

# Social Cohesion, Religious Beliefs, and the Effect of Protestantism on Suicide

## Online Appendix

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## Appendix A: A Theory of Religion-Specific Suicide

Based on the 5<sup>th</sup> Commandment (“Thou shalt not kill”), suicide was forbidden and viewed as sin both in Catholicism and in Protestantism.<sup>1</sup> As Durkheim (1897) emphasized, “The Protestant believes in God and the immortality of the soul no less than the Catholic.” (p. 170) However, we see two classes of theoretical reasoning – one related to social cohesion (“sociological channel” for short), the other to individual religious beliefs (“theological channel” for short) – that have a bearing on the rationality of the act of suicide in the two denominations. We model these denominational differences in the framework of an economic theory of suicide. Before we get to the economic model, we frame this analysis in the current state of knowledge in the more general field of suicidology.

### *A.1 Background on Suicidology*<sup>2</sup>

The scientific study of suicidal behavior and its prevention, or suicidology, is the topic of several disciplines, most notably in psychology and sociology.<sup>3</sup> To most human beings, the instincts for self-preservation are so strong that the idea that someone could willingly and consciously end their own lives is difficult to even conceive. Based on an observation that many suicides are related to depression and other forms of mental illness, the modern psychological and psychiatric understanding of suicide holds that most people who are actively suicidal are not in a normal mental state.<sup>4</sup> They are rather suffering from suicidal depression, a transient state that either ends with the person succeeding in committing suicide or ebbs away.<sup>5</sup> This state tends to be characterized by a high degree of psychic pain, an inability to imagine a future in which the

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<sup>1</sup> When describing Protestant doctrine, we mostly focus on the Lutheran type, which is the first variant of the Protestant Reformation and will also be the subject of our empirical application further below. In Prussia, the two Protestant factions, Lutherans and Reformists, were merged into the single Protestant Church in Prussia (Evangelische Kirche in Preußen) in 1817, and the official statistics dropped the distinction between them. However, statistics from just before the merge show that 94 percent of Protestants in Prussia were Lutherans (Mützell (1825)).

<sup>2</sup> This depiction of the modern understanding of suicide in psychology and psychiatry draws on a helpful referee comment for which we are most grateful.

<sup>3</sup> For encompassing introductions into suicidology see, for example, Maris, Berman, and Silverman (2000) and Wasserman and Wasserman (2009), the first part of which presents a global overview of the relation of religion and suicide. See Jamison (2012) for a popular treatment and the website of the American Association of Suicidology at <http://www.suicidology.org> for further information.

<sup>4</sup> This may be related to neurobiological determinants that make some people particularly genetically vulnerable to suicide. In general, psychological, neurobiological, social, and other environmental factors may interact in affecting the occurrence, strength, and outcomes of suicidal mental states.

<sup>5</sup> Ferrari et al. (2014) find that a majority of the overall suicide burden (measured in disability-adjusted life years) can be attributed to mental and substance use disorders, and in particular depression.

person is alive and the pain is gone, and a tendency to discount the future heavily. It is also frequently accompanied by irrational evaluations of one's own worth and value to others, as well as other thoughts that the persons themselves might see as irrational in other times.

However, even when suffering from mental depression and being in a transient suicidal state, suicidal persons may take the costs and benefits of their action into account. In this sense, an intertemporal utility-maximizing framework of standard economic theory may provide insights for an understanding of what might lead these people to either carry out their suicide or not and exit the suicidal state. People in a suicidal state must still overcome the body's instincts to not kill itself, the natural fear of death and the attendant pain, and the fear that what comes after death is eternal damnation or shame falling on the family. That is, while acknowledging that suicidal states may be different from normal life, a framework of intertemporal maximizing behavior may still be useful in an analysis of the effect of religion on suicide.<sup>6</sup>

## ***A.2 Model Framework: The Economic Theory of Suicide***

Our model framework extends the economic theory of suicide developed by Becker and Posner (2004). In line with the pioneering work by Hamermesh and Soss (1974), suicide is modeled as forward-looking utility-maximizing behavior. We view this model as applying to the suicidal state of mind depicted in the psychological research, where preference parameters may differ from those during normal mental states. In a process of rational decision-making, individuals in the suicidal state compare the expected utility from living with that from death. If the latter is greater than the former, committing suicide will maximize utility.

Let  $u(t)$  denote the utility of living at age  $t$ . Then, the necessary and sufficient condition for suicide to be rational at age  $t$  is that the discounted value of present and future utilities is not greater than the cost of committing suicide  $c$ , neither at age  $t$  nor at any segment starting at  $t$  and ending before or at the length of life without suicide  $T$ :

$$\sum_{i=t}^A \beta^{i-t} u(i) \leq -c_d, \text{ for all } A = t, t+1, \dots, T \quad (1)$$

where  $\beta$  is the discount factor. Note that this discount factor may be larger in the transient state of suicidal depression than in normal life. The left-hand side of the condition depicts the utility

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<sup>6</sup> See Becker and Posner (2004) for a discussion of the extent to which suicides by depressed and mentally disturbed persons may reflect utility-maximizing behavior.

derived from carrying on living, which again may be conceived differently (and in ways considered as irrational in normal phases) in the specific mental state. The right-hand side depicts the utility from dying by suicide, which in this case is comprised only of the disutility stemming from the cost of committing suicide  $c$ , which may vary by religious denomination  $d$  (Protestant or Catholic in our case). Note that the relation has to hold for all segments of life into the future that start in  $t$ , because otherwise it would be worth living a little longer to reap some positive utility before large negative utilities set in. In the Becker and Posner (2004) specification,  $c$  is normalized to zero by choice of the utility function, but given our aim to explicitly model inter-group differences in the cost of committing suicide, we add  $c_d$  as a variable that may differ across individuals and is expressed in units commensurate with the utility function. This is similar in spirit to the “distaste for suicide” variable in the Hamermesh and Soss (1974) specification, although the latter is only subject to random variation, whereas we model systematic differences by denomination.

For simplicity, our setup assumes certainty about all future lifetime utilities. Thereby, we abstract from aspects introduced by uncertainty into the suicide decision, such as the option value of waiting (Cutler, Glaeser, and Norberg (2001); Becker and Posner (2004)) and implications for risk-taking behavior (Becker and Posner (2004)), as well as from further possible refinements of the model setup.<sup>7</sup> While these refinements raise important aspects of the suicide decision in general, we do not view them as pivotal for understanding denominational differences in suicide, so that their modeling would distract from the core mechanisms at work.

### ***A.3 The Sociological Channel: Durkheim’s Point of the Cohesion of the Community***

To understand how religious differences may affect the propensity to commit suicide, we start by modelling a sociological aspect of denominational differences between Protestantism and Catholicism. Durkheim (1897) emphasized that Protestant doctrine encourages independent thought and religious individualism, which decreases the integration of the community. By contrast, Durkheim argued, Catholicism is generally more oriented towards the group, providing social support, and the specific Catholic credos, norms, and codices unify the Catholic community. As Becker and Posner (2004) point out, if there is mutual interdependence in

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<sup>7</sup> In particular, our setup abstracts from differences in the probability of success between different methods of committing suicide (Becker and Posner (2004)), imitative aspects of suicide through contagion (Cutler, Glaeser, and Norberg (2001)), and signaling motives for (intentionally unsuccessful) suicide attempts (Rosenthal (1993); Cutler, Glaeser, and Norberg (2001); Marcotte (2003); Becker and Posner (2004)).

preferences, the fact that there are others who would suffer from a person's suicide will tend to discourage people from committing suicide. In terms of our simple economic model of suicide, the greater cohesion of the Catholic community has three effects.

