary mediators between God and the people (Herzog and Schaff, 1908).

These principles may shape believers' work ethic, their appreciation of worldly success, and their psychological traits.

According to Cohen and Hill (2007) and references therein, Catholics should have more collectivist personalities, that value social connections and group affiliation because Catholicism emphasizes the sense of community and group rituality. Catholics should feel obliged to serve their communities and might be willing to subordinate thier individual desires to the benefit of the collective good. In the case of Protestants, the principles of a personal relationship with God and of being the unique legitimate interpreter of the scriptures suggest a more individualistic personality that is focused on personal goals, uniqueness, and personal control. Protestants believe in the autonomy of the conscience, which is the ultimate judge of his actions; are keener on self-reflection, research, and investigations; and are less inclined to mysticism than Catholics are.

Perhaps the more marked difference between Catholicism and Protestantism regards their *work ethic*. According to medieval Catholic theology, Christianity is divided between those who have received the "calling", whose lives are to be monastic and focused on prayer and meditation, and those who have not received the "calling" who must struggle in the secular world (Bonhoeffer, 1959). Meditation was superior to work which was seen as God's punishment for man's original sin (Schaltegger and Torgler, 2009). This view has changed over the centuries, but work remains associated with toil and difficulty, its merit being only that of allowing man to share Christ's suffering on the cross: "Sweat and toil, which work necessarily involves in the present condition of the human race, present the Christian and everyone who is called to follow Christ with the possibility of sharing lovingly in the work that Christ come to do" (John Paul II, 1981, Laborem Exercens: *Encyclical Letter of the Supreme Pontiff John Paul II on Human Work*).

Protestantism in both the Calvinistic and Lutheran traditions maintains that work of whatever kind is honourable, necessary, and a service to God. Luther dismissed the separation between the "called" and the others, contending that, just as some are called to serve God in the religious ministry, others are called to serve God through secular labours; there is no spiritual distinction between the two (Eaton, 2013).[4]

Catholicism and Protestantism differ also in their *attitudes toward worldly success*. The Catholic Church tends to orient its members toward the hereafter since success in the secular

[4]Luther's and Calvin's views regarding the morality of trade activity differed. Luther looked at trade as a way to take advantage of others' needs, while Calvin considered trade and commerce useful and that those engaged in trade provide a service to society at a risk to themselves.

world and economic achievement are not indications of salvation. On the other hand, Protestants are highly concerned with worldly success, the attainment of material possession, status, and the prestige that is associated with upward social mobility since these achievements are viewed as hints of salvation (Mayer and Sharp, 1962).[5]

Weber (1904) thought that the Catholics' "communitarian" ethic impedes educational and economic achievement while the Protestants' "inner worldly asceticism" with its emphasis on individual achievement, facilitates success (Greeley, 1989). Psychologists like McClelland (1961) claim that ideas and values of the Protestant work ethic determine child-rearing practices of independence, delay of gratification and mastery, which lead to the children's developing strong motivations to achieve. These high achievers are likely to become successful entrepreneurs (Furnham, 1987). According to the economic literature on entrepreneurship, the decision to become an entrepreneur depends on an individual's exogenously-distributed entrepreneurship ability (Lucas, 1978), on the individual probability that a new venture will survive (Holmes and Schmitz, 1990), and/or on the individual level of risk aversion (Kilhstrom and Laffont, 1979) (see Parker, 2005 for a review). All of these factors are likely to be affected by the character traits that the psychologists suggest are influenced by Protestantism. For instance the probability that a new venture will survive may depend on the individual's determination and willingness to succeed. Alternatively, the individual's disposition toward hard work might serve to lower the risk of failure (Parker and Belghitar, 2006).

3 Research Design

This paper's purpose is that of testing whether there exists a differential effect of the Protestant ethic, compared to the Catholic ethic, on the propensity for entrepreneurship.

A major issue in dealing with the ethical and cultural content of religions is that self-identification with a certain religious creed does not necessarily imply internalization of its religious ethical principles, so the implications derived from a simple comparison of individuals' reported affiliations may be misleading. The literature has often used various religiousness-

[5]Such is the case especially in Calvinism. According to the Calvinist concept of predestination, God decides a person's salvation or damnation before his or her birth, but it is hidden from the person, who can do nothing to alter fate. Worldly success came to be regarded as a sign of one's being among the select group that God will save from damnation (Becker and Woessmann, 2009; Arrunada, 2010).

intensity indicators to measure individual attachment to religious beliefs (McCleary and Barro, 2006), but most of these indicators, such as the frequency of attendance of religious services, weekly prayers, and donation of money and time to religious organizations, are likely to be endogenous to labour market outcomes.[6]

To overcome this problem, we propose an indirect measure of attachment to religious principles: the condition of belonging to a religious minority. Members of minority religions are more fervent and strict in their faith than are members of majority religions for three primary reasons.

First, according to Bisin and Verdier (2000), Bisin and Verdier (2001), and Bisin, Topa, and Verdier (2004), religion, along with language, history and culture, is an important element of people's identity that minorities seek to defend.

Second, Stark, Finke, and Iannaccone (1995), Finke and Stark (1998), and Stark (1998) suggest that the clergy of a minority religion works harder to preserve its followers from the constant pressure of the surrounding dominant religion. Third, because of this pressure, only people who are strongly attached to the faith can resist the influence of the majority religion and preserve their creed.

We verify these intuitions by examining the behaviour of Protestant and Catholic minorities in Europe using ISSP Religion III data and find that members of religious minorities declare themselves to be more religious and to pray more often and more regularly than their non-minority counterparts do. Minority Protestants tend to agree more with the principles of direct and unmediated relationship with God (one tenet of Protestantism) than other Protestants do, and minority Catholics believe more than other Catholics that salvation can be achieved by means of good works and that individual fate is not predetermined (one tenet of Catholicism). The minorities of both confessions are more likely to believe in life after death, heaven, and hell, and both minorities tend to have more confidence in churches. Finally, while practically non-existent among majority denominations, transitions from one denomination to another are more frequent among minorities, which is in line with the argument that the pressure from the dominant religions pushes the less fervent out, leaving only those who are most strongly attached to their faith.[7]

[6] Among the early contributions in the economics of religion, Tomes (1984) uses the religion in which one was raised to limit the concern of endogeneity.

[7] See Appendix A and B.1 for details.

Central to our identification strategy is that being born into a religious minority is exogenous because the rise and geographic distribution of minorities of both denominations are historically determined, following the equilibrium found at the end of the religious wars of the sixteenth and seventeenth centuries that depended mainly on contingent historical conditions (Cantoni, 2010, Cantoni, 2011). This distribution has persisted over the centuries because of the intergenerational transmission of religion within families, so it can be considered exogenous to individual labour market choices in current times. (See the appendix B for a more extensive argumentation.)

On these grounds, the differential effect of Protestantism versus Catholicism on entrepreneurship can be identified by comparing minority communities, provided that Protestant and Catholic minorities are alike in terms of characteristics relevant to entrepreneurship other than ethical principles. We discuss to what extent Protestant and Catholic minorities are comparable in section 6.

The rationale of our research design is summarized in Figure 1, where we plot the propensity to become an entrepreneur on the vertical axis and the degree of adhesion to a religion's ethics on the horizontal axis. The degree of adhesion is a latent variable that is not directly observed; what we observe for each individual is the market share of the denomination to which he or she belongs, which is inversely correlated with the degree of adhesion.

FIGURE 1 AROUND HERE

As Figure 1 shows, when the degree of adhesion to one's religious ethics is zero, the likelihood that one will choose to be self-employed is unaffected by religious affiliation; the reported religious affiliation carries no specific religious content and has no consequence on entrepreneurship. We refer to this feature as the "common intercept hypothesis" which can be tested in our empirical analysis. As the degree of adhesion increases, both Protestantism and Catholicism increasingly influence entrepreneurship, possibly in a specific fashion.[8] In order to evaluate any differential effect of religious ethics on entrepreneurship, we must compare individuals with maximum religious attachment.

We consider a sample of self-declared Protestant and Catholic individuals[9] and define the

[8]Here, the relationship between religious attachment and propensity to entrepreneurship is assumed to be linear for exposition purposes only, but linearity is not required.

[9]We exclude atheists because they are likely to differ from religious individuals in some key respects, such

following regression model:

$$Y_{irc} = \alpha_0 + \alpha_1 P_{irc} + \alpha_2 A_{irc} + \alpha_3 A_{irc} P_{irc} + \gamma_1 X_{irc} + \mu_{irc} + \varepsilon_{irc} \tag{1}$$

where Y_{ict} is propensity for entrepreneurship of individual i living in region r of country c; P_{irc} is a dummy indicating whether i is Protestant; and A is i's degree of adhesion to his or her religion. A set of observable controls X_{irc}—which include individual, regional and country controls that we specify below and a set of unobservable controls μ_{irc}, such as social ties and networks, level of risk aversion and preferences—contribute to the individual propensity for entrepreneurship. Suppose that A_{ict} is defined over the interval $[0, 1]$, where 0 corresponds to no adhesion and 1 to full adhesion to the ethical principles of i's creed. Assume that :

Assumption 1.

$$\begin{aligned} E(\mu_{irc}|P_{irc}, A_{irc} = 1, X_{irc}) &= E(\mu_{irc}|A_{irc} = 1, X_{irc}) = \omega_1 \\ E(\mu_{irc}|P_{irc}, A_{irc} = 0, X_{irc}) &= E(\mu_{irc}|A_{irc} = 0, X_{irc}) = \omega_0 \end{aligned} \tag{2}$$

meaning that the expected contribution on unobservables, conditional to A_{ict} and X_{ict} is the same among Protestant and Catholics, and equal to ω_A for $A = 0, 1$. The full differential effect of Protestantism compared to Catholicism on the propensity for entrepreneurship is given by:

$$E(Y_{irc}|P_{irc} = 1, A_{irc} = 1, X_{irc}) - E(Y_{irc}|P_{irc} = 0, A_{irc} = 1, X_{irc}) = \alpha_1 + \alpha_3 \tag{3}$$

A test for the common intercept hypothesis is that

$$E(Y_{irc}|P_{irc} = 1, A_{irc} = 0, X_{irc}) - E(Y_{irc}|P_{irc} = 0, A_{irc} = 0, X_{irc}) = \alpha_1 \tag{4}$$

is not significantly different from zero.

Since the degree of adhesion is unobservable, we rephrase model (1) in terms of minorities, where the proportion of individuals with strong religious feelings is large, and on majorities, where the proportion of people who are largely unattached to the ethical principles of their confession is large.

as risk aversion, as we discuss in section 6.4 and Appendix D. We also exclude other religious denominations since they have very small market shares in our data

Our definitions of a religious minority and a religious majority respond to two considerations. First, a minority market share should be small enough to justify the hypothesis that a certain degree of effort is required to maintain one's religious identity and to embody the religion's ethical principles. Second, a majority should be large enough to suggest that religious affiliation does not necessarily entail internalization of ethical principles but may be simply a label upon which a community is defined. Market shares are always defined with reference to the total population, atheists included, to reflect this concept. Therefore, our baseline specification assumes that minorities should be smaller than 25 percent of the individuals in a community and that majorities should be larger than 50 percent.[10] These definitions allow us to avoid defining as minority or majority a denomination whose market share is only marginally smaller or larger than that of other denominations. In other words, we exclude situations in which the difference between a religious minority and a religious majority is minor.[11]

Our baseline definitions of religious minorities and majorities are as follows.

Definition 1. *Definition 1 (Minority): The denomination d_{ir} of an individual i residing in region r is considered a minority if (a) the market share of d_{ir} is the smallest in region r; and (b) its market share in region r is less than 25 percent.*[12]

Definition 2. *Definition 2 (Majority): The denomination d_{ir} of an individual i residing in region r is considered the majority if (a) the market share of d_{ir} is the largest in region r; and (b) its market share in region r is larger than 50 percent.*

Then we define the counterpart of model (1) as:

$$Y_{irc} = \beta_0 + \beta_1 P_{irc} + \beta_2 M_{irc} + \beta_3 m_{irc} + \beta_4 M_{irc} P_{irc} + \beta_5 m_{irc} P_{irc} + \delta_1 X_{irc} + \mu_{irc} + \theta_{irc} \qquad (5)$$

[10] In the regions of the former HRE, the maximum incidence of Protestants is around 52 percent, whereas the maximum incidence of Catholics is around 88 percent.

[11] Our empirical results are remarkably stable when we adopt other sensible thresholds because the geographic distribution of minorities and majorities in regions of the former HRE follows an obvious pattern that does not leave much room for interpretation, especially considering that we want the difference between a minority and a majority market share to be large. Since the maximum incidence of Protestantism is 52 percent, we cannot use majority thresholds that are greater than 50 percent. See E for additional details.

