

# Protestantism and Effort Expenditure on the Battlefield: Soldier-Level Evidence from World War II\*

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## Abstract

Can religious beliefs explain effort provision in salient settings? We track 15,421 soldiers in Nazi Germany's armies from the start of World War II in September 1939 to the surrender of Germany in May 1945. We proxy effort with military decorations, promotions, injuries, and fatalities. Our cross-sectional and soldier-by-month panel (N = 659,189) results indicate that Protestants outperform Catholics, and Calvinists outperform Lutherans. We also find that Calvinists, whose belief system favours early resolution of uncertainty about salvation, exert more effort early on in the war. Differences in commitment to the Nazi ideology and discrimination against Catholic soldiers do not appear to drive our results. Our results suggest an important role for the horizontal transmission of work ethic-enhancing norms of behaviour: Catholics from historically Protestant districts exert more effort than Catholics from Catholic districts.

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# 1 Introduction

On October 31, 1517, Catholic priest and University of Wittenberg theologian Martin Luther supposedly posted the Disputation on the Power of Indulgences, better known as the Ninety-five Theses, to the door of the All Saints' Church in Wittenberg. Luther wrote the Disputation in response to the then-widespread sale of Church indulgences. Through this practice, churchgoers could reduce time spent in Purgatory by purchasing an indulgence, or forgiveness, directly from the Church. This practice would give rise to the saying: "Wenn die Münze im Kästlein klingt, die Seele in den Himmel springt" (as soon as the coin in the coffer rings, the soul from purgatory springs).<sup>1</sup>

In the Ninety-five Theses, Luther contends that the sale of indulgences is contrary to the gospel. Instead, Luther emphasizes the necessity to truly seek repentance and pursue one's calling (McCleary and Barro, 2006; Barro and McCleary, 2019). Luther viewed work as the God-given purpose of humans (Barro and McCleary, 2019), such that working diligently in one's occupation fulfils the divine plan. This propensity to work hard, found in Luther's teachings as well as John Calvin's and John Wesley's, would later be described by Max Weber (1904) as the root cause of the economic prosperity of Protestant regions.<sup>2</sup> Considering that religious beliefs can engender forms of action with important impacts in the economic sphere (Davie, 2007, p. 29), and that work ethic can have lasting impacts on material well-being (Congleton, 1991; Bénabou and Tirole, 2006a), Max Weber's assertion that a distinctly Protestant work ethic leads to higher economic development has become one of the most debated claims across the social sciences. Critics of Weber's thesis point out that differences in economic development between Catholic and Protestant regions are, at various points in history, either non-existent (Cantoni, 2015; Delacroix and Nielsen, 2001), explainable by differences in human capital (Becker and Woessmann, 2009), or simply inaccurately described (Tawney, 1926).

In this paper, we take a step back from the Protestantism – development debate and focus on the following question: does Protestantism lead to higher effort exertion? We view this as an important question for social science, the answer to which can illuminate the Protestantism – development debate. We study this question by drilling down to the smallest possible unit of observation, the individual, in a uniquely salient life-and-death setting: the battlefields of World War II, where higher effort can have fatal consequences. Using a monthly panel of approximately 660,000 observations, we follow over 15,000 soldiers from Hitler's armies from the start of the war in September

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<sup>1</sup>The saying is also sometimes attributed to Johann Tetzel, a contemporary of Luther's, who was well-known for practicing the sale of indulgences. The sale of indulgences was likely formally endorsed by the Roman Catholic Church; see Placher (1983, p. 183) and Noll (2011, p. 31) for a discussion.

<sup>2</sup>For a short historical discussion regarding how work has been viewed since the ancient Greeks, see Schaltegger and Torgler (2010).

1939 to the unconditional surrender of Germany in May 1945. We measure effort at both the intensive and extensive margins, using military archival data on the injuries, promotions, military decorations, and deaths of soldiers over the course of the war. Our results indicate that Protestant soldiers outperform Catholics on all outcomes. We also find differences among the two major strands of Protestantism: Calvinist soldiers exert more effort, but also earlier effort than Lutherans. This is consistent with the notion, which dates back to Weber, that Calvinist individuals feel anxious about salvation. Calvinists interpret success in earthly matters as a sign of grace, and therefore expend effort on work in order to resolve the uncertainty over their salvation status. Our results are in line with the theoretical predictions of [Alaoui and Sandroni \(2018\)](#).