First, assuming that individual utility  $u$  depends on the extent to which other people care about oneself (with an otherwise uniform utility function  $u$ ), the fact that Protestants are mostly surrounded by individualists means that, *ceteris paribus*, their utility derived from living at any point in time is lower than that of Catholics. Greater cohesion and social support in an integrated community mean that Catholics' utility from living is higher, thereby reducing the probability that their discounted stream of utilities falls below the suicide threshold.

Second, a related point is that the higher interdependence of preferences among Catholics also implies that the variance of utilities of living  $u$  should be lower among Catholics than among Protestants. As a result, the Protestant distribution of utilities will have fatter tails, which implies a larger probability mass of people with extremely low utilities that fall below the suicide threshold. Together, these two aspects model the core of Durkheim (1897)'s argument, who observes an "indivisible unity of the Catholic Church" (p. 158) because its common beliefs and practices create an integrated religious community and are "capable of supporting a sufficiently intense collective life" (p. 170).

Third, the cost of committing suicide  $c_d$  will be higher if the denomination  $d$  is Catholic rather than Protestant, both because it entails breaking from a community with stronger common codices and because of the negative effect on other people for whom a person more strongly integrated in the community is concerned about more strongly. Together, the three effects make it more unlikely that relation (1) holds. Thus, based on the sociological aspect, suicide rates would be predicted to be higher in Protestant communities than in Catholic communities.

#### ***A.4 The Theological Channel: Differences in Religious Beliefs about Afterlife***

Beyond the sociological aspect stressed by Durkheim (1897), we suggest to take into account the theological aspect of the possibility of afterlife. Views about afterlife seem obviously crucial for considerations about ending one's life on earth.

*Differences in Beliefs about the Impact of Man on God's Grace*

Christians – both Catholics and Protestants – believe in life after death. We assume that from this afterlife  $a$ , they derive an expected utility  $u(a)$  per unit of time. However, depending on denominational doctrine, the act of committing suicide may affect the probability of accomplishing these benefits of afterlife. We express this by the parameter  $p$  ( $0 \leq p \leq 1$ ), which depicts the punishment in terms of expected loss of afterlife utility for the act of committing suicide. Considering the possibility of such punishment, there are two ways in which afterlife enters the optimality condition for committing suicide:

$$\sum_{i=t}^A \beta^{i-t} u(i) \leq (1 - p_d) \sum_{i=t}^A \beta^{i-t} u(a) - \left( c_d + p_d \sum_{i=T+1}^{\infty} \beta^{i-t} u(a) \right), \text{ for all } A = t, t+1, \dots, T \quad (2)$$

The first term on the right-hand side depicts the utility of dying before year  $T$ . Because death now means that one may enter afterlife, there is a positive utility component to immediate death. For each period, the individual has to weigh the utility  $u(t)$  from living on earth against the utility  $u(a)$  from afterlife. In principle, the latter should be large, although given uncertainty about whether one actually reaches afterlife, the expected utility may be smaller than full afterlife utility. Still, in itself this aspect raises the suicide inclination of believers relative to non-religious people – “heaven can’t wait.” However, to the extent that the act of committing suicide lowers the probability of reaching afterlife ( $p$ ), this effect is reduced. In addition, this punishment will not only affect the possible years in afterlife until  $T$ , but afterlife into eternity. As a consequence, the expected loss of afterlife utility after  $T$  will add to the cost of committing suicide, as expressed by the additional term at the end of the right-hand side.

In total, then, the question whether suicide inclination is higher or lower for believers than for atheists depends on the relative size of punishment and expected afterlife utility. In particular, suicide incidence will, *ceteris paribus*, be smaller among religious than non-religious people if the punishment  $p$  is larger than the “short-run” gain of the additional time in afterlife until  $T$  (expressed relative to all afterlife utility until eternity).<sup>8</sup> This could explain why there tends to be a negative association between suicide and belief in God (Helliwell (2007); Layard (2005)).

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<sup>8</sup> For  $A = T$ , the condition is:  $p > \sum_{i=t}^T \beta^{i-t} u(a) / \sum_{i=t}^{\infty} \beta^{i-t} u(a)$ .

More to the point of our topic of investigation, differences in denominational doctrines mean that punishment  $p$  will vary with denomination  $d$ . In Catholic doctrine, man can affect his entry into heaven by doing good deeds, while committing a deadly sin leads to a loss of God's grace. By contrast, Protestant doctrine does not provide for an impact of man on God's grace. Given that traditional Catholic doctrine views suicide as a deadly sin which forfeits God's grace and bars man from entering heaven,  $p_C > p_P$ . Thus, the utility from committing suicide – the right-hand side of inequality (2) – will be larger for Protestants than for Catholics. In the extreme, we can expect that  $p_C=1$ ; i.e., for Catholic believers, paradise is lost due to the act of committing suicide. In fact, if Catholics believe that suicide is a deadly sin which turns a possible afterlife of heaven into hell (or at least prolongs purgatory), the act of committing suicide may turn the very utility of afterlife  $u(a)$  from positive to negative (respectively reduce it).

By contrast, following the Protestant “sola gratia” doctrine, suicide (or any other act of man) and the probability of going to heaven are orthogonal, as the latter depends only on God's grace, which is unaffected by any human deed. According to the predestination doctrine, salvation is by God's grace alone, not by any act of man.<sup>9</sup> As a consequence, in the extreme  $p_P=0$  for Protestant believers. This reasoning is consistent with the fact that, at least in modern Protestant doctrine, the predestination aspect leads to a more lenient assessment of suicide. For example, the influential Protestant theologian Karl Barth (1951) argued that there may be cases where God commands the suicide, and man can commit suicide in a state of peace with God.

As a consequence, the denominational differences in beliefs about the extent to (and manner in) which the deeds of man can impact God's grace will lead to a higher propensity to commit suicide of Protestants relative to Catholics.

### *Modeling the Impossibility of Confessing the Sin of Suicide*

While Catholic doctrine has confession as a holy sacrament, Protestant doctrine (generally) does not. The confession of sins is one of the seven holy sacraments of Catholicism, of which Lutheranism accepts only two (baptism and communion). Due to the irreversibility of the act of successfully committing suicide, by definition it is impossible to confess a successful suicide. As Becker and Posner (2004) put it, “The dominant characteristic of suicide is its finality – there is

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<sup>9</sup> The Lutheran version of the predestination doctrine may not be as strict as the Calvinist version, but the two Protestant factions did accept the joint predestination doctrine of the 1973 Leuenberg Agreement. In Protestantism, success in life was sometimes viewed as a *sign* of God's contentment and election, but not as its *cause*.

no second chance.” (p. 5) This fact reinforces the mechanism just discussed, because Catholics cannot use confession to evade the loss of afterlife utility due to the act of suicide.

But the finality of suicide gives rise to an additional mechanism by which confession affects the optimality of the suicide decision. When considering the possibility or impossibility of confession, the finality of the specific sin of suicide creates a substitution effect between committing suicide and other possible options considered by people who are in a suicidal mental state: The possibility of confessing sins raises the relative “price” of suicide relative to other sinful options, compared to a situation where confession is not a possibility at all.

When contemplating different possible actions in response to extreme depressions, someone in a miserable state of mind may thus view the cost of the specific sinful action of suicide (which cannot be confessed because the person will not be there to do so) as higher relative to the cost of other sinful actions such as heavy drinking, blindfold marriage, or committing crimes. This effect will be lower, the less important a doctrine views the influence of the act of confession; and it does not arise at all in a denomination whose doctrine does not allow for the possibility of confession. In light of the denominational differences discussed above, this creates an additional theological mechanism by which Catholics are predicted to be less prone to suicide than Protestants.