[12] This definition of a minority denomination is the most stringent among the definitions that are discussed in Appendix E. In our sample of regions of the former HRE, 18.4 percent of religious individuals are Protestants and 81.6 percent are Catholics. The sampled Protestants who reside in regions where they are in the minority are 20.6 percent of the total; the corresponding figure for Catholics is around 3.9 percent. Therefore, minority Protestants and Catholics are 3.8 percent and 3.2 percent of our total sample, respectively.

where M_{irc} is a dummy that equals one if individual i is part of any religious majority, and m_{irc} is a dummy that equals one if individual i is part of any religious minority. $M_{irc}P_{irc}$ and $m_{irc}P_{irc}$ are interactions between the majority/minority dummies and the Protestant dummy, and θ_{irc} is an IID error term.

Although minority and majority conditions are correlated with the degree of adhesion, they do not perfectly reflect the degree of adhesion. To see how model (5) compares to (1), suppose, for the sake of simplicity, that A_{irc} takes only values 0 and 1 and that the proportion of individuals that display full adhesion to their religious ethic is π_P in Protestant minorities, π_C in Catholic minorities and Π_P and Π_C in Protestant and Catholic majorities, respectively, with $\pi_P > \Pi_P$ and $\pi_C > \Pi_C$.

We assume:

Assumption 2.

$$\begin{aligned} \pi_P = \pi_C = \pi \\ \Pi_P = \Pi_C = \Pi \end{aligned} \tag{6}$$

meaning that there is the same distribution of adhesion to ethical principles among Protestant and Catholic minorities (resp. majorities). The joint assumptions 1 and 2 formalize the identification hypothesis that Protestant and Catholic minorities (resp. majorities) are comparable.

By applying the law of iterated expectations, we obtain

$$\begin{aligned} E(Y_{irc}|P_{irc}=1, m_{irc}=1, X_{irc}) = \\ = \pi \times E(Y_{irc}|P_{irc}=1, A_{irc}=1, m_{irc}=1, X_{irc}) + \\ +(1-\pi) \times E(Y_{irc}|P_{irc}=1, A_{irc}=0, m_{irc}=1, X_{irc}) = \\ = \alpha_0 + \alpha_1 + \pi(\alpha_2 + \alpha_3) + \pi\omega_1 + (1-\pi)\omega_0 \end{aligned} \tag{7}$$

for Protestant minorities and similar expressions for the other religious groups. Combining these quantities, the expected difference in the propensity for entrepreneurship between

Protestant and Catholic minorities is

$$E(Y_{irc}|P_{irc}=1,m_{irc}=1,X_{irc})-E(Y_{irc}|P_{irc}=0,m_{irc}=1,X_{irc})= \tag{8}$$
$$=\beta_1+\beta_5=$$
$$=\alpha_1+\pi\alpha_3$$

and that between Protestant and Catholic majorities is

$$E(Y_{irc}|P_{irc}=1,M_{irc}=1,X_{irc})-E(Y_{irc}|P_{irc}=0,M_{irc}=1,X_{irc})= \tag{9}$$
$$=\beta_1+\beta_4=$$
$$=\alpha_1+\Pi\alpha_3$$

The within-religion expected differences between minorities and majorities for Protestants and Catholics, respectively, are

$$E(Y_{irc}|P_{irc}=1,m_{irc}=1,X_{irc})-E(Y_{irc}|P_{irc}=1,M_{irc}=1,X_{irc})= \tag{10}$$
$$=\beta_3-\beta_2+\beta_5-\beta_4=$$
$$=(\alpha_2+\alpha_3)\times(\pi-\Pi)+(\omega_1-\omega_0)\times(\pi-\Pi)$$

and

$$E(Y_{irc}|P_{irc}=0,m_{irc}=1,X_{irc})-E(Y_{irc}|P_{irc}=0,M_{irc}=1,X_{irc})= \tag{11}$$
$$=\beta_3-\beta_2=$$
$$=\alpha_2\times(\pi-\Pi)+(\omega_1-\omega_0)\times(\pi-\Pi)$$

Were the proportions π and Π known, parameters α_1 and α_3 would be identified from (8) and (9), while parameter α_2 cannot be identified even in this favourable case since the term $(\omega_1-\omega_0)(\pi-\Pi)$ which is the difference in the unobservables between majorities and minorities of a given religion,[13] is unknown.

[13]That is $E(\mu_{irc}|P_{irc},m_{irc}=1,X_{irc})-E(\mu_{irc}|P_{irc},M_{irc}=1,X_{irc})$ for both $P_{irc}=0,1$.

From equations (8) and (9) we obtain:

$$\alpha_1 = \beta_1 + \beta_4 - \frac{(\beta_5 - \beta_4)\Pi}{\pi - \Pi} \tag{12}$$

$$\alpha_3 = \frac{\beta_5 - \beta_4}{\pi - \Pi} \tag{13}$$

and the effect of Protestantism $\alpha_1 + \alpha_3$ is equal to:

$$\alpha_1 + \alpha_3 = \beta_1 + \beta_5 + (1 - \pi)\alpha_3 \tag{14}$$

Indeed, the observable quantity $\beta_1 + \beta_5$, which is the differential effect between Protestant and Catholic minorities, as determined from (5), captures the effect of Protestantism up to the bias $-(1 - \pi)\alpha_3$. The latter tends to disappear as π approaches 1, that is, the better the condition of belonging to a minority proxies for a strong attachment to religion. Moreover, given equation (13), the sign of α_3 coincides with the sign of $\beta_5 - \beta_4$.

The specification test statistics becomes

$$\alpha_1 = \beta_1 + \beta_4 - \Pi\alpha_3 \tag{15}$$

and the observable quantity $\beta_1 + \beta_4$, which is the differential effect between Protestant and Catholic majorities according to (5), captures the parameter of interest α_1 up to the bias $\Pi\alpha_3$, which tends to disappear as Π approaches 0, that is, the better the condition of belonging to a majority proxies for a weak attachment to religion.

In both cases the sign of the bias depends on the sign of α_3.

4 The Data

Our sample consists of European Social Survey (ESS) data, which is collected every two years, from 2002, 2004, 2006, and 2008. Selecting all geographic regions from the former HRE and excluding all non-Christian religious minorities left us with 40,633 individuals, of which 19,964 are Christians. We then focused on those who said they were active in the labour market

and ended up with a sample of 8,966 individuals in 7 countries and 59 regions.

The countries selected for our estimation sample are Austria, Belgium, the Czech Republic, Germany, Luxembourg, Poland, and Slovenia. Table A.1 (in Appendix F) shows the composition of our estimation sample. Regions are defined according to their populations. The ESS data provide several levels of regional aggregation, NUTS 1, NUTS2, and NUTS 3, the last of which is available for only some countries. We defined minorities and majorities at the most disaggregate level available for each country but checked to ensure our results are robust to changes in the adopted criteria.[14]

FIGURES 3 AND 4 AROUND HERE

Figures 3 and 4 display the geographic distribution of Catholicism and Protestantism across HRE regions (NUTS 2), while Figures 5 and 6 report the geographic distribution of Catholic and Protestant minorities. Catholicism is mostly prevalent in Austria, Belgium, the Czech Republic, Luxembourg, Poland, and Slovenia, while Protestantism is mostly concentrated in Germany, where the two confessions are almost identically represented.

Europe has undergone a fast process of secularization in the last few decades. According to our ESS sample, in most regions of France and northern Europe in the period covered by our data, more than half of the residents declared that they were atheist. Similar patterns are provided by ISSP religion surveys collected in 1991, 1998 and 2008 that were especially designed to provide detailed information about various aspects of individual religiosity.

FIGURES 5 AND 6 AROUND HERE

The Czech Republic, France, and Slovenia have the smallest number of self-employed individuals as a proportion of the total number of employed individuals. Predominantly Catholic countries like Poland have the largest proportion of self-employed individuals. Of course, such a simple correlation is not particularly informative since it is driven by unobservable country-specific factors that affect both religion and entrepreneurship.

FIGURE 7 AROUND HERE

[14]See section 5.4 for a broader discussion on how results are sensitive to the choice of different regional aggregation levels.

We estimate model (5) by adopting a linear probability model specification that clusters standard errors at the regional level. We are interested in the average effect of religion on entrepreneurship, so the linear estimator is preferable to Probit or Logit since it is consistent and it does not require a specific distributional assumption of the error term. (For a similar approach see Angrist and Evans, 1998.) Individual controls include age, gender, whether the individual is a foreigner, years of education, marital status, and a wealth variable that indicates whether the individual's main source of income is financial. We also control for entrepreneurial family background, that is, whether the individual's father was self-employed. Family background is of particular relevance since we can distinguish individuals who inherited a business (or perhaps a propensity to be self-employed) from those who did not have such an advantage. In addition, we include a full set of area (country or regional) and time fixed effects in order to control for unobservable and/or institutional country (or region) characteristics and common cyclical factors.

In all specifications we include time-varying regional controls provided by Eurostat. These include regional GDP growth, population density, unemployment rate, number of doctors per capita (as a proxy for social development), educational attainment at the regional level, and the extension of motorways (as a proxy for infrastructure development). Summary statistics are reported in Table A.2 (Appendix F).

5 Empirical Findings

5.1 Baseline Estimates

We present our empirical findings starting from the estimates of our baseline specification of equation (5). This specification accounts for differences in country-specific institutions, regional and individuals characteristics that may affect entrepreneurship.

Table 1 displays our estimates, reporting the differential effect of Protestant minority with respect to Catholic minority ($\beta_1 + \beta_5$) from equation (5) and the differential effect of Protestant majority with respect to Catholic majority ($\beta_1 + \beta_4$), i.e. our test of the "common intercept hypothesis". According to our baseline estimates (column 1), the probability that an individual is an entrepreneur is 5.4 percentage points higher among Protestant minorities than it is among Catholic minorities. This is a sizeable effect, as only about 13 percent of working individuals

in Europe are self-employed.

Table 2 reports the individually estimated parameters β of model (5). We note that $\beta_5 - \beta_4$ is positive and statistically significant,[15] suggesting that α_3 is also positive.

Therefore, we conclude that there is a significant and positive differential effect of Protestant ethics on entrepreneurship, and the differential effect of the Protestant minority that we have estimated is a lower bound of it (see equation (14)).

Our specification test indicates that the differential effect of Protestantism versus Catholicism is not present when we compare religious majorities. The differential effect of the Protestant majority is positive but not significantly different from zero. Since this test statistics is the sum of α_1 and a small upward bias (equation (15)), we conclude that also α_1 is not significantly different from zero.[16]

TABLE 1 AROUND HERE

Column 2 of Table 1 shows similar results from the estimated model using German regions only—the regions where Protestantism and Catholicism are almost evenly represented—where the estimated differential effect is still significant and only marginally smaller than the baseline. The baseline result is also robust to the exclusion of potential endogenous variables (e.g., education, marital status, and whether the main source of wealth is financial) that could confound the interpretation of our results in the setting of our research design (column 3).

Taken together the results here indicate that religious ethics has a significant impact on the individual propensity for entrepreneurship when adhesion to religion is strong, as it is among minorities. The effect is absent when the adhesion is less strong, as it is among majorities. Regarding the effects of controls, the probability that an individual is self-employed increases by almost 15 percentage points if his or her father was self-employed, by 6 percentage points if the individual is male, and it is generally increasing in age and education. The effect of being a foreigner and whether the individual's main source of income is financial are not statistically significant.

The next sections provide a set of robustness checks of the validity of our estimates.

[15] One-sided tests not reported but available upon request

[16] More precisely, from equation (15) we obtain $\alpha_1 = (\beta_1 + \beta_4) - \frac{\Pi}{\pi - \Pi}(\beta_5 - \beta_4)$. It follows that α_1 is not significantly different from zero if $\frac{\Pi}{\pi - \Pi}$ is small enough. According to our estimates, this is the case for all $\frac{\Pi}{\pi - \Pi} < 6$ i.e. whenever $\pi > 1.17 \cdot \Pi$, a condition which looks quite plausible.

5.2 Robustness to Migration Patterns

This section addresses the potential impact of recent waves of migration on the geographic distribution of religious beliefs across Europe. The geographic pattern of Christian minorities across the regions of the former HRE is historically determined since it follows the events generated by the Reformation during the sixteenth and seventeenth centuries.[17] A comparison of historical information with the actual distribution of minorities in selected areas of the HRE seems to exclude that cumulative historical migration patterns may have significantly altered the map of the incidence of denominations and minorities across Europe. (See the evidence discussed in section B.2 of the Appendix.)

However, we cannot exclude a priori the possibility that contemporary migration patterns could be endogenously driven by religious factors as well as by the individual propensity to start or export a business abroad. If such is the case, the estimated relationship between religion and entrepreneurship may be biased.

We check for the effect of migration by excluding all individuals who are immigrants (i.e., either non-nationals or those born abroad) and recalculating our minority indicators. Table 3 shows the new estimates in columns 1 and 2. The differential effect of Protestantism is still positive and significant and, at 4.8 percentage points, is close to what we found in our baseline estimation. Again, we find no significant effect when we compare majority individuals. In addition, when we compare the immigrants' religion with the predominant religion of the host country, we find no clear correlation, a further indication that our findings are not confounded by migration-related factors.