This paper's main result, namely that Protestants appear to work harder than Catholics, cannot be explained away by differences in commitment to the Nazi ideology, risk preferences, human capital, or discrimination against Catholic soldiers, among other competing interpretations. Our work contributes to the emerging body of evidence on Protestantism and work ethic. [van Hoorn and Maseland \(2013\)](#) find that Protestants' subjective well-being is more adversely affected by unemployment. [Spenkuch \(2017\)](#) documents that Protestants work longer hours. [Basten and Betz \(2013\)](#) show that Protestantism affects referenda votes for leisure, suggesting that Protestants are more effort-oriented than Catholics. [Schaltegger and Torgler \(2010\)](#) find that religiosity is linked to work ethic, but also that work ethic is influenced by education. [Bryan et al. \(2021\)](#) find evidence suggesting that Protestant religiosity increases grit, which is connected to work ethic.

Our contributions, relative to existing work, are as follows. First, if one thinks of preferences as deep-lying decision-making parameters which are influenced by religious denomination, then owing to the wartime setting, we should observe behaviour that is closely related to preferences. In other words, if Protestantism has any 'bite' on work effort, we are much more likely to observe its effects in a setting where effort has very serious consequences, as is the case in wartime. Thus, we depart from previous studies which use stated preferences, like [van Hoorn and Maseland \(2013\)](#) and [Spenkuch \(2017\)](#). Second, while the econometrician does not normally observe effort, we rely on the military processes that govern the bestowal of awards and promotions to measure, if not effort directly, at least its observable consequences. These processes are well-codified and, we argue, likely to reflect true effort. A natural concern is that these military processes may have been biased in favour of Protestants; we test for this possibility extensively and find no evidence to suggest any such bias. Moreover, we also find differences in rates of death and injury, which are likely much less dependent on bureaucratic discretion. Third, we drill down to the smallest level possible of observation, the individual, which allows us to improve on the aggregate-level analyses of [Basten and Betz \(2013\)](#), [Becker and Woessmann \(2009\)](#), and [Cantoni \(2015\)](#), among others.

For this analysis, we rely on a detailed soldier-level dataset from the German Federal Archives ([Rass, 2003](#)), which we describe extensively below.

In addition to the above literature on the Protestant work ethic hypothesis, our work is related to three other strands of research. The first investigates the interplay of religion and economic, social, and political outcomes,<sup>3</sup> with particular reference to the role of the Protestant Reformation. Early inquiries into this field include works by Adam Smith, Karl Marx and Max Weber, while modern studies emerged with the work of [Azzi and Ehrenberg \(1975\)](#), followed by [Iannaccone \(1991\)](#), [Finke and Stark \(1992\)](#), [Ekelund et al. \(1996\)](#), [Iannaccone \(1998\)](#), [Stark and Finke \(2000\)](#), and [McCleary \(2011\)](#). The past decade has witnessed particular interest in the causes and consequences of the Reformation, starting with [Becker and Woessmann \(2009\)](#), and including salient contributions by [Cantoni \(2012, 2015\)](#), [Rubin \(2014\)](#), [Becker and Woessmann \(2018\)](#), [Becker and Pascali \(2019\)](#), [Nunziata and Rocco \(2016, 2018\)](#), and [Cantoni et al. \(2018\)](#) (see [Becker et al. 2016](#) for a survey).

Second, we contribute to a growing body of micro-level economic studies in wartime settings, especially in the context of Nazi Germany. A related paper by [Ager et al. \(2022\)](#) examines status competition among *Luftwaffe* pilots during WWII. They present robust evidence that bestowing recognition on air force pilots improves the performance of former peers, but also results in higher death rates for less skilled peers. [Geerling et al. \(2016\)](#) study the effect of ideological commitment on judicial decision-making in the Nazi People's Court. [Spenkuch and Tillmann \(2018\)](#) and [King et al. \(2008\)](#) study religious differences in the 1932 German election. [Ferguson and Voth \(2008\)](#) show that Nazi-linked firms outperformed unconnected firms on the stock market in the 1930s, suggesting a sizable role for political connections. [Voigtländer and Voth \(2015, 2025\)](#) study the effect of Nazi indoctrination in shaping antisemitic attitudes, and the impact of public expenditure on pro-Nazi voting, respectively.<sup>4</sup> Third, we contribute to the growing literature on the economics of awards (for an overview, see [Frey and Gallus 2017b,a](#)). Awards are widely used in all arenas of society, from the army, to the arts, media, fashion, sports, academia and the business world ([Frey and Gallus, 2017b](#)).