## **Appendix B: Robustness Analyses**

### ***B.1 Validity of the Instrumental-Variable Strategy***

The validity of the instrumental-variable model described in section III.C in the main text rests on the assumption that the initial concentric spread of the Reformation led to exogenous variation in the Protestant share. Reasons for the roughly circular dispersion include costs of traveling and of information diffusion through space, increasing dissimilarity of German dialects, and the role of Electoral Saxony as an early leader and role model for the implementation of the new denomination that allowed observing Reformation ideals put in practice and forming regional Protestant alliances (see Becker and Woessmann (2009) for details). Exploring the determinants of the adoption and diffusion of Protestantism in Germany, Cantoni (2012) provides evidence that the concentric spread of the Reformation from Wittenberg is consistent with the importance of strategic neighborhood interactions, reflecting considerations of local lords to imitate neighboring lords. Similarly, regional alliances in the West and in the East helped to stop the spread of the Reformation. Thus, locational transaction costs, political alliances, and historical randomness are factors that likely contributed to the historical diffusion process.

While consistent data on suicide rates before the Reformation are not available, the lack of a significant association of the distance-to-Wittenberg instrument with several proxies of suicide proneness observed before the onset of the Reformation lends credibility to assuming exogeneity of the instrument. Factors that have been shown rather consistently in the suicide literature to be correlates of suicide include economic conditions, urbanity, education, and cultural disposition (e.g., Helliwell (2007); Chen et al. (2012)). As Becker and Woessmann (2009) have shown, distance to Wittenberg is orthogonal to proxies in each of these groups of factors that are observed before the Reformation set on in 1517. First, free imperial cities and Hanseatic cities, which constituted major trading hubs in pre-Lutheran times, were important centers of economic activity before the Reformation. In addition, Guiso, Sapienza, and Zingales (2016) emphasize that cities that were free cities in the medieval age show persistently higher levels of civic capital and self-efficacy beliefs until today. To the extent that beliefs of self-efficacy may hedge against suicide proneness, free imperial and Hanseatic cities may have been less prone to suicidality. However, distance to Wittenberg is unrelated to the probability of being a free imperial city (measured in pre-Reformation status) and to the probability of being a Hanseatic city.

Second, pre-industrial urbanity is often used to proxy for economic progressiveness before industrialization, and urbanization is also a correlate of suicide in its own right. Again, distance to Wittenberg is orthogonal to urban population density and to city sizes in 1500. Third, moving to measures of pre-existing differences in education, distance to Wittenberg is unrelated to whether a school or a university existed in the county before 1517, or to their year of foundation. Fourth, distance to Wittenberg is orthogonal to the density of monasteries in a county in 1517, which proxies for the cultural predisposition to religiosity. In sum, these tests lend credibility to the validity of the instrument by showing that the spread of the Reformation from Wittenberg is unrelated to pre-existing differences in factors that tend to be correlated with suicide proneness.

The lack of consistent pre-Reformation suicide data prevents a difference-in-differences analysis that would condition on values of the outcome variable before the Reformation. However, there is ample anecdotal evidence that the initial spread of Protestantism was indeed associated with increases in suicide incidences. For example, drawing on a study by Dieselhorst, Midelfort (1996) reports suicide numbers in the city of Nuremberg, which accepted the Reformation in 1525, that increased from 25 in the entire 15<sup>th</sup> century and 21 in 1501-1540 to 128 in 1541-1600. Similarly, Schär (1985) argues that the introduction of the Reformation in Zurich led to a steady increase in suicides from the 16<sup>th</sup> to the 18<sup>th</sup> century. According to his counts, the number of suicides in Zurich increased from seven in 1530-1600 to 36 in 1601-1650, 119 in 1651-1700, 167 in 1701-1750, and 182 in 1751-1799. This anecdotal evidence is consistent with our interpretation that suicides are of consequence of the Reformation.

Still, the fact that we have shown in Becker and Woessmann (2009) that Protestantism affected literacy and economic development raises the question of interpretation whether it was these other outcomes of the Reformation, rather than Protestantism *per se*, that led to the increase in suicides. As shown in Table 3 in the main text, the estimated effect of the Protestant share on suicide rates is largely unaffected by conditioning on the share of the work force that has moved out of agriculture, and it in fact increases (although not statistically significantly so) when conditioning on the share of literate adults, which is significantly *negatively* associated with suicides in this specification. This suggests that the estimated effect of Protestantism on suicides is barely affected by any effect of the Reformation on literacy and economic development.

However, both of these outcomes might be multidimensional. Therefore, in the first two columns of Table A.2, we add controls for further dimensions of educational and economic

development. Column (1) considers additional measures of education, namely enrollment rates in primary and secondary school (available from the 1864 Population Census), respectively, and enrollment rates in university (available for 1871 from Eulenburg (1904)).<sup>10</sup> As the sectoral structure may not fully capture economic conditions, column (2) adds additional proxies for economic development, namely the average annual income of male elementary school teachers as a proxy for income levels, income tax per capita, and the share of poor people (proxied by the share of day laborers in the total population). None of these additional measures is significantly related to suicide rates, and none affects the result on the effect of Protestantism on suicide.

The final columns condition on two additional potential non-religious outcomes of the Reformation. Literacy and economic development might have contributed to economic inequality giving rise to unmet aspirations, and suicides have been related to relative economic conditions (Daly, Wilson, and Johnson (2013)). Column (3) thus adds a control for income inequality as proxied by the relative income of teachers versus day-laborer wages, where day laborers are at the bottom of the income scale and teachers proxy for higher (albeit not top) incomes. Furthermore, the protest movement of the Reformation might have facilitated social unrest and disruption, even in the long run. Thus, column (4) adds the number of social protests that occurred in a county during the 19<sup>th</sup> century until 1871 (as collected by Tilly (1990)). Again, neither measure enters significantly or affects the estimate on Protestantism. Overall, the results seem most consistent with a strong effect of Protestantism *per se* on suicides.

## ***B.2 Robustness to Other Factors Including General Mental Disabilities and Bad Weather***

We proceed with a number of additional tests of the robustness of the IV specification. Table A.3 adds several further control variables. In the first column, we start with a set of additional demographic controls. As suicide rates are generally found to differ substantially by gender, we add the share of females (see below for more extensive analyses of gender patterns). The share of Jews accounts for the only other sizable religious group in Prussia (at 1.1 percent of the population on average) apart from Protestants and Catholics. Neither control enters significantly or alters the main effect of interest.

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<sup>10</sup> The university enrollment rate refers to the number of students enrolled as a share of the population aged 15 to 60. Qualitatively the same results emerge when using an indicator for the existence of a university in a county.

While migration *per se* does not pose a problem for our interpretation, migration that is differently selective across denominations, e.g., in that suicide-prone Catholics are more likely to migrate to Protestant areas and vice versa, might introduce bias into the county-level analysis (see below for an extensive treatment of ecological composition). Furthermore, suicide research has shown that migrants tend to take suicide propensities with them. To account for the general effects of migration, the specification in column (1) adds two measures of the extent of migration in a county that refer to internal and external migration, respectively: the share of the population born in the specific municipality and the share of the population that is of Prussian origin. Only the share of the population of Prussian origin enters the model statistically significantly, indicating higher suicide rates in counties with a stronger presence of foreigners. The estimated effect of Protestantism, however, is hardly affected.

As a further test to gauge the potential relevance of denominationally selective migration, we can exploit the fact that for a subset of counties that were part of Prussia already in 1816 and had negligible boundary changes over time, we can observe denominational shares already in 1816 (see the first-difference analysis below for details). This allows us to restrict the analysis to a subsample of 158 counties whose Protestant share changed by less than 2 percentage points between 1816 and 1871. As is evident from the specification shown in column (7), results are robust in this smaller sample of counties where denominational shares did not change much. The fact that results do not differ between the denominationally stable and the full sample suggests that migration is unlikely to substantially affect our results.