5.3 Sectoral Composition and Unpaid Family Workers

Table 3 also checks whether sectoral composition affects our estimates. We control for sectoral composition at the individual level because of the possibility that entrepreneurship patterns differ across industries. Accounting for the fifteen main NACE sectors of activity, we estimate a positive and significant differential effect of Protestantism that is only marginally smaller than that found previously, that is, around 4.5 percentage points (column 3). No significant effect is found for majorities.

[17] See the discussion in Appendix B.

Special attention should be paid to agriculture, as the agricultural sector is traditionally characterized by a comparatively high concentration of self-employed individuals, and agricultural communities are traditionally more religious than urban communities are. When we exclude from our sample all individuals who work in agriculture, which amounts to around 3.3 percent of our observations, our point estimate remains strongly statistically significant and close to our previous estimate of 5.1 percentage points (column 4).

Next, we exclude self-employed individuals who are unpaid family workers, that is, those whose compensation is in a form other than wages, such as an increase in business value. In our sample only around 1 percent of respondents (around 400) fit this category, and the effect of excluding them is marginal (column 5).

5.4 Robustness to Regional Fixed Effects and Alternative Calculations of Minorities

Table 3 shows that our results hold when we include NUTS 1 regional fixed effects instead of country fixed effects (column 1) as well as when we consider only regions in which respondents from both religious denominations are represented (column 2). When minorities are calculated at a NUTS 1 regional level for all countries,[18] the estimated effect does not change (column 3), and similar findings are estimated when minorities are calculated at the NUTS 2 level instead of NUTS 2 or NUTS3 (column 4).

TABLE 3 AROUND HERE

Finally, we estimate a model on individuals who are employed instead of just active. Around 4.6 percent of individuals in our baseline sample are unemployed. Since we know their occupation and employment status (if any) during their last employment, and since we are interested in the causal effect of religious ethics on occupational outcomes, we include respondents who were unemployed at the time of the survey. However, in principle, unemployed individuals may differ from employed individuals based on unobservable dimensions.

Nevertheless, when we exclude unemployed respondents, our point estimates are very similar, confirming our intuition (column 5). In addition, all of our findings remain valid when we

[18]Whenever ESS provides information on respondents' regions of residence at the NUTS 2 and 3 levels, we aggregate at NUTS 1 and calculate which religious denomination, if any, is the minority.

estimate our baseline model on a larger sample that includes retired individuals for whom we know their last job before retiring (not reported).

6 Discussion of Our Identification Assumptions

In this section we discuss the validity of the assumptions (1) and (2) at the basis of our identification strategy.

6.1 The Geographic Distribution of Minorities.

Suppose that the territories that are more inclined to commercial activities may have turned to Protestantism in anticipation of its supposed growth-promoting potential. Or, on the other hand, they may have remained Catholic to avoid the costs and risks of an institutional transition. Alternatively, suppose that nowadays the regions where Protestant and Catholic minorities reside differ in terms of institutional characteristics that are more or less favourable to entrepreneurship. If these hypothesis were true, then by comparing Protestant and Catholic minorities we would capture also such differences and our results would be spurious.

To address these concerns, in this section we investigate whether the regions where Protestant and Catholic minorities live are similar in all respects relevant to entrepreneurship.

An important argument in favour of comparability is that religious minorities in regions of the former HRE are historically determined and that their rise is related to the spread of Protestantism between the sixteenth and seventeenth centuries.[19]

Moreover and more importantly, according to Cantoni (2010, 2011) the only variables that significantly predict a territory's adoption of Protestantism are the distance from Wittenberg, home of the Reform, and whether the territory was formerly an ecclesiastical domain.[20] Cantoni then argues that the determinants of conversion to Protestantism were mainly contingent on the strategic conditions at the time of the Reform, rather than on economic considerations, and concludes that Protestant and Catholic territories were similar in terms of their economic potential at the time of the Reform.

[19] Appendix B reports extensive evidence confirming that the current distribution of religious minorities closely reflects that which emerged at the end of the religious wars, complementing the discussion in Cantoni (2010) and Spenkuch (2011).

[20] The distance from Wittenberg is understood as distance from Saxony, the powerful German state that first supported Luther's ideas and guaranteed military protection against possible reactions by the HRE.

Confirming this conclusion, if pre-Reform-era characteristics mattered, we should observe a differential propensity for entrepreneurship also between religious majorities. For instance, if the territories that were more inclined to commercial activities had turned to Protestantism for the most part, we should observe a positive effect of being a majority Protestant on entrepreneurship. However, this is not what we find in our estimates, as we find only a difference between Protestant and Catholic minorities and no difference between majorities.

As a further check, we performed a placebo test, by randomly reshuffling individual religious affiliation within each region. This reshuffling preserves the market shares of the religions and the geographic distribution of majorities and minorities. We estimated model (5) on the reshuffled data and checked whether a significant effect of religion resulted, which would indicate that the effect we obtained from the baseline model is due to confounders, not to religion. We repeated this operation 1000 times, and the effect of Protestantism was significantly different from zero in less than four percent of the repetitions. Therefore, we can reject the possibility of a spurious effect.

6.2 Minorities' Social Networks and Entrepreneurship

Since the condition of being in a minority generates stronger networks and higher social capital than does the condition of being in the majority, it could also favour entrepreneurship through these channels rather than through religious ethics. Social networks tend to be stronger among minorities because cooperation is easier to achieve among smaller communities, which tend to share similar values and cultural traits (McPherson, Smith-Lovin, and Cook, 2001). Minority religions are typically over-represented among entrepreneurs, as suggested by the "middleman theory" (Bonacich, 1973): either minorities act as mediators between other social groups, or they demand mediation.

Historically, Jews developed commercial and financial networks in the small communities scattered among European cities (Botticini and Eckstein, 2005), but it was not the Jewish religion alone that favoured entrepreneurship. The conditions that the religion is likely to have favoured, such as close connection and trust among its members, also played a part (Dana, 2006). Dana (2009) reviewed several examples of financial, employment, and information networks that emerge between people of the same religion, while Ellison, Krause, Shepherd, and Chaves (2009) and the references therein suggested that small congregations are much more

likely than large communities to provide their members with support and protection in the case of negative shocks. Therefore, a strong social connection could be the key to successful entrepreneurship.

We use data from the ISSP survey on Social Networks II collected in 2001 to determine whether there is a systematic difference between Catholic and Protestant minorities in terms of networking. After considering a battery of social network indicators related to respondents' network size, participation in voluntary associations, potential for financial exchange with relatives and friends, social support, and generalized trust, we find no evidence of a systematic difference between minorities in terms of social connection, as detailed in Appendix C, and no difference between minorities and non-minorities, which confirms the absence of religious discrimination among Protestants and Catholics in contemporary Europe.

6.3 Entrepreneurship as a Way out of Discrimination

Intense social ties within minority groups can favour entrepreneurship, but entrepreneurship could also be a way out of discrimination. In this subsection we consider whether religious majorities discriminate against religious minorities.

It is commonly maintained that the Catholic Church is intransigent in condemning norms, behaviours, and conduct that are contrary to its principles, whereas the less hierarchical and more dispersed Protestant churches are considered to be much more open and inclusive.[21] If such were actually the case, Catholic individuals should be more intolerant toward other faiths or beliefs than Protestants are. If such is the case, Protestant minorities that are surrounded by Catholic majorities should be over-represented among entrepreneurs, since entrepreneurship may represent an option against discrimination and minority Catholics who live alongside open-minded and tolerant Protestant majorities should be over-represented as non-entrepreneurs. As a result, there should be comparatively more entrepreneurs among Protestant minorities than among Catholic minorities, a situation that would have less to do with religious ethics being conducive to entrepreneurship than with the majorities' attitude towards tolerance. In

[21] However, the supposed higher level of tolerance of Protestant churches and Protestant people is doubtful. According to Kaplan (2007), extreme intolerance, which was equally common across denominations and countries, lasted for at least 150 years after the end of the religious wars. Protestants were often deeply intolerant not only of Catholics but also of each other (as confirmed by the burning of Servetus, a Spanish Protestant, in Calvin's Geneva). In Britain and Ireland, the civil war, the spread of Puritanism, the Catholic intolerance of James II, and the anti-Catholic Gordon riots are examples of intolerance from both sides.

addition, we would not find differences between religious majorities in terms of the level of entrepreneurship because neither would be discriminated against.

In order to analyse patterns of religious discrimination in the present day, we use data from all European countries where clear patterns of Protestant and Catholic majorities and minorities exist. Our analysis of ISSP Religion III data reveals that 82 percent of Catholics and 75 percent of Protestants in Europe agree with the principle that all religions deserve respect, and about 80 percent of the members of both religions would accept the idea of a close relative marrying a person from another religion.

The ESS data has specific information about discrimination, as respondents report whether they are part of a group that experiences discrimination and whether that discrimination is due to religious reasons. We perform a set of independent-sample t-tests that compare the degree of discrimination between Protestants and Catholics in our estimation sample. The tests are performed to compare all Protestants and all Catholics, as well as to compare minority and majority Protestants and Catholics only. The p-values of the tests, shown in Table A.6, indicate that there are no significant differences in the degree of discrimination perceived by the survey respondents between confessions, even among minorities and majorities.

6.4 Risk Aversion as an Explanatory Factor

Another issue worth investigating is the role of risk aversion, which is an important ingredient in entrepreneurship. (See Kihlstrom and Laffont, 1979 and Ekelund, Johansson, Jarvelin, and Lichtermann, 2005, among many others.) In principle, being Catholic, Protestant, or atheist could be correlated with several attributes of individual preferences because religion and some character traits are learned within the family. For instance, the growing literature of endogenous preferences suggests that time preferences (Doepke and Zilibotti, 2005) and trust (Guiso, Sapienza, and Zingales, 2008) are partly decided and shaped by parents, so it may be reasonable to suppose that risk aversion is also learned in the family. If religious affiliation and the propensity to choose entrepreneurship are affected by a predetermined level of risk aversion, then our estimates may be more difficult to interpret than they would be otherwise.

We focus on Germany and use SOEP 2004 data to determine whether there are differences between Catholics and Protestants in terms of risk aversion. Our choice of country is motivated by the fact that the German SOEP provides several measures of individual risk aversion,

along with information on respondents' religions and family religious backgrounds. The overall message of the analysis, discussed in detail in Appendix D, is that there are no systematic differences in Catholics' and Protestants' levels of risk aversion.

This result is reassuring, as any difference in the level of entrepreneurship between the two religions cannot be ascribed to omitting the attitude toward risk.

6.5 Degree of Adhesion among Minorities and Majorities

The identification assumption is that Protestant and Catholic minorities' average degrees of adhesion to their underlying religious ethical tenets are similar. A number of indirect pieces of evidence suggest that this assumption is corroborated by the data.

First, the proportion of individuals born within religious minorities who retain their parents' religion (i.e., those who resist the pressure of the surrounding religious majority) is similar between Protestant and Catholic minorities (69 percent for Catholics and 66 percent for Protestants, a difference that is not statistically significant).[22] Second, using ISSP Religion III data, we tested whether Protestant and Catholic minorities differ in terms of level of adhesion based on certain religious outcomes. We find no significant difference in the degree of religious adhesion between minorities.[23] Third, again with ISSP Religion III data, we estimated the proportions of individuals who reported believing in life after death, the main tenet of Christianity, among those individuals who reported being Protestant or Catholic and belonging to either minorities or majorities.[24] These proportions should serve as valid proxies for the parameters π and Π introduced in section 3. Our results show that 47.9 percent and 48.0 percent of minority Protestants and minority Catholics, respectively, believe in life after death, compared to 18.5 percent and 25.8 percent among majority Protestant and Catholics, respectively.

When asked about whether they believe in hell, an aspect of Christian theology that lost considerable attention over the last century, 29.1 percent and 28.7 percent of respondents responded affirmatively among Protestant and Catholic minorities, respectively, against 9.0 percent and 8.0 percent among Protestant and Catholic majorities, respectively. We observed a clear alignment in the proportions of Protestant and Catholic majorities who responded that they believed in heaven (16.5% and 13.0%, respectively) and some discrepancy among

[22] See also the discussion in Appendix B.1.

[23] See Table A.8 in the Appendix.

[24] These figures are calculated using ISSP population weighted data.

Protestant and Catholic minorities (37.0% and 53.9%, respectively). Although one should be careful in interpreting these figures as reliable measures of π and Π, we believe that they provide support for our assumption (2).

7 Conclusions

In this paper we suggest a novel methodology for identifying the causal implications of alternative ethical norms embodied by religious denominations on labour market outcomes in regions of the former HRE in Europe. More specifically, we investigate the differential impact of Protestantism versus Catholicism on entrepreneurship by means of a quasi-experimental approach based on the minority status of religious denominations across those regions. We exploit religious minorities' stronger degree of attachment to religious ethics compared to that of religious majorities and the exogenous historical determination of the distribution of religious denominations that took place at the time of the Reformation in the HRE in order to elicit the role played by religious ethical norms on labour market outcomes. In addition, we rely on the homogeneous general economic and cultural environment to which Protestant and Catholic minorities are subject in those regions.