However, [Frey and Gallus \(2017b\)](#) point out that “[d]espite the importance of awards in society, research in social science has largely disregarded them” (p. 193). Awards are designed to honour achievements and therefore a key topic of interest among economists has been to study the performance or status effects of awards ([Besley and Ghatak, 2008](#); [Azoulay et al., 2014](#); [Chan et al., 2014](#); [Borjas and Doran, 2015](#); [Neckermann et al., 2014](#))

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<sup>3</sup>See also [Barro and McCleary \(2003, 2005\)](#), [Schaltegger and Torgler \(2010\)](#), [Akçomak et al. \(2016\)](#), [Ager and Ciccone \(2017\)](#), [Michalopoulos et al. \(2016\)](#), [Botticini and Eckstein \(2007\)](#), [Johnson and Koyama \(2017\)](#), [Finley and Koyama \(2018\)](#), [Hornung \(2014\)](#), [Kuran \(2004\)](#), [Chuah et al. \(2016\)](#), [Rubin \(2017\)](#), [Iyigun \(2008\)](#), [Nunn \(2010\)](#), and [Pascali \(2016\)](#).

<sup>4</sup>See also [Akbulut-Yuksel and Yuksel \(2015\)](#), [Okoye et al. \(2019\)](#), [Waldinger \(2010, 2012\)](#), [Satyanath et al. \(2017\)](#), [Voigtländer and Voth \(2012\)](#), [Geerling et al. \(2015\)](#).

but “the literature on discretionary awards given ex post to outstanding performance is still in its beginnings” (Frey and Gallus, 2017b, p. 195). Finally, our analysis looks beyond people’s daily interactions in families, neighbourhoods, or organizations, as these behaviours offer only limited understanding of cultural values in extreme situations. Most economics research seeks to capture behaviour under “normal” conditions and thus provides no clear evidence on how or whether its results would apply in extreme or difficult environments. Our analysis builds on recent work (Costa and Kahn, 2003; Frey et al., 2010; Elinder and Erixson, 2012; Savage and Torgler, 2015) into decision-making under stress. A key advantage of exploring life-and-death situations is that preferences are clearly revealed.

This paper is organized as follows. Section 2 discusses the historical background of Hitler’s armies as well as that of Protestantism in Germany. The construction of our dataset is described in detail in Section 3. Section 4 presents our empirical approach and main results. In Section 5, we examine competing explanations to the Protestant work ethic which may also account for the observed differences in effort. In Section 6, we study the mechanisms through which the Protestant ethic may operate. Section 7 offers some concluding remarks.

## 2 Background

### 2.1 Work Ethic

In recent years, explanations for Protestant prosperity have emerged that do not rely on a work ethic argument. Becker and Woessmann (2009) develop and test a human capital theory of Protestantism, using 19th century Prussian county-level data, and show that literacy accounts for most of the development gap between Protestant and Catholic areas. Cantoni (2015) casts further doubt on the Weber hypothesis, and finds no effect of Protestantism on city growth during 1300–1900. The lack of evidence in favour of a direct link running from Protestantism to macroeconomic performance therefore raises the question of whether a distinct Protestant work ethic exists in the first place. This is the question we concern ourselves with in this paper.

Why might one expect Protestantism to affect work ethic? Martin Luther’s teachings emphasized the necessity of dedicating oneself to work. McCleary (2011, p. 4) summarizes the theological argument as follows: “God demanded of each person a lifetime of works that were ordered by morality (...). The quality of the action, Christian conduct, was defined by a rational system of morality and became the standard by which to measure the glory of God. Thus, salvation by work (daily work, not ascetic activities of monastic communities) was organized and rationally justified in an impartial moral system that applied to the activities of one’s daily life”. Thus, Protestants in