Psychiatric research tends to link suicide to mental and depressive disorders (see Appendix A.1 above). To account for variation in the general prevalence of mental and physical disabilities across counties, we use information on the share of the population classified as blind, deaf-mute, and insane, respectively. Controlling for these shares does not change the results (column (2)). In fact, in the data the incidence of mental illness is not significantly related to religious denomination (see also Guttstadt (1874)).<sup>11</sup>

Suicide incidence has also been linked to military experience. In the 1882 occupational data, we can observe the share of the county population working in military and related services. This variable is not significantly related to the share of Protestants in the county (not shown),

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<sup>11</sup> Results are also robust to controlling for the existence and membership of sports clubs as proxies for non-religious sources of social cohesion in a county, available for 1864 from the *Zweites Statistisches Jahrbuch der Turnvereine Deutschlands* (not shown).

indicating that military suicides are unlikely to underlie the denominational pattern. Furthermore, special tables provided in Hulse (1871) indicate that only 4.1 percent of the suicides in 1869 were committed by persons whose residence was in military facilities, and 5.7 percent by persons working in the military or navy.<sup>12</sup> Given that suicide rates among Protestants are more than twice as large as among Catholics, suicides by soldiers thus cannot account for the main effect.

Research has also shown that married individuals are less susceptible to suicide. Column (3) therefore adds a control for marital status, measured as the share of married people among those aged 15 years and older. The share of married people is indeed negatively related to suicide rates, but if anything, the estimated effect of Protestantism on suicide increases with this control.<sup>13</sup>

As our IV identification builds on geographic variation, we next add geographic controls. First, to test for a potential concern that mountainous regions might have stopped the spread of the Reformation, column (4) adds altitude as a control variable to the model. While altitude is significantly positively related to suicide rates, its inclusion does not alter our qualitative result on the effect of Protestantism, limiting concerns about non-randomness in the geographic spread of the Reformation. Next, using latitude, longitude, and their interaction, the specification in column (5) controls for potentially systematic variation in suicide rates across geographical space, for instance due to different climatic conditions. Column (6) adds a set of dummies indicating the year in which the county became part of Prussia. Depending on the duration of affiliation with Prussia, common norms may have settled in to a different degree. Our results indicate, however, that neither set of geographic controls affects the qualitative result on the effect of Protestantism on suicide.

Apart from general geographic patterns, suicide propensity may be affected by gloomy weather. If distance to Wittenberg were correlated with better weather conditions, this could introduce bias in the IV model so that the Protestantism effect is overestimated. To account for possible effects of unpleasant weather conditions on suicide, we make use of the high-resolution interpolated climate surfaces by Hijmans et al. (2005), whose climate model provides data on

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<sup>12</sup> Unfortunately, this information is not available by county or by religious denomination.

<sup>13</sup> The standard error also increases in this specification and the *F*-statistic of the instrument in the first stage becomes rather small, which mainly reflects a strong negative correlation of the share married with the urban share (and their weaker association with the instrument). In a specification without the urban share, the coefficient on the share married remains significantly negative, the coefficient on the Protestant share is more precisely estimated and of a size more similar to our main specification (coef. 31.099, std. err. 6.949), and the first-stage *F*-statistic is larger at 17. Similarly, in a specification with the urban share and an East Prussia dummy, the first-stage *F*-statistic is 32 and the coefficient on the Protestant share is 23.900 (std. err. 3.296).

monthly precipitation and mean temperature based on rich input data from weather station records from a variety of sources for the 1950-2000 period (interpolated geographically using data on latitude, longitude, and elevation).<sup>14</sup> Assuming that the general pattern of climatic variation across the Prussian counties did not change substantially since the late 19<sup>th</sup> century, we can control for the weather situation in our suicide analysis using geo-coordinates of a county's main town to map the climate data into our dataset of Prussian counties.<sup>15</sup>

As the first part of Table A.4 shows, distance to Wittenberg is in fact *negatively* correlated with rainfall and *positively* with temperature: The further away from Wittenberg, the more pleasant is the weather. Thus, if unpleasant weather were predictive of higher suicide, our IV model would tend to underestimate the effect of Protestantism. However, when entering rainfall and temperature as control variables in our IV specification, neither of the two enters significantly to predict suicide rates. The strong effect of Protestantism on suicide is robust in this specification, although with a somewhat (though not statistically significantly) smaller point estimate.

### ***B.3 Robustness to Misreporting and Alternative Death Causes***

As discussed above, some observers have worried that there might have been attempts to hide suicides and classify them under different death causes in order to ensure a religious funeral ceremony. If such misreporting varied by denomination, this would bias our estimate on the effect of Protestantism. The most obvious other category of death causes where suicides might be hidden is the category of “fatal accidents.” The specification in the first column of Table A.5 therefore adds the fatal accident rate in the county to account for potential underreporting of suicide rates. However, there is no statistically significant conditional association between reported suicide rates and reported fatal accident rates, and controlling for the latter leaves the effect of Protestantism on suicides unaffected. Further categories of death causes that might be possible places to hide suicides are “sudden incidents of illness” and “undetermined illnesses” (van Poppel and Day (1996)). Again, both death categories do not enter our suicide model significantly and do not affect the estimated Protestantism effect (not shown).

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<sup>14</sup> Worldwide, the climate model draws on data from 47,554 weather stations for precipitation and 24,542 weather stations for temperature.

<sup>15</sup> Using instead the centroid of the county or the mean of all climate data points (on a 1 km grid) in the county to map the climate data into our Prussian county data leads to virtually identical results.

To address any form of relabeling suicide, column (2) adds the total mortality rate as a control variable. While the total mortality rate enters significantly positively, the effect of Protestantism is qualitatively unaffected. This result also addresses a potential concern that our main finding might reflect other differential behavior across denominations that might give rise to differential exposure to natural death causes. A related possible concern is that denominational sorting into occupations with different frequencies of fatal accidents makes the denominations differentially susceptible to other sources of death. To address this concern, column (3) replaces the employment share in manufacturing and services by an extensive set of controls for employment shares in 32 sectors. Again, qualitative results are unaffected.

To test for misreporting even more stringently, column (4) uses the fatal accident rate instead of the suicide rate as the dependent variable in our basic specification.<sup>16</sup> There is no significant effect of the share of Protestants on the fatal accident rate, and if anything, the point estimate is positive. This evidence speaks against disproportional misreporting of suicides as fatal accidents in Catholic regions.

Furthermore, to test whether Protestantism might have created worse living conditions in a local area in general which might impact suicide risk, column (5) uses the total mortality rate as the dependent variable in our model. Protestantism in fact has a significant *negative* effect on overall mortality, working against the possibility that Protestantism might have undermined overall health conditions or increased (non-suicidal) mortality in general. The mortality-reducing effect is consistent with the finding of a positive effect of Protestantism on literacy and economic development in Becker and Woessmann (2009).

Another way to show that the positive effect of Protestantism on suicides is not driven by an overall increase in deaths is to use the suicide proportion (suicides per death incidents) rather than the suicide rate (suicides per inhabitants) as an alternative outcome measure. In column (6), we again find a sizeable and statistically significant effect of Protestantism on suicide also when measured by the suicide proportion.

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<sup>16</sup> The specification includes a dummy for the far eastern province of East Prussia, which has particularly high fatal accident rates. Additional historical data tables indicate that these are due to freezes in particularly cold weather during the winter months and drownings of sailors at sea. Without the East Prussia dummy, the IV estimate is marginally significantly negative (while the OLS estimate is strongly positive). However, this is driven by particularly high fatal accident rates in the *Protestant* counties: while the 32 mostly Protestant counties in East Prussia (all with Protestant shares above 84 percent) have an average fatal accident rate of 62.5, the four mostly Catholic counties (all with Protestant shares below 12 percent) have an average fatal accident rate of 45.0. Our main results with suicide rates as the dependent variable are fully robust to including an East Prussia dummy (not shown).