Unlike previous contributions, such as Becker and Woessmann (2009) and Cantoni (2010), our findings suggest that religious ethics may play a significant role in explaining a facet of economic performance. We identify a significant and positive effect of Protestantism on entrepreneurship in finding that Protestants are 5 percentage points more likely than Catholics to be entrepreneurs.

This effect is not the result of a correlation between religious denomination and socio-economic characteristics, such as education, economic development, sectoral composition, or institutions at the regional or country level. It is also robust across alternative specifications and to a number of robustness checks, including a placebo test, and it does not depend on the inclusion of specific geographic clusters in the sample.

Our findings on members of majority religions suggest that we can exclude any systematic difference between individuals who generically define themselves as Protestants or Catholics but are less observant than are individuals who practice minority religions, as no difference is found in any of our specifications between Protestant and Catholic majorities after controlling

for a long battery of individual and regional covariates. Only when internalization of ethical norms and values is high, as is often the case among minorities, does a significant difference in the impact of the two religions' ethical norms emerge.

This result suggests that an historical, long-lasting religious tradition does not influence entrepreneurship per se but that a genuine individual attachment to a specific religious culture inherited through the family (in addition to all the other elements we highlighted in our analysis, including entrepreneurial family background) is what matters in whether an individual will choose entrepreneurship.

What are the specific normative channels through which Protestantism is more favourable to entrepreneurship than Catholicism? We can only speculate at this stage. The emphasis of Protestantism on the individual, unmediated relationship with God seems to be correlated to the emergence of a strong sense of self and self-esteem, two important engines of entrepreneurship. Moreover, the Protestant ethic may favour the moral approbation toward success and wealth accumulation that could push individuals toward entrepreneurship. Since social approbation develops only when the surrounding community shares the same Protestant ethics, this interpretation fits well with the finding that Protestantism is more conducive to entrepreneurship within minority denominations, where people tend to be more strictly observant than they are in majority groups.

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Figure 1: The propensity for entrepreneurship and the degree of adhesion to Protestantism and Catholicism

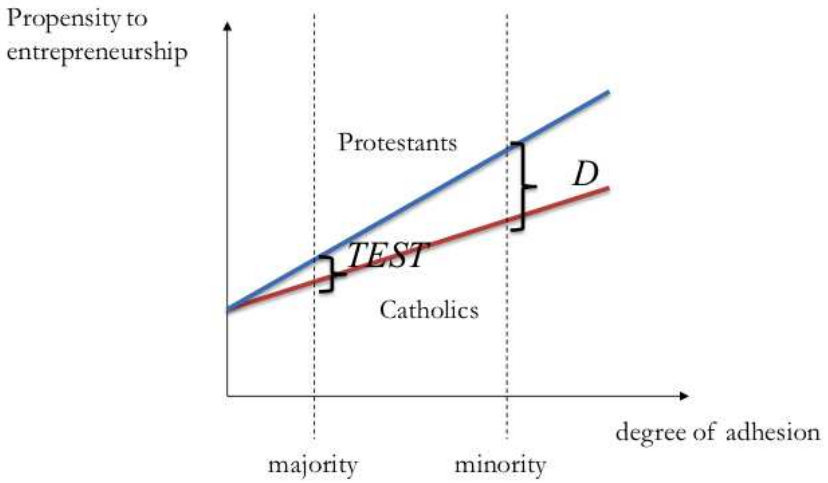
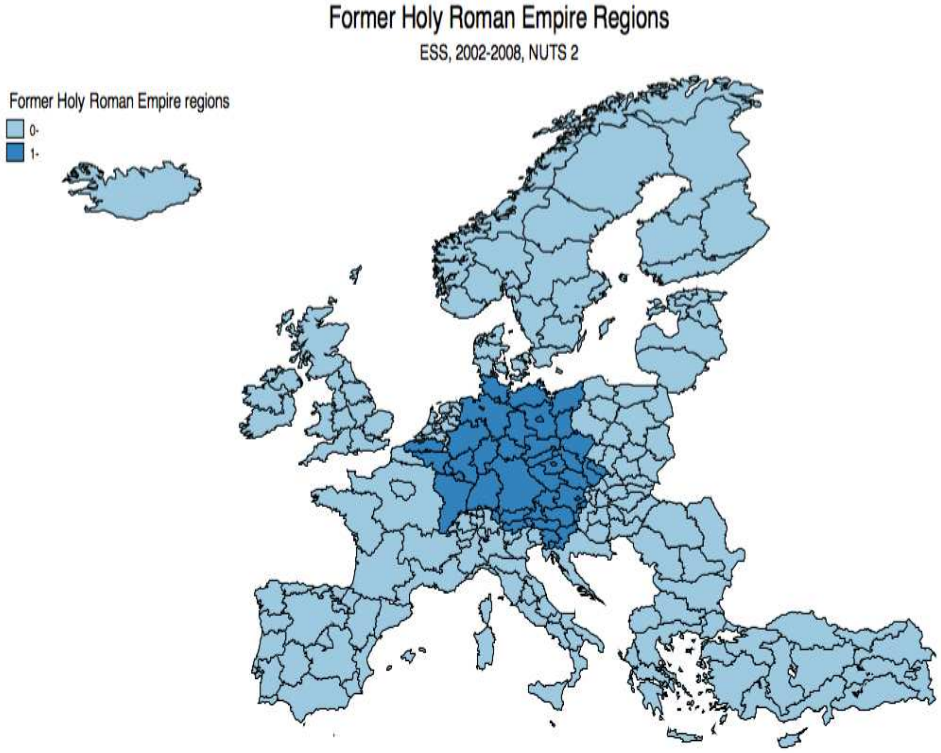
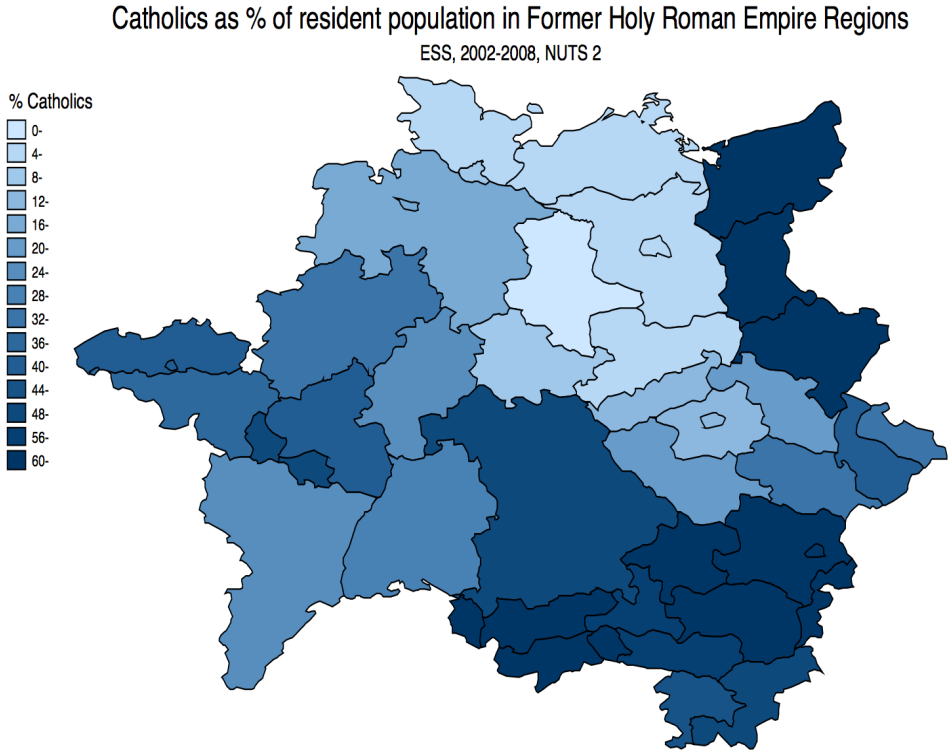


Figure 2: Regions of the former Holy Roman Empire



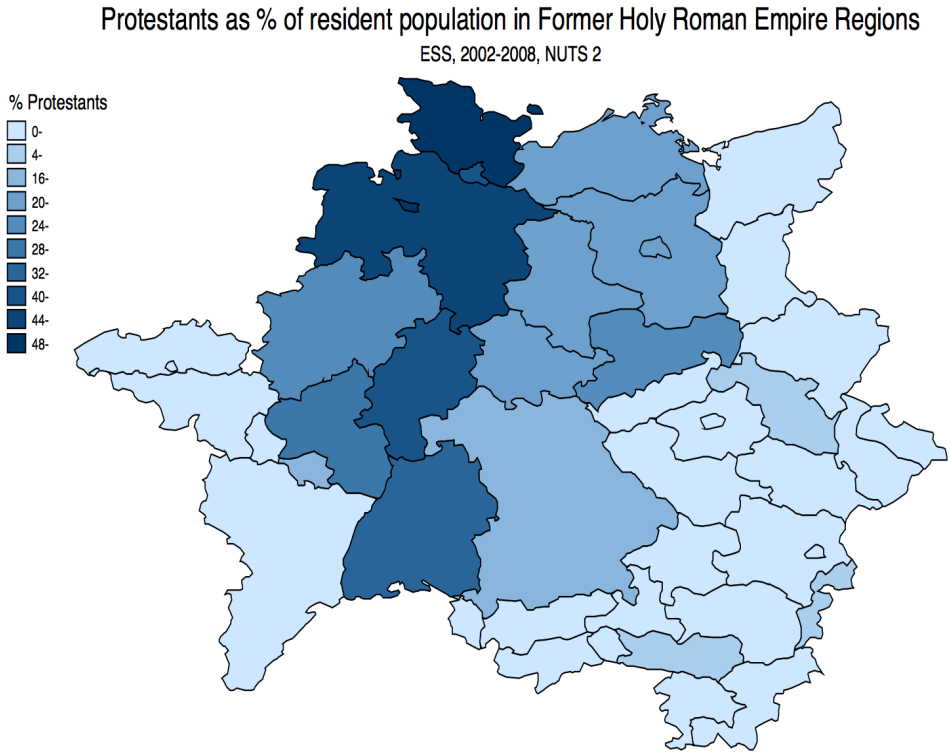
NUTS 2

Figure 3: Geographic distribution of Catholicism across regions of the former Holy Roman Empire



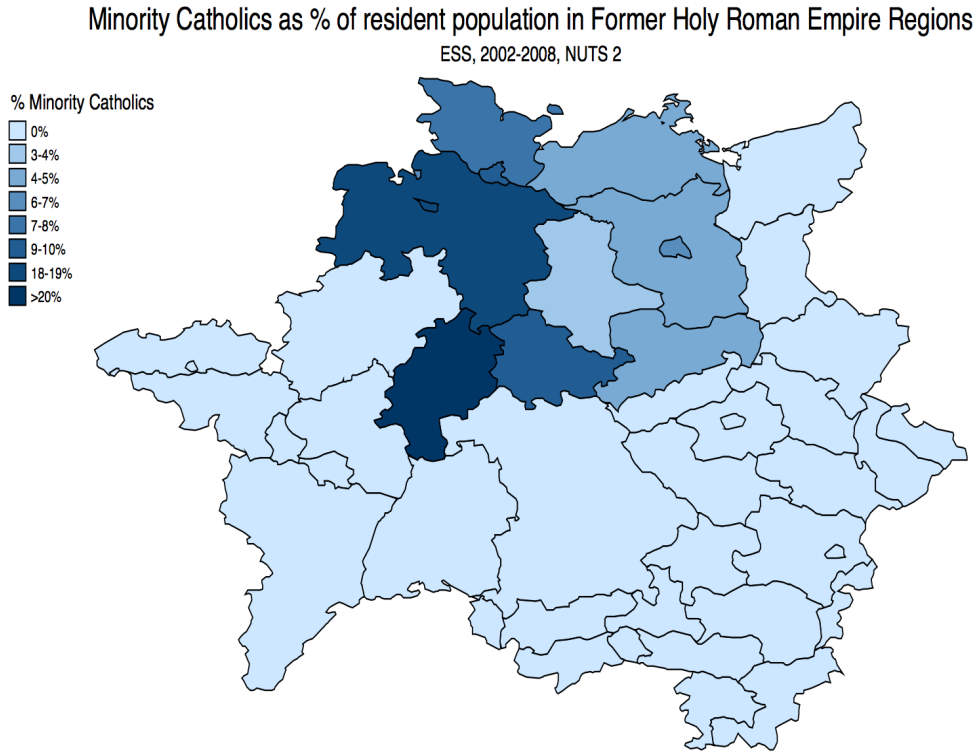
Source: authors' elaboration on ESS data, 2002-2008. NUTS 2