the Lutheran tradition work because that is God's purpose for humans. Duly fulfilling one's obligations is God-pleasing; shirking is not. Protestant religious belief is therefore expected to engender stronger preferences for work. As [Iyer \(2016, p. 407\)](#) also notes, "spiritual grace from religion is attained by demonstrating temporal success in one's calling through diligence, discipline, self-denial, and thrift". John Calvin's view on work is similar to Luther's: "we ought not to vow anything which will hinder us in fulfilling our vocation; as if the father of a family were to vow to leave his wife and children, and undertake other burdens; or one who is fit for a public office should, when elected to it, vow to live private" ([Calvin, 1845, p. 1040](#)). Calvin, however, taught that salvation was fully pre-ordained by God; in his view, only a predestined spiritual elite would be saved, regardless of worldly actions. Thus, one may wonder why Calvinists work, if doing so does not affect one's prospects of salvation. First, work in Calvinism is a means of finding out about one's salvation status. Success in earthly endeavours is interpreted as a sign that one is saved. Thus, Calvinists, facing anxiety about salvation, work in order to learn whether they are graced or damned ([Barro and McCleary, 2019](#)). Second, a Calvinist individual works in order to signal to others that she is part of a spiritual elite, with the intention of receiving "positive behaviour from others (...), (including) everything from respect or generosity to basic civil liberties" ([Glaeser and Glendon, 1998, p. 430](#); see also [Levy and Razin, 2014](#) and [Bénabou and Tirole, 2006b](#) for models of social and self-signalling).

In sum, the adherents to both major strands of Protestantism found in interwar Germany are expected to exert more effort on work. A small number of studies have found evidence consistent with such a link. [Basten and Betz \(2013\)](#) exploit a natural experiment in 16th century Switzerland, where Protestantism was imposed by conquest in Vaud, but not in adjacent Fribourg. They find that the adoption of Protestantism left persistent differences in leisure time across Protestant and Catholic areas. [van Hoorn and Maseland \(2013\)](#) find that Protestants' subjective well-being is more adversely affected by unemployment, relative to members of other religious groups, which suggests that Protestants place an intrinsic value on effort. [Cavalcanti et al. \(2006\)](#) show theoretically that differences in work ethic can explain why Northern Europe industrialized earlier than Southern Europe. Most closely related to this paper is [Spenkuch \(2017\)](#), who shows that Protestants report working longer hours than Catholics in contemporary Germany. We depart from [Spenkuch \(2017\)](#) by studying the question in a more salient setting, which we argue allows us to more closely observe revealed preferences for effort across denominations, if those differences exist. A recent paper by [Bryan et al. \(2021\)](#) presents a rare opportunity to evaluate the short-term effects of randomized exposure to Protestantism. They conduct an evaluation of Protestant missions in the contemporary Philippines and find that Protestant religiosity likely increased grit in treatment recipients. [Bryan et al.'s \(2021\)](#) mechanism is thus consistent with Weber's

hypothesis. A sizable literature on Protestantism and effort exists in sociology and psychology. The literature has focused on the achievement motivation and occupational success of different religious groups (for an overview see [Hood et al. 2009](#)). Some selected studies from these literatures are reviewed in the Appendix. An important shortcoming of the sociology and psychology literatures is that Protestantism is taken as given, such that the effect of Protestantism is not well-identified. We address this shortcoming in the next section.

## 2.2 *Cuius Regio, Eius Religio*: The Peace of Augsburg as a Natural Experiment

Religion is not normally randomly assigned. In the canonical models of [Azzi and Ehrenberg \(1975\)](#) and [Iannaccone \(1988, 1992\)](#), an individual endogenously selects into or out of a particular religious denomination based on her own cost-benefit analysis. Thus, simply comparing effort levels across Catholics and Protestants tells us little about the causal effect of religious denomination on effort expenditure.

German history offers a unique natural experiment which allows us to disentangle the causal effect of Protestantism. In the early 16th century, the Holy Roman Empire, with Emperor Charles V at its helm, was a federation of territories and cities, each ruled more or less autonomously by local princes and dukes. Only four years after the start of the Reformation in 1517, Martin Luther was excommunicated by Pope Leo X and outlawed by Emperor Charles V's Edict of Worms. Protestant ideas, however, were spreading, and several princes began forming military alliances along religious lines. The largest and most threatening to the Empire of these alliances was the Schmalkaldic League. In 1546, the Schmalkaldic War began when Ernestine Saxony, ruled by Protestant Duke John Frederick, was attacked by neighbouring Catholic Duke Maurice of Albertine Saxony and Emperor Charles V. Although the war was over by May 1547, a second Schmalkaldic War broke out in 1552. This war would end with the Peace of Augsburg in 1555.