#### ***B.4 Effects of Religious Concentration and Ecological Composition***

As our analyses are performed at the county level, we further probe robustness of our results to issues of religious concentration and minority behavior. Counties that have a larger degree of heterogeneity in religious denominations may differ in their suicide rates from counties that do not. Also, people of the same denomination might behave differently when constituting a small minority in the region than when their denomination is in the majority. As a first test of concentration effects, we compute the Herfindahl index of religious concentration in a county (computed over the shares of Protestants, Catholics, and Jews). Adding the Herfindahl index to our suicide model in the first column of Table A.6 leaves the estimate of the Protestantism effect virtually unaffected. The Herfindahl index enters the IV model significantly negative, indicating a tendency of lower suicide rates in areas with higher religious concentration.

We can provide additional evidence on the relevance of religious heterogeneity in a county for our results by restricting our sample to counties with very high concentrations of one denomination. Thus, column (2) restricts the estimation sample to those 142 counties that have either more than 98 percent Protestants or less than 2 percent Protestants. In this smaller sample, the IV estimates get somewhat smaller, closer to the original OLS estimates. We can even restrict the sample to those 33 counties where Protestants make up more than 99.9 percent or less than 0.1 percent of the population. The effect of Protestantism on suicide rates is robust.

This subsample evidence also addresses the potential concern of ecological inferences of individual associations from aggregate data (Robinson (1950); Morgenstern (1995)).<sup>17</sup> Given the near universal denominational affiliation in these counties, the higher suicide rates in Protestant counties are unlikely to be driven by the Catholic minority living in those counties.

We can probe the issue of ecological composition in further detail by making use of special tables reported in Hilse (1871) that show simple cross-tabulations of suicide numbers by religious denomination within districts. These data refer to suicides in the year 1869 only (rather than averaging over three years, as in our county-level analyses).<sup>18</sup> While the available county-level data do not allow us to distinguish between suicides by Protestants and by Catholics within

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<sup>17</sup> Note that Robinson (1950) showed that the difference between ecological and individual inference will usually be lower the more the variables are clustered within regions, and religious affiliation is very highly clustered in Prussian counties (see the bottom panel of Figure 1 in the main text).

<sup>18</sup> The data on districts' population by denomination that allow us to compute the suicide rates are available in the population census for the year 1871.



a county, for 25 districts the cross-tabulated data present information on suicides by the denomination of the individual person committing suicide.<sup>19</sup> The suicide rate in the Protestant population is indeed much higher than the suicide rate in the Catholic population (Table A.7). Protestants have a suicide rate of 18.4, compared to the Catholic suicide rate of 6.5. The difference of 11.9 between the two denominations closely resembles our OLS estimates reported in Table 2 in the main text, indicating that the latter are not driven by ecological fallacy. (Further analysis of ecological fallacy based on modern micro data is presented in Section IV.C in the main text.)

The cross-tabulated data also allow us to distinguish the denomination-specific suicides by gender. Again, while the data are based on information for the individuals committing suicide, they are available only at the aggregate level.<sup>20</sup> The descriptive pattern clearly shows that suicides are substantially higher among males than among females, a pattern consistently found also in modern suicide research (Helliwell (2007)). Still, within both gender groups, suicide rates are substantially higher among Protestants than among Catholics. Specifically, average suicide rates of Protestant males are as high as 30.3 suicides per 100,000 inhabitants, compared to 11.3 for Catholic males. In the female population, suicide rates of Protestant females are at 6.9 suicides per 100,000 inhabitants, compared to only 2.0 for Catholic females.

The cross-tabulated district data also allow us to probe the issue of effects of being a religious minority on suicide rates in greater detail. For this, we subdivide the districts by increasing shares of Protestants and analyze denomination-specific suicide rates in the different groups of districts (see Table A.7, bottom panel). Within each group of districts defined by brackets of the share of Protestants, the suicide rate of Protestants is higher than the suicide rate of Catholics. The suicide rate of Protestants does not vary systematically with the size of the Protestant population in the district, indicating that there is neither a substantial effect of being a religious minority nor of an increasing share of the Protestant community in the district. The suicide rate of Catholics is higher in Protestant-majority districts compared to Catholic-majority districts, which might either reflect a minority effect for Catholics that does not exist for Protestants or an imitation or social-spillover effect whereby Catholics are induced to suicide in areas where they observe a large number of Protestant suicides.

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<sup>19</sup> For the other 10 Prussian districts, cross-tabulations of suicides by denomination are not available.

<sup>20</sup> For county-level analysis of gender-specific suicide rates see our analysis of the 1816-21 data below.

The absence of a general effect of denominational concentration is also confirmed in regression analyses estimated for the 50 district-by-denomination observations (25 districts with one observation each for the Protestant and the Catholic population): When regressing the suicide rate on a denomination dummy, the share of the own denomination in the district population, and the share of Protestants in the district population, only the own denomination enters strongly and significantly as a predictor of the denomination-specific suicide rate, whereas neither the size of the own denomination in the district nor the size of the Protestant community in the district enter significantly (not shown).

The presented evidence rejects the existence of important nonlinearities in the effect of Protestantism on suicide. We have also probed this in further detail in our county-level regression analyses. While nonlinear specifications become imprecise in IV models, OLS models are quite precise and reject the existence of noteworthy nonlinearities: A quadratic term in the share of Protestants is statistically insignificant, and a specification with a set of indicators for the Protestant share being larger than a quarter, half, and three quarters indicates that the Protestantism effect is linear along the value range of the share of Protestants (not shown).

## Appendix C: Data Sources

The county-level data available for Prussia in the 19<sup>th</sup> century is generally viewed as a unique source of highest-quality data for micro-regional analyses (Galloway, Hammel, and Lee (1994)). We have compiled the county-level data used in this paper from several archives (see Becker et al. (2014) for details).

### *1816 Population Census and 1816-21 Suicide Statistics*

The Prussian Statistical Office, founded in 1805, collected detailed data at the county level for the first time in 1816. This is the earliest year that lends itself to a micro-regional analysis of religion and suicide. Suicide rates are reported for the years 1816-21 combined and are drawn from the local burial and death registers. The share of Protestants in the county population refers to the year 1816. In addition, the 1816 Population Census provides data on demographics, schooling, the number of public buildings per capita, and other death causes. The data refer to the 306 counties in Prussia in its borders at the time. The source of the 1816 Population Census data and the 1816-21 Suicide Statistics is Mützell (1825).

### *1869-71 Suicide Statistics*

The second period for which we have county-level suicide data is 1869-71. In dedicated suicide statistics, introduced in the last quarter of 1868, the local state administration – the city council or the local police – had to count every suicide on a separate data sheet. The survey also collected background information on the person committing suicide with the explicit aim of understanding the factors affecting suicides. The data refer to the 452 counties existing at the time.<sup>21</sup> The source of the 1869-71 Suicide Statistics is Preussische Statistik (1874). The data are further described in a paper by Hilse (1871) which also contains interesting cross-tabulations of suicides by characteristics of the person committing suicide and of the suicide incident, although only at the district level.

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<sup>21</sup> Prussia annexed several territories between 1816 and 1871, namely Hohenzollern-Sigmaringen, Schleswig-Holstein, the Kingdom of Hannover, Hessen-Kassel, Nassau, and the free city of Frankfurt.

### ***1871 Population Census***

The 1871 Population Census provides information on the share of different religious denominations – in particular, Protestants, Catholics, and Jews – in a county. In addition, the majority of our control variables is drawn from the 1871 Population Census, including a host of demographic characteristics, literacy rates (measured as the ability to read and write among the population aged 10 years or older), and shares of the population with physical or mental disabilities (blind, deaf-mute, and insane). The source of the 1871 Population Census data is Preussische Statistik (1875).