Figure 4: Geographic distribution of Protestantism across regions of the former Holy Roman Empire



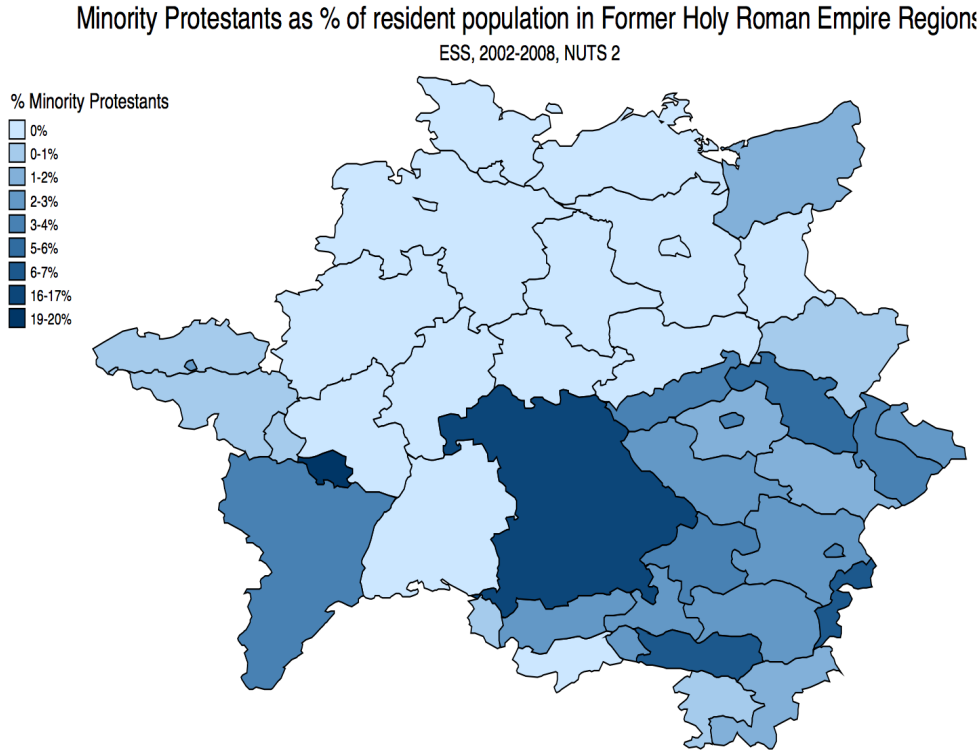
Source: authors' elaboration on ESS data, 2002-2008. NUTS 2

Figure 5: Geographic distribution of Catholic minorities across regions of the former Holy Roman Empire



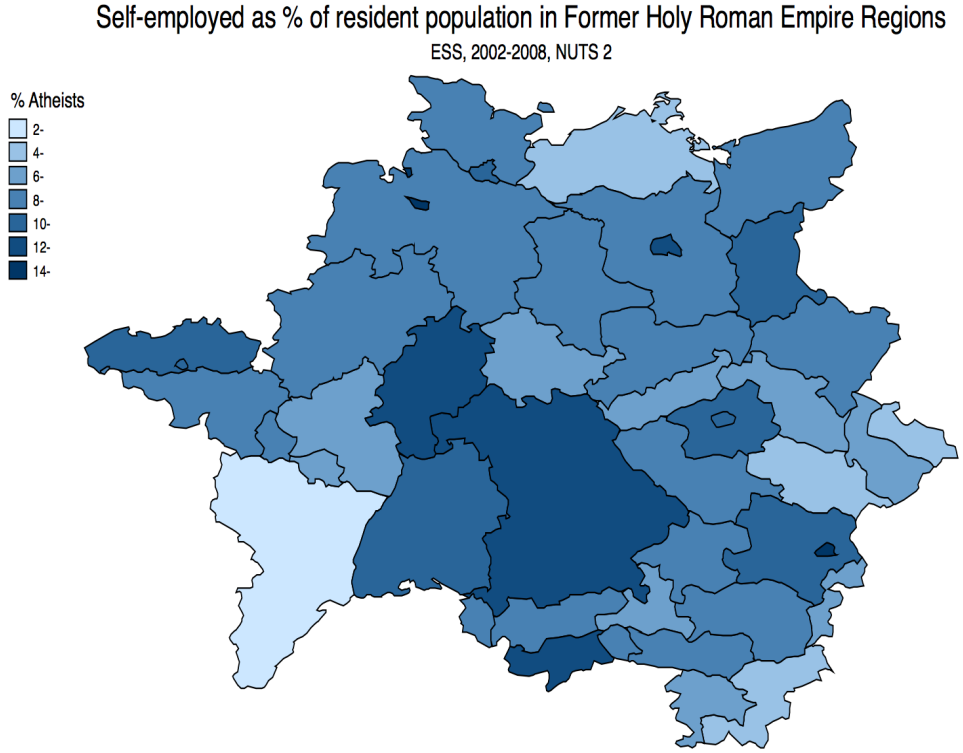
Source: authors' elaboration on ESS data, 2002-2008. NUTS 2

Figure 6: Geographic distribution of Protestant minorities across regions of the former Holy Roman Empire



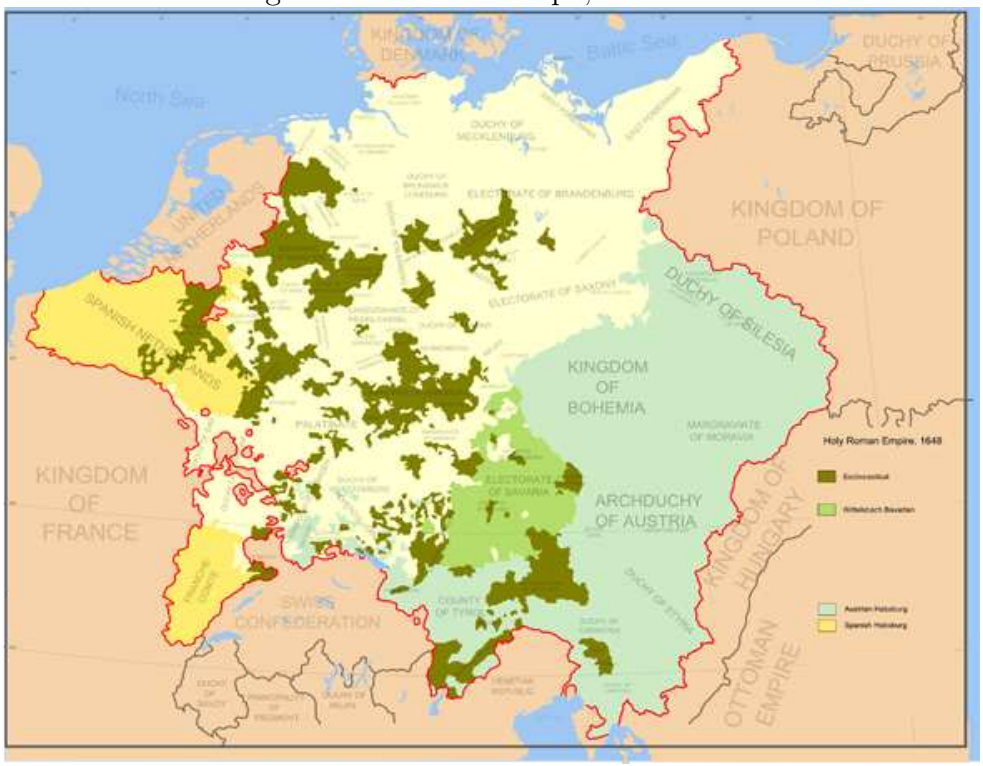
Source: authors' elaboration on ESS data, 2002-2008. NUTS 2

Figure 7: Percentage of self-employed across regions of the former Holy Roman Empire



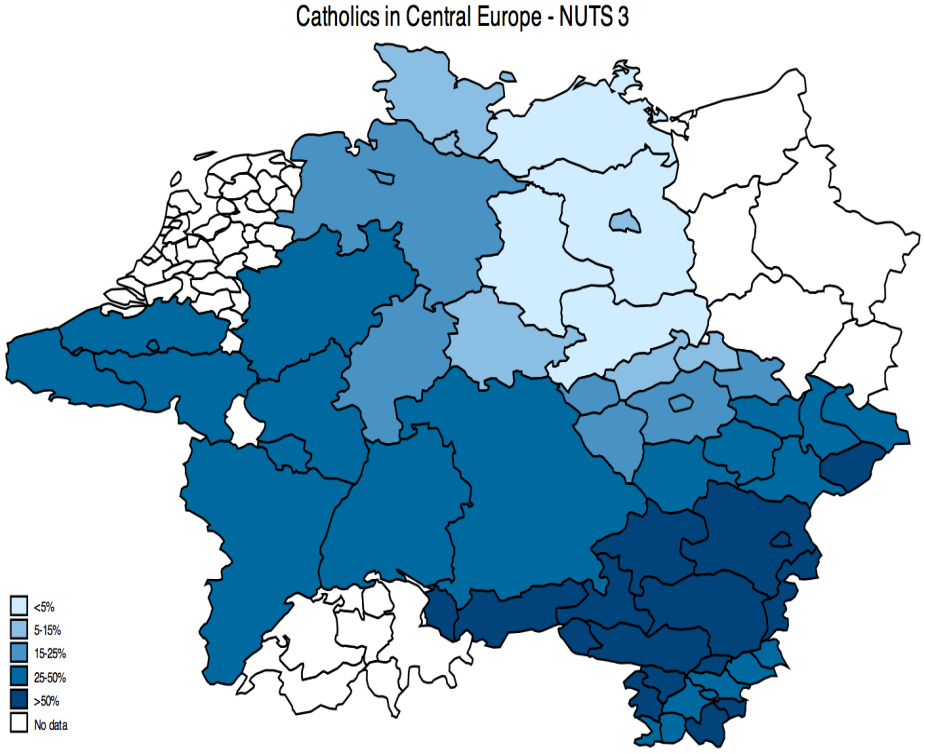
Source: authors' elaboration on ESS data, 2002-2008. NUTS 3

Figure 8: Central Europe, circa 1648



Source: the public domain map "Central Europe about 1648" from the Historical Atlas *by William R. Shepherd, at the Perry-Castañeda Library Map Collection at the University of Texas.*

Figure 9: Catholics as a percentage of residents in central Europe



Source: authors' elaboration on ESS data, 2002-2008. NUTS 3

Table 1: Religious denomination and the propensity for entrepreneurship

	(1) Entr.=1	(2) Entr.=1	(3) Entr.=1
Min Prot - Min Cath	0.054***	0.050***	0.058***
s.e.	(0.011)	(0.007)	(0.012)
Maj Prot - Maj Cath	0.000	0.005	0.002
s.e.	(0.022)	(0.022)	(0.022)
Obs	8966	2659	8966
R-squared	0.071	0.080	0.067

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Dependent variable: dummy variable equal to one if the respondent is an entrepreneur. The table presents the estimated differential effect on the propensity for entrepreneurship of being a minority Protestant compared to being a minority Catholic (Min Prot-Min Cath). Column 1 is the baseline model; column 2 is estimated on German regions only; column 3 excludes potentially endogenous variables. All columns are estimated by a linear probability model and include country and time fixed effects. Standard errors are clustered at the regional level. Individual level controls include whether the respondent is a foreign national, age, gender, whether the respondent's father was self-employed, years of education, marital status, and whether the respondent's main source of income is financial. Regional controls include unemployment rate, GDP growth, the extent of motorways, population density, number of doctors per thousand residents, proportion of college graduated residents. Maj Prot-Maj Cath is the test of whether there is a significant difference in the propensity for entrepreneurship between majorities.

Table 2: Religious denomination and the propensity for entrepreneurship. All parameters.

VARIABLES	Parameter	(1) Entr.=1	(2) Entr.=1	(3) Entr.=1	(4)
PROTESTANT	β_1	-0.021	-0.021	-0.018	
		(0.017)	(0.022)	(0.017)	
MAJORITY	β_2	-0.014	0.025	-0.017*	
		(0.009)	(0.017)	(0.009)	
MINORITY	β_3	0.015	0.011	0.015	
		(0.012)	(0.009)	(0.012)	
PROTESTANT*MAJ.	β_4	0.021	0.026	0.021	
		(0.024)	(0.028)	(0.024)	
PROTESTANT*MIN.	β_5	0.075***	0.070***	0.077***	
		(0.019)	(0.022)	(0.019)	

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Estimates of equation (5). Dependent variable: dummy variable equal to one if respondent is an entrepreneur. Column 1 is the baseline model; column 2 is estimated on German regions only; column 3 excludes potentially endogenous variables. All columns are estimated by a linear probability model and include country and time fixed effects. Standard errors are clustered at the regional level. Individual level controls include whether the respondent is a foreign national, age, gender, whether the respondent's father was self-employed, years of education, marital status, and whether the respondent's main source of income is financial. Regional controls include unemployment rate, GDP growth, the extent of motorways, population density, number of doctors per thousand residents, proportion of college graduated residents.