### ***1882 Occupation Census***

The 1882 Occupation Census collected information on employment and self-employment across two-digit sectors. We calculate the share of the labor force working in the manufacturing sector and in the service sector, using the classification provided by the Prussian Statistical Office to classify the two sectors. The manufacturing sector (sector B in the 1882 classification) includes mining, construction, and manufacture of metals, machinery, equipment, chemicals, textiles, paper, leather, food products, and wood. The service sector (sector C in the 1882 classification) includes trade business, insurance, transport, lodging, and restaurants. The source of the 1882 Occupation Census data is Preussische Statistik (1884/85).

### ***1864 Population Census***

The 1864 Population Census provides information on the number of students enrolled in different types of primary and secondary schools. We calculate enrollment rates by dividing the enrollment counts by the size of the population aged below 15 in 1864, also available in the Population Census. The source of the 1864 Population Census data is Preussische Statistik (1867).

### ***1862 and 1881 Church Attendance Data***

Our measure of church attendance stems from the statistical surveys of the Protestant Regional Churches of Germany on the “Expressions of Churchly Life.” The uniform annual surveys were organized by the Statistical Central Office at the Protestant Higher Church Council in Berlin in 1862 and then from 1880 to World War II. Parish priests collected the data on

preprinted forms following uniform surveying directives. Regional Consistories combined these parish data into registers at the level of church districts, the level at which they are available today. Our measure of church attendance is the number of participations in Holy Communion divided by the number of Protestants in a church district. To match our 1869-71 suicide statistics, we take a simple average of church attendance in 1862 and 1881, the closest years with available data for most church districts. We map the church-district data into our administrative-county data by using GIS technology to compute the surface-weighted average of the available church district data for each county. The source of the 1862 and 1881 Church Attendance Data is Hölscher (2001), who gathered the data from regional archives covering modern Germany.

### ***1992 and 2009 Mortality Statistics***

Data on suicides in modern-day Germany come from the Mortality Statistics (*Todesursachenstatistik*), covering all deaths from 1992 to 2009 at an individual level. The Mortality Statistics are based on the death certificate issued by the doctor declaring the death, in combination with the death registry certificate issued by the registrar of the municipality of residence. The death certificate contains information about the causes of death: diseases and significant other health issues which have contributed to death. The classification of causes of death follows the World Health Organization's International Classification of Diseases (ICD-9 until 1997 and ICD-10 since). In addition to the primary disease, the Mortality Statistics include demographical features such as the date of death, gender, age, German citizenship, religion, marital status, and place of residence. The 1992-2009 Mortality Statistics are accessible via controlled remote access through the Research Data Centers of the Federal Statistical Office and the Statistical Offices of the Länder (EVAS 23211).

### ***1987 Population Census***

County-level variables entering some of our modern-day suicide regressions stem from the 1987 Population Census (*Volkszählung*) in (West) Germany. The county-level variables include the share of Protestants among Protestants and Catholics; the total county population; the share of the county population in 20 separate age groups; the share of the county population who are singles, widowed, married, divorced; the share of foreigners; the share of the work force in four separate sectors; the share of the population receiving social benefits; the share of the population

receiving financial support from relatives; and the share of the population with five separate educational degrees. The county-level data from the 1987 Population Census are available from the Statistical Offices of the Länder.

### ***2003 German Socio-Economic Panel***

The German Socioeconomic Panel (SOEP) is a household survey covering several thousand individuals and has been running since 1984. It covers religious denomination only in selected years. Questions on social activities are also only infrequently asked. We use the data for the year 2003 when both religious denomination and social activities are surveyed; 2003 is also in between the two years 1992 and 2009 covered in our modern-day suicide regressions. Data can be obtained from DIW Berlin and detailed documentation is available on the SOEP website: <http://www.diw.de/en/soep>.

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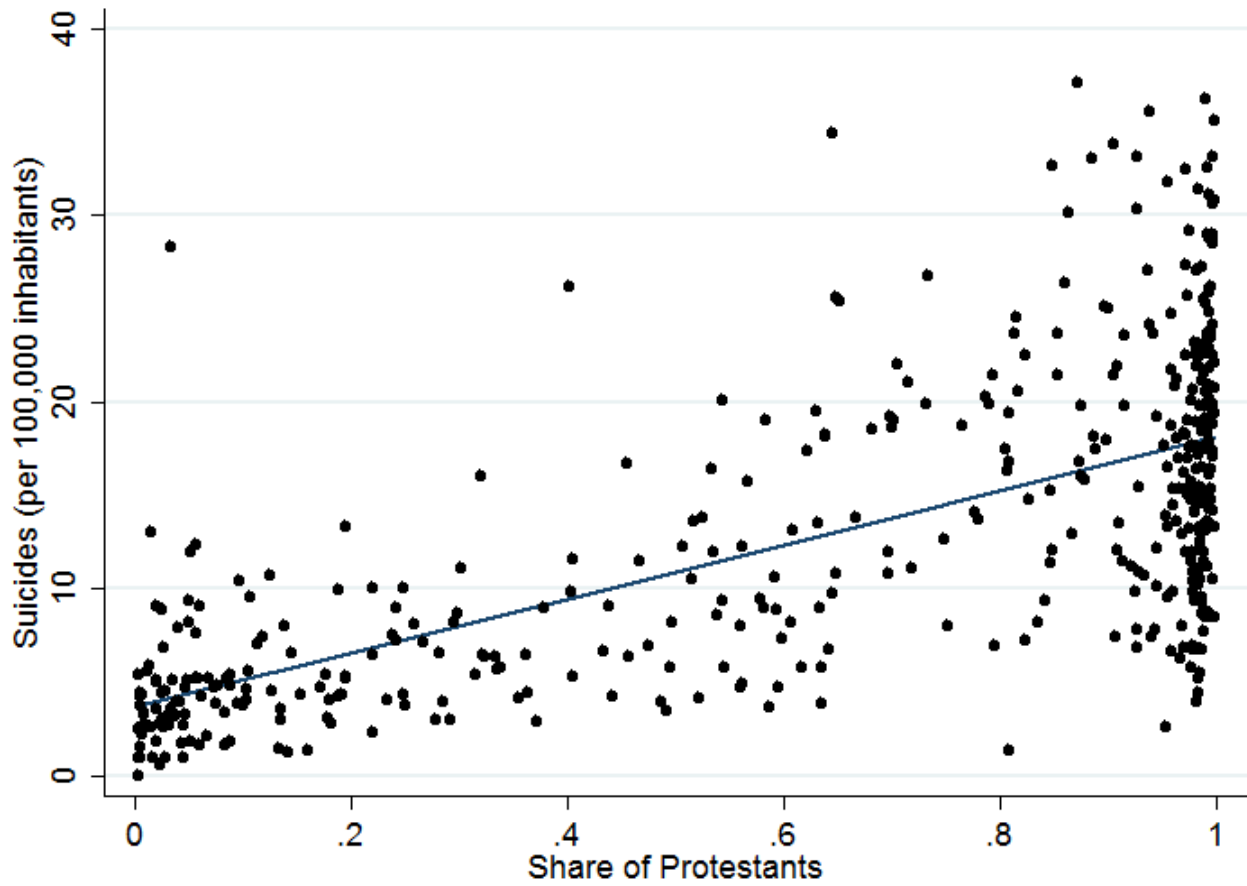
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Figure A.1: Protestantism and Suicide in Prussia, 1871



Share of Protestants 1871 and suicide rate 1869-71. County-level depiction based on 1871 Population Census and 1869-71 Suicide Statistics. See online appendix C for details.

Table A.1: Suicide Methods

	Male (1)	Female (2)	Total (3)
Hanging	63.5	43.2	59.6
Drowning	16.5	42.7	21.6
Shooting	12.4	0.2	10.1
Poisoning	2.3	7.3	3.3
Cutting throat	2.8	2.8	2.8
Plunging	0.7	1.1	0.8
Have oneself ridden over	0.6	0.3	0.6
Cutting artery	0.3	0.7	0.4
Stabbing	0.3	0.2	0.3
Inhaling gases	0.1	1.1	0.3
Strangling	0.3	0.2	0.3
Other means	0.0	0.3	0.1
Undisclosed means	0.1	0.0	0.1
Total	100.0	100.0	100.0

Suicides in the year 1869, in percent. Based on a total number of 3,187 classified suicides (2,573 male and 614 female). Source: Hilse (1871).

Table A.2: Robustness to Conditioning on Potential Non-religious Outcomes of the Reformation

Dependent variable:	Suicide rate (per 100,000 inhabitants)			
	(1)	(2)	(3)	(4)
	Share of Protestants	26.530 (4.543)***	25.279 (4.777)***	24.066 (3.876)***
Share of population < 15 years	-75.929 (24.201)***	-64.394 (24.529)***	-79.398 (18.744)***	-77.429 (18.559)***
Share of population > 60 years	134.993 (63.779)**	78.514 (59.587)	60.780 (45.364)	62.913 (46.528)
Average household size	-3.589 (1.933)*	-4.788 (1.770)***	-3.911 (1.594)**	-3.884 (1.558)**
Share of population living in towns	-3.354 (2.708)	-5.711 (4.043)	-3.615 (2.359)	-3.670 (2.394)
Share of labor force in manu. and serv. (1882)	16.196 (5.487)***	13.233 (6.259)**	14.017 (4.856)***	13.920 (4.755)***
Share of literate adults	-22.087 (7.565)***	-22.005 (7.397)***	-18.073 (6.181)***	-17.816 (5.967)***
Elementary school enrolment rate (1864)	-.360 (9.639)			
Secondary school enrolment rate (1864)	-15.571 (16.740)			
University enrolment rate (1871)	160.478 (137.851)			
ln(Income of male elementary school teachers)		1.068 (3.983)		
Income tax per capita (1877)		-.340 (.727)		
Share of day laborers (1901)		-6.276 (4.177)		
Teacher income / day laborer income			-.185 (.997)	
Number of social protests 1816-1871				.039 (.147)
Standard controls	yes	yes	yes	yes
Observations	359	426	452	452
$R^2$	.317	.338	.404	.408
F-statistic (instrument)	18.83	16.24	22.68	23.66

Instrumental-variable (IV) estimation, where share of Protestants is instrumented by distance to Wittenberg.

Heteroskedasticity-robust standard errors in parentheses: \* significance at ten, \*\* five, \*\*\* one percent.

Standard controls: share of population < 15 years, share of population > 60 years, average household size, share of population living in towns, share of labor force in manufacturing and services, share of literate adults, and a constant.

Column 1: counties in 1864 Prussian borders. Column 2: counties for which income tax data are available in 1877.

Data for Prussian counties from the 1869-71 Suicide Statistics, the 1871 Population Census, and the 1882 Occupation Census; see main text and online appendix C for details.

Table A.3: Robustness to Additional Factors

Dependent variable:	Suicide rate (per 100,000 inhabitants)						
	All counties						Stable counties <sup>a</sup>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of Protestants	25.617 (4.197)***	24.759 (3.781)***	44.907 (16.439)***	25.736 (4.166)***	17.094 (2.313)***	26.076 (3.970)***	20.570 (2.744)***
Share of females	-21.400 (27.976)	-5.420 (25.982)	-64.443 (58.531)	-28.990 (29.614)			
Share of Jews	46.201 (34.706)	52.915 (33.393)	106.483 (75.492)	59.614 (35.652)*			
Share of population born in municipality	11.725 (8.090)	10.671 (7.466)	31.418 (21.662)	5.868 (6.304)			
Share of population of Prussian origin	-66.155 (22.264)***	-62.765 (22.104)***	-61.970 (31.554)**	-50.691 (17.314)***			
Share blind (x 100)		7.160 (11.405)	-10.984 (19.749)	7.027 (11.634)			
Share deaf-mute (x 100)		-23.586 (8.696)***	-45.174 (22.702)**	-27.235 (9.588)***			
Share insane (x 100)		.758 (1.671)	-.161 (2.347)	.532 (1.715)			
Share married			-191.999 (104.487)*				
Altitude (in m)				.015 (.006)***			
Latitude, longitude and their interaction					yes		
36 dummies for years when annexed by Prussia						yes	
Standard controls	yes	yes	yes	yes	yes	yes	yes
Observations	452	452	452	452	452	452	158
R <sup>2</sup>	.389	.432	-.412	.422	.633	.547	.636
F-statistic (instrument)	31.39	36.61	5.48	34.05	134.74	27.85	25.75

Instrumental-variable (IV) estimation, where share of Protestants is instrumented by distance to Wittenberg.

Heteroskedasticity-robust standard errors in parentheses: \* significance at ten, \*\* five, \*\*\* one percent.

Standard controls: share of population < 15 years, share of population > 60 years, average household size, share of population living in towns, share of labor force in manufacturing and services, share of literate adults, and a constant.

<sup>a</sup> Subsample of counties observed with negligible boundary changes over time whose Protestant share changed by less than 2 percentage points between 1816 and 1871.

Data for Prussian counties from the 1869-71 Suicide Statistics, the 1871 Population Census, and the 1882 Occupation Census; see main text and online appendix C for details.

Table A.4: Accounting for Unpleasant Weather Conditions

Dependent variable:	OLS		IV 1st stage	IV 2nd stage
	Rainfall	Temperature	Share Protestants	Suicide rate (per 100,000 inhabitants)
	(1)	(2)	(3)	(4)
Share of Protestants				18.479 (4.729)***
Distance to Wittenberg (in 1,000 km)	329.781 (28.202)***	-1.949 (.244)***	-.538 (.165)***	
Rainfall per year (in mm)			-.0008 (.0002)***	-.006 (.007)
Temperature (average)			-.222 (.023)***	.819 (1.144)
Standard controls			yes	yes
Observations	452	452	452	452
$R^2$	.179	.120	.387	.579
F-statistic (instrument)				10.61

Instrumental-variable (IV) estimation, where share of Protestants is instrumented by distance to Wittenberg.

Heteroskedasticity-robust standard errors in parentheses: \* significance at ten, \*\* five, \*\*\* one percent.

Standard controls: share of population < 15 years, share of population > 60 years, average household size, share of population living in towns, share of labor force in manufacturing and services, share of literate adults, and a constant.

Data for Prussian counties from the 1869-71 Suicide Statistics, the 1871 Population Census, and the 1882 Occupation Census; see main text and online appendix C for details.