Table 3: Religious denomination and the propensity for entrepreneurship: robustness checks 1.

	(1) Entr.=1	(2) Entr.=1	(3) Entr.=1	(4) Entr.=1	(5) Entr.=1
Min Prot - Min Cath	0.048***	0.048***	0.045***	0.051***	0.053***
s.e.	(0.012)	(0.015)	(0.015)	(0.012)	(0.011)
Maj Prot - Maj Cath	-0.003	-0.004	-0.022	-0.028	-0.001
s.e.	(0.020)	(0.023)	(0.019)	(0.028)	(0.022)
Obs	8508	8213	7875	8671	8855
R-squared	0.072	0.072	0.168	0.058	0.073

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Dependent variable: dummy variable equal to one if the respondent is an entrepreneur. The table presents the estimated differential effect of being a minority Protestant compared to being a minority Catholic, on the propensity for entrepreneurship (Min Prot-Min Cath). Column 1 excludes all non-national immigrants; column 2 excludes all born-abroad immigrants; column 3 controls for sector of activity at the individual level; column 4 excludes individuals whose main activity is in agriculture; and column 5 excludes unpaid family workers. All columns are estimated by a linear probability model and include country and time fixed effects. Standard errors are clustered at the regional level. Individual level controls include whether the respondent is a foreign national, age, gender, whether the respondent's father was self-employed, years of education, marital status, and whether the respondent's main source of income is financial. Regional controls include unemployment rate, GDP growth, the extent of motorways, population density, number of doctors per thousand residents, proportion of college graduated residents. Maj Prot-Maj Cath is the test of whether there is a significant difference in the propensity for entrepreneurship between majorities.

Table 4: Religious denomination and the propensity for entrepreneurship: robustness checks 2.

	(1) Entr.=1	(2) Entr.=1	(3) Entr.=1	(4) Entr.=1	(5) Entr.=1
Min Prot - Min Cath	0.054***	0.054***	0.053***	0.054***	0.058***
s.e.	(0.012)	(0.011)	(0.011)	(0.011)	(0.013)
Maj Prot - Maj Cath	0.156	-0.004	-0.005	-0.000	0.002
s.e.	(0.038)	(0.021)	(0.019)	(0.021)	(0.022)
Obs	8966	8563	8978	8966	8561
R-squared	0.072	0.072	0.071	0.071	0.073

Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Dependent variable: dummy variable equal to one if the respondent is an entrepreneur. The table presents the estimated differential effect of being a minority Protestant compared to being a minority Catholic, on the propensity to be an entrepreneur (Min Prot-Min Cath). Column 1 includes NUTS 1 regional fixed effects instead of country fixed effects; column 2 is estimated only on regions where both religions are represented; minorities in column 3 are identified at the NUTS 1 regional level instead of NUTS 2 and NUTS 3; whenever possible, minorities in column 4 are identified at the NUTS 2 regional level instead of NUTS 3; and column 5 includes employed individuals only instead of active individuals. All columns are estimated by a linear probability model and include country and time fixed effects. Standard errors are clustered at the regional level. Individual level controls include whether the respondent is a foreign national, age, gender, whether the respondent's father was self-employed, years of education, marital status, and whether the respondent's main source of income is financial. Regional controls include unemployment rate, GDP growth, the extent of motorways, population density, number of doctors per thousand residents, proportion of college graduated residents. Maj Prot-Maj Cath is the test of whether there is a significant difference in the propensity for entrepreneurship between majorities.

Appendices

A Religiosity among Minorities

There are three primary reasons that members of minority religions are often considered more religious and more observant of ethical norms than are followers of the same religion when they are in the majority: religion is an important factor in people's identity (Bisin and Verdier, 2000; Bisin, Topa, and Verdier, 2004), ministers of a minority religion work harder than do those of a majority religion to preserve their herd (the so-called market share hypothesis; Stark, Finke, and Iannaccone, 1995; Finke and Stark, 1998; Stark, 1998), and the pressure of the majority religion selects out the less fervent.

To test the strength of this claim, we use data on a large number of European countries from ISSP Religion III, a multi-country survey collected in 2008.[25] We look at nine possible outcomes: three related to the intensity of religiosity, five to articles of faith, and one to confidence in churches and religious organizations. The three religious-intensity measures are the average number of times an individual prays per week,[26] whether an individual prays regularly,[27] and a self-assessment of the individual's religiosity that is measured by a dummy that is equal to one when the individual reports being "extremely, very, or somewhat religious" and 0 otherwise.[28]

Regarding articles of faith, we initially considered two elements that point to the specifics of Protestantism and Catholicism. The personal and un-mediated relationship with God is a tenet of Protestantism that gives a more minor role to the clergy and the religious institution than Catholicism does. Respondents were asked whether they agree (on a scale from 1 to 5) with the statement, "I have my own way of connecting with God without churches or religious services". Another point of differentiation between the two religions is their approach to predestination:

[25] Included countries are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Latvia, the Netherlands, Norway, Slovak Republic, Slovenia, Spain, Sweden and Switzerland.

[26] Praying should depend mainly on individual religiosity and only marginally on the supply of churches and priests, unlike attendance at religious services.

[27] Defined as at least once per month.

[28] Although religiosity does not necessarily imply adhesion to religious ethical norms, people who are more religious are typically also more strictly observant. One reason behind this correlation is the actions of the priests, which transmit both religious norms and the need to profess one's faith actively. Given this correlation, religiosity has often been preferred over religious denomination as a measure of the degree of attachment to religious cultural beliefs (McCleary and Barro, 2006).

Catholicism states that salvation can be obtained and deserved by means of good works, while Protestantism indicates that salvation is God's grace and that good works signal individual fate but cannot alter it. A measure of the respondents' views on predestination is their level of agreement with the statement, "There is little that people can do to change the course of their lives". From these two questions we derive two dummies, each of which is equal to one when the respondent agrees or strongly agrees with the statement and zero otherwise.

The three articles of faith that are common to both religions regard beliefs about life after death, heaven, and hell. We coded them as dummies that are equal to one if individuals answered "yes, definitely" or "yes, probably" and zero otherwise. The last outcome is confidence in churches and other religious organizations, which is coded one if respondents reported "complete" or "a great deal of confidence" and zero otherwise.

For each outcome we estimated a model analogous to (5):

$$Y_{irc} = \lambda_0 + \lambda_1 P_{irc} + \lambda_2 m_{irc} C_{irc} + \lambda_3 m_{irc} P_{irc} + \lambda_4 X_{irc} + \theta_{N1} + \varepsilon_{irc} \tag{16}$$

which tests whether Protestant and/or Catholic minorities behave and believe differently from other Protestants and Catholics.

Outcome Y_{irc} of individual i living in region r (defined at NUTS 2 whenever possible) of country c is regressed over individual religion, captured by the dummy P (where 1 is coded for Protestantism and 0 for Catholicism), and two interactions between the minority status and individual i's religion, Protestant (mP) or Catholic (mC). These interactions take the value 1 when the individual's religion is held by a minority in his or her region of residence. Next, gender, age, years of education, parents' religion, urban or rural residence and regional (NUTS 1) fixed effects denoted by X and θ_{N1} respectively, are included as controls. Coefficients λ_2 and λ_3 identify the differential effect of minorities compared to the remaining population of the same faith.[29] The computation of religious market shares that enter into the definition of minorities is based on the religion of respondents' parents in order to identify the historical religious distribution across regions and avoid the fluctuations that are connected with the recent secularization trends.[30]

[29] A model with some analogies to this is estimated in Gruber (2005).

[30] This approach is made possible by the richness of information about religious family background that is available in the ISSP Religion III data

TABLE A.3 AROUND HERE

Estimates for each outcome are reported in Table A.3. As expected, religious minorities tend to pray more and to pray more regularly than religious non-minorities do, and they report being more religious.[31] Turning to the articles of faith, minority Protestants tend to agree more with the principle of a direct and unmediated relationship with God than do other Protestants, and minority Catholics believe more than other Catholics do that salvation can be achieved by means of good works and that an individual's fate is not predetermined. As for the articles of faith common to both religions, we find that the minorities of both religions are more likely to believe in life after death, heaven, and hell than the majorities are. Finally, both minorities tend to have more confidence in churches–more so among minority Catholics–than do the majorities.

B The Persistence of Religious Denomination

Here we discuss two closely related issues: the stability of religious denomination in Europe across generations, and the historical determination and persistence over time of the geographic distribution of religions, especially of religious minorities.

B.1 Religion is an Inheritance from Parents

Religion and religiosity are transmitted by parents to their children, generation after generation (Hoge, Petrillo, and Smith, 1982; Clark and Worthington, 1987; Ozorak, 1989; Hayes and Pittelkow, 1993; Brañas-Garza and Neuman, 2006). While in the US religious denomination is more likely to change during the individual's lifetime, Europe is characterized by strong intergenerational religious persistence (Cantoni, 2010). Usually, the only European individuals who change denominations are those who become atheists.

According to ISSP Religion III data, 96 (94) percent of respondents who had two Catholic (Protestant) parents were raised Catholic (Protestant). Of those raised Catholic (Protestant), 83 (79) percent continue to follow their denomination when they reach adulthood, while 16 (20) percent become atheists, and only about 1 (1) percent convert to Protestantism (Catholicism). When we exclude eastern European countries, where atheism was promoted by the Communist

[31] These results contrast with those of Gruber (2005), which finds a positive relationship in the US between attendance in religious services and the share of residents who share the same religion.

regimes, we find that 80 percent of Catholics and 79 percent of Protestants maintain the religion in which they were raised, and 19 percent and 20 percent, respectively, become atheists. Overall, about 80 percent of respondents follow their parents' religion, with a slightly higher persistence among Catholics.

These proportions change somewhat among minorities, as an effect of the pressure of the surrounding majority religion. Among Protestant (Catholic)minorities, 66 (68) percent keep their parents' religion, 26 (25) percent become atheists and 8 (7) percent convert to Catholicism (Protestantism). The higher levels of conversion for those in a minority religion are partly explained by the fact that only about half of the people who belong to a minority religion marry someone with the same religion, compared to more than 80 percent who do so in the total population.[32].

B.2 Stability of Minorities Over the Long Run

The formation of Protestant and Catholic minorities in Europe is closely related to the pattern of conversion to Lutheranism during the sixteenth and seventeenth centuries in a population that had been uniformly Catholic for at least eight centuries. In the mid-seventeenth century, central Europe, under the flag of the Holy Roman Empire of the German Nation, was a patchwork of religions, with Catholic enclaves surrounded by Protestant territories and vice versa. This pattern was the outcome of a weak central power. Two hundred twenty-five fiefs and free cities, some comparatively large and some so small that they consisted of only one village, composed the HRE at the time of the Augsburg Peace (1555). In most cases, even the largest of these were territorially fragmented because of the marriages between prince families, and all pursued increased autonomy from the emperor. In this context, religion was not only a matter of spirituality but also a weapon in the political arena that consisted of the emperor, the church, and the nobles (Dixon, 2002).

Following the publication of Luther's 95 theses (1517), Lutheranism expanded even though it was formally banned with the Edict of Worms, and many princes converted. In 1531 the Schmalkaldic League was created among the Protestant territories as a mutual defence against the emperor. The League was defeated and dispersed in 1547, but Lutheranism was nonetheless

[32]Similar patterns have been found using data on subsamples of countries from both ISSP Religion 2 (1998) and ISSP Religion 1 (1991), except that secularization is less pronounced.

legitimated in the Peace of Augsburg (1555). The principle of *cuius regio eius religio* ("whose realm, his religion") granted the rulers the right to decide the official and unique religion of their territories to which their subjects could subscribe or leave the territory with their possessions. This principle applied with two exceptions: The *Reservatum Ecclesiasticum* provided that in the ecclesiastical territories, the prince-bishops who converted to Lutheranism had to abandon their power and be replaced by a Catholic, but their subjects could continue to practice their faith, whether it was Catholic or Lutheran, and the *Declaratio Ferdinandei* exempted some of the cities from the requirement of religious uniformity if the reformed religion had been practised there since the mid-1520s. As a result there were a few cities and towns, where Catholics and Lutherans lived together (Holborn, 1982).

The outcome of these norms, coupled with the Empire's fragmentation, was a dispersed geographic distribution of Protestantism and Catholicism in central Europe.[33] Protestantism dominated the northern territories, with the notable exceptions of large ecclesiastical fiefs, like the Bishoprics of Munster and Wurzburg, the Archbishoprics of Magdenburg and Tier, and the free cities of Bremen, Hamburg, and Lubeck. The South, with Bavaria and Austria, was predominantly Catholic but it also had several free cities, such as Augsburg, Ulm, and Krempten, that were largely or significantly Protestant. Wurttemberg (the second-largest southern fief) joined the Schmalkaldic League before being restored to Catholicism.