Table A.5: Alternative Death Causes

Dependent variable:	Suicide rate (per 100,000 inhab.)			Fatal accident rate <sup>a</sup> (per 100,000 inhab.)	Total mortality rate (per 1,000,000 inhab.)	Suicide proportion (per 1,000 deaths)
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Protestants	23.004 (3.156)***	25.521 (4.508)***	31.458 (10.407)***	3.296 (3.219)	-39.284 (15.902)**	9.265 (1.465)***
Share of population < 15 years	-82.143 (17.878)***	-70.640 (19.801)***	-21.611 (32.352)	-31.792 (34.087)	-222.030 (75.878)***	-25.914 (7.301)***
Share of population > 60 years	28.235 (36.431)	98.474 (58.792)*	166.461 (92.128)*	-344.672 (73.828)***	-973.153 (203.571)***	38.417 (17.621)**
Average household size	-4.366 (1.300)***	-2.663 (2.045)	-3.255 (2.639)	-2.546 (2.146)	-30.840 (6.952)***	-.766 (.608)
Share of population living in towns	-4.782 (2.573)*	-2.578 (2.319)	-11.070 (5.413)**	-24.169 (5.977)***	-26.797 (11.331)**	-.846 (.883)
Share of labor force in manu. and serv. (1882)	14.483 (4.813)***	12.573 (4.798)***		37.055 (8.639)***	37.787 (22.633)*	4.491 (1.896)**
Share of literate adults	-17.965 (5.770)***	-16.669 (6.112)***	-26.285 (14.807)*	-27.937 (9.976)***	-32.860 (27.855)	-6.139 (2.357)***
Fatal accident rate (per 100,000 inhabitants)	-.055 (.034)					
Number of deaths (per 1,000,000 inhabitants)	.038 (.018)**					
Employment shares in 32 sectors	yes					
Constant	60.906 (10.278)***	27.709 (21.394)	22.953 (21.747)	106.796 (21.471)***	626.268 (53.080)***	13.008 (5.026)***
Observations	452					
R <sup>2</sup>	.452					
F-statistic (instrument)	33.43					
	19.17					
	5.51					
	174.49					
	22.79					
	22.79					

Instrumental-variable (IV) estimation, where share of Protestants is instrumented by distance to Wittenberg.

Heteroskedasticity-robust standard errors in parentheses: \* significance at ten, \*\* five, \*\*\* one percent.

<sup>a</sup> Column 4 includes a dummy for East Prussia to account for its high fatal accident rates due to freezes and sailor drownings.

Data for Prussian counties from the 1869-71 Suicide Statistics, the 1871 Population Census, and the 1882 Occupation Census; see main text and online appendix C for details.

Table A.6: Religious Concentration

Dependent variable:	Suicide rate (per 100,000 inhabitants)		
	All counties	Counties with share of Protestants	
	(1)	<2% or >98% (2)	<.1% or >99.9% (3)
Share of Protestants	24.739 (4.029)***	15.443 (3.319)***	17.574 (7.766)**
Share of population < 15 years	-83.074 (18.318)***	-54.081 (30.327)*	-117.200 (70.141)*
Share of population > 60 years	69.192 (46.899)	80.997 (56.678)	81.524 (216.141)
Average household size	-3.350 (1.710)*	-4.717 (2.135)**	-3.911 (3.315)
Share of population living in towns	-4.611 (2.542)*	-1.672 (6.618)	-34.468 (25.076)
Share of labor force in manu. and serv. (1882)	13.129 (4.573)***	16.598 (7.463)**	52.275 (9.329)***
Share of literate adults	-15.216 (5.386)***	4.628 (8.055)	-39.946 (23.627)*
Herfindahl index of religious distribution	-7.577 (3.270)**		
Constant	54.062 (12.111)***	29.687 (19.075)	85.792 (45.938)*
Observations	452	142	33
$R^2$	.400	.623	.838
F-statistic (instrument)	24.17	17.72	2.39

Instrumental-variable (IV) estimation, where share of Protestants is instrumented by distance to Wittenberg.

Heteroskedasticity-robust standard errors in parentheses: \* significance at ten, \*\* five, \*\*\* one percent.

Data for Prussian counties from the 1869-71 Suicide Statistics, the 1871 Population Census, and the 1882 Occupation Census; see main text and online appendix C for details.



Table A.7: Suicide Rates by Individual-Level Religion and Gender

	Suicide rate (per 100,000)			Number of observations		
	Protestant (1)	Catholic (2)	Total (3)	Districts (4)	Prot. suicides (5)	Cath. suicides (6)
Prussian total	18.4	6.5	14.1	25	2127	426
By gender						
Male	30.3	11.3	23.4	25	1718	359
Female	6.9	2.0	5.4	25	409	67
By share of Protestants in the district						
0% - 15%	17.2	4.0	5.3	5	46	105
15% - 40%	17.5	4.7	7.7	2	65	56
40% - 60%	16.4	7.9	12.4	5	356	150
60% - 85%	19.6	14.3	18.4	4	437	93
85% - 100%	18.7	14.4	18.6	9	1223	22

Suicide rates (per 100,000 people in the sub-group) in the year 1869. Based on a total count of 2,553 Protestant and Catholic suicides in the 25 (out of 35) Prussian districts with cross-tabulated data. Source: Hilde (1871).

Table A.8: Descriptive Statistics, Prussia 1816

	Mean (1)	StdDev (2)	Min (3)	Max (4)
Suicide rate (per 100,000 inhabitants)	6.50	5.06	.00	26.06
Suicide rate males (per 100,000 inhabitants)	10.52	8.28	.00	47.50
Suicide rate females (per 100,000 inhabitants)	2.69	2.88	.00	22.42
Suicide proportion (per 1,000 deaths)	2.30	1.90	.00	8.82
Share of Protestants	.59	.41	.00	1.00
Distance to Wittenberg (in 1,000 km)	.32	.15	.00	.73
Share of population < 15 years	.36	.03	.26	.46
Share of population > 60 years	.07	.01	.04	.11
Share of population living in towns	.12	.21	.00	1.00
Public buildings (per 100 inhabitants)	.33	.38	.00	2.09
School enrollment rate	.59	.20	.02	1.10
Fatal accident rate (per 100,000 inhabitants)	42.96	16.73	14.01	123.54
Fatal accident proportion (per 1,000 deaths)	15.39	6.77	4.23	54.90

Suicide rates are average annual rates in 1816-21. Data for 306 Prussian counties from the 1816-21 Suicide Statistics and the 1816 Population Census; see main text and online appendix C for details.

Table A.9: Protestantism and Suicide in Prussia 1816: OLS Estimates

Dependent variable:	Suicide rate (per 100,000 inhabitants)					
	All (1)	Males (2)	Females (3)	All (4)	Males (5)	Females (6)
Share of Protestants	7.221 (.533)***	11.065 (.899)***	3.605 (.324)***	4.735 (.524)***	7.341 (.879)***	2.232 (.341)***
Share of population < 15 years				-36.224 (9.772)***	-61.949 (16.803)***	-12.448 (6.121)**
Share of population > 60 years				-84.322 (18.091)***	-134.666 (31.264)***	-34.774 (12.077)***
Share of population living in towns				5.978 (1.302)***	10.974 (2.452)***	1.680 (.815)**
Public buildings per capita				2.529 (.659)***	2.488 (1.019)**	2.584 (.761)***
School enrollment rate				3.135 (1.009)***	5.396 (1.760)***	1.070 (.697)
Constant	2.262 (.244)***	4.023 (.416)***	.573 (.149)***	18.961 (4.593)***	32.135 (7.980)***	6.485 (2.894)**
Observations	306	306	306	306	306	306
$R^2$	.342	.300	.263	.509	.468	.405

Ordinary least squares (OLS) estimation.

Heteroskedasticity-robust standard errors in parentheses: \* significance at ten, \*\* five, \*\*\* one percent.

Data for Prussian counties from the 1816 Census; see main text and online appendix C for details.

Table A.10: Denomination and Social Cohesion in Germany: Individual-Level SOEP Data, 2003

	Frequency of respective activity		Number of observations
	at least once a week (1)	at least monthly (2)	
Attendance of church, religious events			
Protestant	.048	.163	6790
Catholic	.201	.353	6004
No religion	.003	.007	6189
Mutual visits of family members or relatives			
Protestant	.478	.789	6784
Catholic	.506	.795	6002
No religion	.415	.744	6184
Mutual visits of neighbors, friends, or acquaintances			
Protestant	.472	.785	6787
Catholic	.456	.775	6014
No religion	.411	.747	6203
Going out for food or a drink (café, bar, restaurant)			
Protestant	.208	.509	6804
Catholic	.242	.541	6029
No religion	.211	.496	6216

Data: German Socioeconomic Panel (SOEP) 2003; see main text and online appendix C for details.