Essentially the same religious pattern that emerged four centuries ago is present in today's Central Europe. This similarity is made apparent by comparing Figures 8 and 9. Figure 8 reports the map of the HRE after the Treaty of Westphalia (1648), highlighting the Hapsburg domains, Bavaria, and the Ecclesiastic possessions, all areas with a massive Catholic presence. Figure 9 shows the same area today, with the proportion of Catholics in each region. The match between the two is very good as it is exemplified by the regions bordering the Netherlands, occupied by the important Bishopric of Munster, which currently have a significant Catholic population, although the Netherlands and northern Germany are largely Protestant.

FIGURES 8 AND 9 ABOUT HERE

Spenkuch (2011), who collects historical information (1555 and 1624) about the prevalent

[33]Religious wars continued in Europe for almost a hundred years. The Peace of Westphalia (1648) that ended the Thirty Years War confirmed the religious situation emerged a century before with the Peace of Augsburg (Parker, 1997). The Peace also made the imperial power more symbolic than real, guaranteeing the rooting of Protestantism.

religion in each of the modern German counties, confirms these patterns. Since detailed demographic data in the sixteenth and seventeenth centuries are not available, Spenkuch determines the prevalent religion at the county level by taking into account the size of the fiefs included within the borders of the current counties. The religion of each fief is that of its ruler according to *cuius regio eius religio* principle. A comparison of the geographic distribution of religions in 1624 with today's distribution reveals that the two largely overlap. Moreover, microdata from the German Socio-Economic Panel (SOEP) reveals that the probability of an individual's reporting to be Protestant today (compared to Catholic or atheist) is significantly higher in counties that were prevalently Protestant in 1624 than it is in those that were prevalently Catholic.

We complement Spenkuch's analysis in two ways. First, we compare the proportion of historically Protestant counties[34] in each of the modern German *lander* (state) with the proportion of Protestant fellows today; to be consistent with the historical data, we take into account only religious people. The correlation is as high as 0.87 when we focus only on the landers of the former Federal Republic of Germany, and it is 0.90 when we consider all German landers.[35].

TABLE A.4 ABOUT HERE

Second, we look at the modern German Catholic dioceses, whose boundaries in many cases almost perfectly reproduce those of the antique bishoprics, such as in the case of the dioceses of Mainz, Munster, Wurzburg. There are twenty-seven Catholic dioceses in today's Germany, compared to sixteen landers and more than four hundred counties. Thus, dioceses are disaggregated enough to generate considerable variability, but given their size, their religious composition is not significantly altered by the residents' normal mobility at more disaggregated geographic levels. Another advantage of using the modern German Catholic dioceses is that it is relatively simple to associate each diocese with the corresponding states at the time of the Thirty Years War and to gauge their relative importance.

Table A.4 reports the proportion of Catholics today for each Catholic diocese, the most important Catholic and Protestant territories in 1618 that are totally or partially included

[34]We rely on Spenkuch (2011)'s dataset and account for mixed counties (i.e., those without a prevalent religion) by attributing them to both the set of Protestant counties and the set of Catholic counties, giving each half the weight.

[35]However, in the East, after fifty years of Communist regime, less than 30 percent of the people report being religious.

in the current borders of the diocese, and an evaluation of the relative importance of the Protestant territories compared to Catholic territories, based on their relative size. We find that the correlation between the proportion of Catholic residents today and the historical relevance of Protestantism (measured over a 5-point scale, where 1 is highest importance) is as high as 94 percent.

C Minorities and Social Connections

Minorities are typically characterized by strong social ties, so entrepreneurship may be influenced by these ties, rather than by religious ethical norms. However, as long as social connections are similarly distributed among Protestant and Catholic minorities, their effect is cancelled out by our differencing. Using European data collected from the ISSP survey on Social Networks II, which was produced in 2001,[36] we explore whether the extent of social connections among Protestant and Catholic minorities in Europe is comparable. We estimate equation (16) using a battery of social network indicators as dependent variables.

Outcome variables refer to 1) the number of a) close friends in the workplace, b) close friends who live near the respondent, and c) other close friends; 2) participation in volunteer work with local organizations; 3) the ability to borrow money from relatives and friends in case of need; 4) the number of times the respondent has helped relatives and friends with housework or shopping in the current year; 5) the number of times the respondent has lent money to relatives and friends in the current year; 6) to what extent relatives and friends are sources of information for finding a job; 7) how often the respondent helped someone to find a job; 8) the self-reported level of trust in other people; and 9) the self-reported perception of others' opportunism[37]

[36]The European countries included in ISSP Social Networks II are: Germany, the UK, Austria, Hungary, Norway, Slovenia, Poland, Spain, Latvia, France, Denmark, Switzerland, and Finland.

[37]The definitions of the outcomes of Table A.5 are reported here. Each outcome is based on a single question from the ISSP Social Networks II survey, as detailed below. The questions are indicated in italics.

1) *Thinking about people at your workplace, how many of them are close friends of yours?* We took the number of friends (between 0 and 60).

2) *Thinking now of people who live near you - in your neighbourhood or district: How many of these people are close friends of yours?* We took the number of friends (between 0 and 90).

3) *How many other close friends do you have apart from those at work, in your neighbourhood, or family members? Think, for instance, of friends at clubs, church, or the like.* We took the number of friends (between 0 and 90).

4) *People sometimes belong to different kinds of groups or associations. The list below contains different types*

The difference between the coefficients of mP and mC indicate to what extent Protestant minorities are more socially connected than Catholic minorities are. Results are reported in Table A.5. We find no evidence of a systematic difference between minorities in terms of social connection and no systematic difference between those in minority religions and those in non-minority religions.

TABLE A.5 AROUND HERE

D Religion and Risk Aversion

Using SOEP 2004 data for Germany, we define five measures of risk aversion. The first is an index of relative risk aversion (RRA) derived from a question about the amount of windfall money the respondent would reinvest in a lottery with specified probabilities and returns, following the procedure indicated in Caliendo, Fossen, and Kritikos (2009). This measure is an objective experimentally validated measure (Dohmen, Falk, Huffman, Sunde, Schupp, and Wagner, 2005). The second measure is the self-reported aversion to take risks, measured on a scale from 0 (minimal aversion) to 10 (maximal aversion). The remaining three measures are self-reported indicators of aversion to risk in financial matters, in one's occupation, and in trusting other people. In all cases the majority of respondents are clustered toward maximal

of groups. For each type of group, please tick a box to say whether you have participated in the activities of this group in the past 12 months. We derived a dummy variable that equals one if the respondent reported participate in church or other religious organizations and zero otherwise, and similarly for sports groups, hobbies, or leisure clubs; charitable organizations or groups; neighbourhood associations or groups; and other associations or groups.

5) *Now, suppose you needed to borrow a large sum of money. Who would you turn to first for help?* We derived a dummy variable that is equal to one if the respondent answered one of the following, and zero otherwise: husband, wife, partner, mother, father, daughter, son, sister, brother, other blood relative, in-law relative, godparent, close friend, neighbour, someone you work with, and employer.

6-7-8) *During the past 12 months, how often have you done any of the following things for people you know personally, such as relatives, friends, neighbours or other acquaintances? a) Helped someone outside of your household with housework or shopping b) Lent quite a bit of money to another person ; d) Helped somebody to find a job.* For all items (a, b, and d) we derived a dummy variable that is equal to one if the respondent reported having helped in this way at least once in the previous twelve months, and zero otherwise.

9) *There are many ways people hear about jobs - from other people, from advertisements or employment agencies, and so on. Please indicate how you first found out about work at your present employer.* We derived a dummy variable that is equal to one if the respondent answered parents, brothers or sisters, other relatives, a close friend, or an acquaintance, and zero otherwise.

10-11) *To what extent do you agree or disagree with the following statements? a) There are only a few people I can trust completely; c) If you are not careful, other people will take advantage of you.* For item a) we derived a dummy variable that is equal to one if the respondent disagreed or strongly disagreed, and zero otherwise. For item c) we derived a dummy variable that is equal to one if the respondent agreed or strongly agreed, and zero otherwise.

aversion. We then recoded all measures as dummies (low/high aversion) and found the proportion of individuals who reported a high level of risk aversion to be similar between Catholics and Protestants for all indicators. We estimated model (5) to determine any difference in risk aversion between religious minorities and majorities,[38] and reported the results in Table A.7. We found no significant difference between Protestant and Catholic religious minorities or between religious majorities and minorities in any of the indicators of risk aversion we considered. In addition, point estimates are relatively small.

TABLE A.7 AROUND HERE

E Regions and Minorities in ESS data

In order to identify religious minorities across European regions according to the definition given in the main text, and to control for unobservable characteristics of geographic areas of residence, we must define the regional aggregation level that we want to apply to our data in these two dimensions. Ideally, regions should be comparable in terms of population and size. The Eurostat NUTS classification provides four levels of aggregation: NUTS 0 identifies countries, NUTS 1 identifies macro-regions with populations between 3 and 7 million, NUTS 2 identifies regions with populations between 800,000 and 3 million, NUTS 3 identifies regions (sub-regions in most cases) with populations between 150,000 and 800,000. Unfortunately, not all countries surveyed by the European Social Survey report the same NUTS levels, as some are more disaggregated (up to level 3) and some are only at level 1. Moreover, in some cases the number of observations at higher NUTS levels is too small to use in measuring the distribution of religious denominations in each region, forcing us to aggregate downward. In the end, we defined four possible aggregation criteria by which define a regional unit to apply to our ESS data:

Region 0: each country coincides with a region;

Region 1: NUTS 1 whenever possible; NUTS 0 otherwise;

Region 2: NUTS 2 whenever possible; Region 1 aggregation otherwise;

Region 3: NUTS 3 whenever possible; Region 2 aggregation otherwise.

[38] Controls are individual age, gender, years of education, marital status, employment condition, parents' religion, and regional (lander) fixed effects.

Our dataset contains 59 regions that meet the definitions of *Region 3* and *Region 2*, 28 that meet the definition of *Region 1*, and 7 that meet the definition of *Region 0*. In our baseline model, the calculation of minorities and clustering takes place at the most disaggregated regional aggregation level (i.e., *Region 3*). Geographic fixed effects are at the country level. We perform a number of robustness checks (discussed in section 5.4) by changing the aggregation level for calculating minorities.

Our definition of "minority" states that the religion d_{ir} of an individual i residing in region r is a minority religion if: a) the market share of d_{ir} is the smallest in region r and (b) its market share in region r is less than 25 percent.

We also considered alternative definitions of a minority religion in our analysis:

(i) the religion d_{ir} of an individual i residing in region r is a minority religion if its market share in region r is less than 25 percent;

(ii) the religion d_{ir} of an individual i residing in region r is a minority religion if condition (i) holds and if d_{ir} is Protestant (Catholic) and its market share is smaller than that of Catholicism (Protestantism);

(iii) the religion d_{ir} of an individual i residing in region r is a minority religion if the market share of d_{ir} is the smallest in region r.

Our preferred definition is the most stringent, while a priori no clear ranking exists among the other three. In general, these alternative definitions map to a similar set of regions, as only a few regions in Germany are affected by the adoption of alternative definitions of a minority religion and those do so only when Protestantism is considered. (The regions that report Catholic minorities are essentially the same across alternative definitions.) In order to avoid measurement errors, we always exclude from our sample regions with fewer than fifty respondents. However, our results do not change when we include all regions.

F Further Summary Statistics and Estimations

The ESS sample by country and wave is described in Table A.1, and the summary statistics of regional controls are displayed in Table A.2. The estimation of our baseline model, dropping one country at a time, shows that our estimates do not depend on the inclusion of a particular country in the sample. These estimates are available upon request. The extent of religious

discrimination across religions is reported in Table A.6.

A Appendix Tables

Table A.1: European Social Survey, countries of the Former Holy Roman Empire and baseline model sample size.

Country	1	2	3	4	Total
AT	758	691	893	0	2342
BE	344	302	288	307	1241
CZ	118	275	0	0	393
DE	643	629	700	687	2659
FR	0	0	48	45	93
LU	300	398	0	0	698
PL	117	95	93	87	392
SI	270	337	266	275	1148
Total	2550	2727	2288	1401	8966

Source: ESS data, 2002-2008.

Table A.2: Summary statistics of regional controls

country	**Un rate**	**Motorway**	**Pop dens**	**Doctors**	**GDP growth**	**Graduate**
AT	4.5	38.0	873	348	2.1	0.17
BE	7.5	60.2	750	391	2.5	0.30
CZ	8.0	7.9	371	351	8.8	0.12
DE	10.9	41.9	520	338	1.6	0.25
FR	8.0	20.5	110	315	2.0	0.22
IT	2.7	25.4	64	297	2.0	0.10
LU	3.9	52.7	175	280	4.5	0.21
PL	19.6	4.1	109	216	6.1	0.15
SI	6.0	29.4	121	228	5.4	0.22
Total	7.8	38.6	504	327	3.5	0.22

Source: ESS data, 2002-2008

Table A.3: Adhesion to religion and religious norms among minorities.

VARIABLES	(1) pray	(2) reg pray	(3) religious	(4) my way	(5) fate	(6) afterlife	(7) heaven	(8) hell	(9) confidencechurch
PROTESTANT	0.681***	-0.0386	-0.0641**	-0.0323	-0.0189	-0.0375	-0.0486	-0.0250	-0.0138
	(0.262)	(0.0296)	(0.0300)	(0.0333)	(0.0252)	(0.0327)	(0.0323)	(0.0312)	(0.0275)
PROTESTANT*MIN	0.922**	0.170***	0.236***	0.120**	0.0176	0.142***	0.168***	0.130**	0.0867*
	(0.427)	(0.0464)	(0.0475)	(0.0489)	(0.0397)	(0.0495)	(0.0506)	(0.0507)	(0.0467)
CATHOLIC*MIN	1.685***	0.247***	0.141*	0.0622	-0.204***	0.310***	0.150*	0.218***	0.155**
	(0.535)	(0.0694)	(0.0744)	(0.0765)	(0.0720)	(0.0639)	(0.0833)	(0.0843)	(0.0749)
CONSTANT	0.168	0.165**	0.342***	0.459***	0.598***	0.602***	0.548***	0.500***	0.237***
	(0.562)	(0.0725)	(0.0725)	(0.0781)	(0.0623)	(0.0769)	(0.0777)	(0.0752)	(0.0670)
Observations	12,869	12,869	12,896	12,268	13,179	11,669	11,566	11,397	12,614
R-squared	0.193	0.188	0.146	0.062	0.055	0.108	0.141	0.122	0.066

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: OLS linear probability model estimates of equation (1) on ISSP Religion III data. Robust standard errors are in parenthesis. The sample includes only Protestants and Catholics. Gender, age, years of education, urban or rural residence, parents' religion, and regional fixed effects (NUTS 1) are included as controls. Countries included are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Latvia, the Netherlands, Norway, the Slovak Republic, Slovenia, Spain, Sweden, and Switzerland.

Table A.4: Correspondence between modern German Catholic dioceses and religious distribution in 1618.

	Population 2009	Catholics 2009	proportion Catholics 2009	territories of 1618 totally or partially included in the current catholic bishopric		Importance of protestant territories in 1618
				Catholic	Protestant	
Church province of Bamberg	5.589	2.560	46			
Archdiocese of Bamberg	2.077	727	35	Bishopric of Bamberg	Ansbach, Bayreuth	2
Diocese of Eichsttt	870	424	49	Bishopric of Eichsttt	Ansbach	3
Diocese of Speyer	1.308	580	44	Bishopric of Speyer, Bishopric of Strasbourg	Landau, Electoral Palatinate	3
Diocese of Wrzburg	1.334	829	62	Bishopric Wurzburg and Bishopric of Mainz	(Protestant territories all around)	4
Church province of Berlin	10.682	563	5			
Archdiocese of Berlin	5.811	393	7		Brandeburg	1
Diocese of Dresden-Meien	4.155	141	3		Saxony	1
Diocese of Grlitz	716	29	4		Saxony	1
Church province of Freiburg	13.027	4.694	36			
Archdiocese of Freiburg	5.203	2.006	39	Breisgau, Bishopric of Strasbourg	Baden-Baden, Baden-Durlach, Wurttemberg	3
Diocese of Mainz	2.824	767	27	Archbishopric of Mainz	Electoral Palatinate (Calvinism), Hessen-Darmstadt	2
Diocese of Rottenburg-Stuttgart	5.000	1.921	38	Hohenzollern and other small fiefs at the border with Switzerland	Wurttemberg	2

continue

Church province of Hamburg	13.342	1.591	12			
Archdiocese of Hamburg	5.787	389	7		Mecklenburg, Lauenburg, Holstein	1
Diocese of Hildesheim	5.400	627	12	bishopric of Hildesheim	Luneburg, Brunschweig, Hessen-Kassel	1
Diocese of Osnabrck	2.155	575	27	bishopric Osnabruck	Bremen, Lingen, Hessen-Kassel	2
Church province of Kln	18.895	8.286	44			
Archdiocese of Kln	5.200	2.111	41	bishopric of Koln, mixed	mixed	3
Diocese of Aachen	2.038	1.137	56	Julich	Koln	4
Diocese of Essen	2.557	880	34	Essen Abbey, Berg	Mark	3
Diocese of Limburg	2.358	663	28	Sayn	Nassau, Hessen-Darmstadt	2
Diocese of Mnster	4.274	1.991	47	bishopric of Munster	Oldenburg, Mark	4
Diocese of Trier	2.468	1.504	61	archbishopric of Trier		4
Church province of Mnchen u. Freising	7.813	4.914	63			
Archdiocese of Mnchen und Freising	3.552	1.787	50	Bishopric of Freising, Bavaria		5
Diocese of Augsburg	2.298	1.377	60	Bishopric of Augsburg	Cities of Augsburg, Kepten, Memmingen, Lindau	4
Diocese of Regensburg	1.404	1.255	89	Bishopric of Regensburg, Bavaria	City of Regensburg	5
Diocese of Passau	559	495	89	Bishopric of Passau		5
Church province of Paderborn	12.147	2.302	19			
Archdiocese of Paderborn	4.900	1.643	34	bishopric of Paderborn, Westphalia	Ravensberg, Lippe, Schaumburg, Waldek	3
Diocese of Fulda	2.297	413	18	Fulda Abbey	Hessen-Kassel, Hessen-Darmstadt	2
Diocese of Erfurt	2.250	156	7		Sachsen Herzogtumer, Schwarzburg	1
Diocese of Magdeburg	2.700	90	3		Magdeburg	1

Source: Columns (1)-(3) are from German Bishops Conference data; *Historical Atlas* by Shepherd (1923). Importance of 1618 Protestant territories is defined as: 1 = largely dominant, 2 = larger than Catholic territories, 3 = smaller than Catholic territories but sizeable, 4 = much smaller than Catholic territories, 5 = very small.

Table A.5: Religious minorities and social networks.

VARIABLES	(1) wpfriends	(2) nearfriends	(3) otherfriends	(4) participate	(5) borrow	(6) helped	(7) lend	(8) helpedjob	(9) workinfo	(10) trust	(11) takeadvantage
PROTESTANT	-0.125	-0.190	-0.514	0.030	0.014	0.022	-0.016	0.053**	0.026	0.014	-0.070***
	(0.224)	(0.200)	(0.474)	(0.025)	(0.026)	(0.026)	(0.024)	(0.027)	(0.028)	(0.019)	(0.026)
PROTESTANT*MIN	2.175	0.282	3.137	0.108	-0.089	0.031	0.145	0.056	-0.145	-0.052	0.054
	(1.625)	(0.735)	(2.125)	(0.097)	(0.095)	(0.092)	(0.091)	(0.096)	(0.107)	(0.069)	(0.098)
CATHOLIC*MIN	0.269	-0.462	-1.149*	-0.035	0.017	-0.056	-0.086	-0.024	0.020	0.044	-0.067
	(0.342)	(0.320)	(0.678)	(0.055)	(0.057)	(0.056)	(0.053)	(0.053)	(0.061)	(0.040)	(0.060)
Constant	3.289***	4.269***	10.735***	0.349***	1.113***	0.549***	0.522***	0.409***	0.607***	0.045	1.133***
	(0.830)	(0.893)	(1.610)	(0.089)	(0.084)	(0.089)	(0.085)	(0.087)	(0.100)	(0.071)	(0.079)
Observations	4,578	6,333	6,502	6,665	6,562	6,534	6,452	6,456	5,916	6,567	6,458
R-squared	0.130	0.074	0.086	0.219	0.111	0.073	0.062	0.118	0.073	0.055	0.214
Min Prot - Min Cath	2.050	0.0915	2.622	0.138	-0.0750	0.0526	0.129	0.110	-0.119	-0.0381	-0.0155
	(1.587)	(0.649)	(1.967)	(0.0868)	(0.0841)	(0.0803)	(0.0819)	(0.0840)	(0.0952)	(0.0602)	(0.0869)
p val.	0.197	0.888	0.183	0.111	0.372	0.512	0.116	0.191	0.210	0.527	0.858

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: OLS estimates of equation (16) on ISSP Social Networks II data. The sum of the estimates associated with Protestant and minority*Protestant measures the differential impact between minorities. This quantity is reported at the bottom of the table as "Min Prot - Min Cath", with the corresponding standard error and p-value. Only individuals of working age (15-70) are included. Robust standard errors are in parentheses *** p¡0.01, ** p¡0.05, * p¡0.1. Because of the relatively large sample size available in this survey, regions used to determine minorities are defined at NUTS 2 whenever possible, except for Latvia (NUTS 3) because NUTS 2 is not defined for Latvia. All specifications include gender, age, years of education, urban or rural residence, marital status, number of siblings, number of children under 18, number of adult sons/daughters, years of residence at the current place of residence, a dummy for the Latvian region of Latgale (NUTS 3), and regional (NUTS 1) fixed effects. Countries included are Germany, the UK, Austria, Hungary, Norway, Slovenia, Poland, Spain, Latvia, France, Denmark, Switzerland, and Finland. Number of regions: 109.

Table A.6: Discrimination among religious minorities.

	Prot. vs Cath.	Prot. min vs Cath. min	Prot. maj vs Cath. maj
Belong to a discriminated group	0.32	0.86	0.69
Discriminated for religious reasons	0.80	0.75	0.61

Note: p-values of independent sample t-tests that compare the degree of discrimination between Protestants and Catholics in our estimation data. H_0 is no difference in the means. The tests, which compare total Protestant and Catholics as well as minority and majority Protestants and Catholics only, indicate no significant differences in means between any of the compared groups.

Table A.7: Risk aversion among Catholics and Protestants in Germany.

	(1) RRA	(2) risk	(3) finrisk	(4) occrisk	(5) trustrisk
Min Prot - Min Cath	0.029	-0.038	-0.024	-0.001	0.021
	(0.044)	(0.042)	(0.039)	(0.044)	(0.044)
Maj Prot - Maj Cath	-0.039	-0.016	0.036	-0.010	-0.002
	(0.037)	(0.037)	(0.033)	(0.038)	(0.037)
Obs	11272	11213	11163	10097	11217
R2	0.054	0.087	0.075	0.131	0.052

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: OLS linear probability model estimates of equation (1) on SOEP 2004 data. RRA is relative risk aversion; risks is the aversion to risk in general; and finrisk, occrisk, and trustrisk are aversion to risk in financial matters, in occupation and in trusting others, respectively (0 is low aversion and 1 is high aversion). Controls are lander dummies, age, gender, years of education, marital status, employment condition, and parents' religion.

Table A.8: Adhesion among Protestant and Catholic minorities.

VARIABLES	(1) pray	(2) reg pray	(3) religious	(4) afterlife	(5) heaven	(6) hell	(7) confidencechurch
PROTESTANTS	-0.178	-0.079	-0.078	-0.078	-0.061	-0.014	-0.093
	(0.539)	(0.068)	(0.067)	(0.074)	(0.072)	(0.073)	(0.067)
FEMALE	0.764	0.129***	0.122**	0.030	0.081	-0.077	0.102**
	(0.472)	(0.050)	(0.049)	(0.054)	(0.052)	(0.054)	(0.049)
AGE	-0.213**	-0.006	-0.016	-0.009	-0.039***	-0.025**	-0.027**
	(0.107)	(0.012)	(0.011)	(0.012)	(0.010)	(0.011)	(0.011)
AGE SQUARED	0.247**	0.011	0.017*	0.009	0.037***	0.023**	0.029***
	(0.101)	(0.010)	(0.009)	(0.011)	(0.009)	(0.010)	(0.010)
YEARS OF EDUC.	0.053	0.012*	0.008	0.007	-0.002	-0.013	0.024***
	(0.070)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
MARRIED	0.204	-0.046	-0.019	-0.086	-0.051	-0.068	-0.001
	(0.439)	(0.048)	(0.050)	(0.052)	(0.053)	(0.055)	(0.049)
CONSTANT	4.682	0.201	0.516	1.195***	1.715***	0.897***	0.147
	(3.483)	(0.395)	(0.413)	(0.362)	(0.386)	(0.319)	(0.317)
Observations	491	491	491	446	438	434	482
R-squared	0.123	0.106	0.082	0.105	0.125	0.102	0.135

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: OLS linear probability model estimates based on ISSP Religion III data. Robust standard errors are in parentheses. The sample includes only individuals who were born in a religious minority and who preserved their parents' religion. Gender, age, years of education, and settlement type dummies and country fixed effects are included as controls. Countries included are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Latvia, the Netherlands, Norway, the Slovak Republic, Slovenia, Spain, Sweden, and Switzerland. In order to preserve a sufficiently large sample size, the definition of minority religion that is adopted here is that religion d_{ir} of an individual i residing in region r is considered a minority religion if its market share in region r is less than 25 percent.