To bring Catholic – Protestant warfare to an end, the Peace of Augsburg formally recognized Protestant religion. In doing so, the *Cuius regio, eius religio* (whose realm, his religion) principle was established. Under this precept, each local ruler was free to choose the religion practiced in his city or territory. Indeed, the only religion allowed in a territory was the one chosen by the local ruler. Rulers may, of course, choose a religion for strategic political reasons; once a religion is chosen, local rank-and-file subjects are required to follow suit. The *Cuius regio, eius religio* precept in the 1555 Peace of Augsburg therefore makes religious denomination of rank-and-file German soldiers on the eve of World War II as good as randomly assigned. [Spenkuch \(2017\)](#) shows that the religious landscape of Germany has changed little between 1555 and today. This stylized fact is a direct consequence of the *Cuius regio, eius religio* clause: the adoption

of a religion in the Middle Ages was likely unrelated to the personal characteristics of local peasants, who had no choice but to attend the only church their local lord allowed. Religious denomination was then passed down from generation to generation until the present. Therefore, on the eve of World War II, we can interpret a soldier's religious denomination as exogenous and resulting from the religion his ancestors were forced into, approximately four hundred years earlier, by a choice made by their local ruler. We are thus able to bypass endogeneity concerns regarding self-selection into religious denominations.

## 2.3 Military Setting: The *Wehrmacht*

### 2.3.1 Combat motivation and cohesion

The German army was well-known to be highly organized and adaptable (Nobel, 2003).<sup>5</sup> The doctrinal manual *Die Truppenführung* (Troop Leadership) begins with the opening paragraph (Murray, 1999, p. 32):

- “1. The conduct of war is an art, depending upon free, creative activity, scientifically grounded. It makes the highest demands on individuals.
2. The conduct of war is based on continuous development. New means of warfare call forth ever changing employment.
3. Situations in war are of unlimited variety. They change often and suddenly and are rarely discernible at an early point. Incalculable elements are often of great influence. The independent will of the enemy is pitted against ours. Frictions and mistakes are an everyday occurrence.”

The German ground force consisted of two different armies, namely the *Wehrmacht* (national army) and the *Waffen-SS*. The latter was a defence squad that began as the private army of the Nazi party and personal bodyguard squad of Hitler. It developed a reputation as an elite force of Germany, responsible for many of the atrocities committed during the war (for a discussion, see Traversa 1995).

Crucially, military environments, and the German military in particular, are engineered to create new identities for soldiers, with the objective of encouraging maximum effort from all soldiers, regardless of religious denomination. Murray (1999, p. 3) highlights that the “German military possessed a devotion to duty (and) a seriousness about tactics”. Akerlof and Kranton (2005, pp. 9–10) point out that economists' current picture of organizations and work incentives does not work in military settings, where non-economic motives and identity generation towards the goals of the army dominate:

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<sup>5</sup>For a discussion of the military effectiveness of the German military see also Krepinevich (1994). Millett et al. (1986) also emphasized the unparalleled operational flexibility.

“This change in identity is a way to motivate employees, different than incentives from monetary compensation. Indeed, a change in identity is the ideal motivator if, as in the army, the effort of a worker is either hard to observe or hard to reward (...) which shows a missing motivation in economists’ current depiction of organizations, suggests a need to modify our models, just as physicists’ discovery of “missing matter” has led them to alter their model of the universe”. Historical evidence suggests that the change in identity, as suggested by Akerlof and Kranton, was successful. The German military during World War II is widely thought to have had greater cohesion than most armies. Historian Omer [Bartov](#) (2001, p. 99) documents that the army remained united until the very end of the war, even when it was clear that the war would eventually be lost. This was true even on the Eastern Front, where conditions were notoriously atrocious: “(It) is difficult to find another example of an army which fought so long under such terrible conditions and yet showed no significant signs of rebellion or breakup such as were observed, for example, among German and French troops towards the end of the First World War” (p. 99). This high degree of cohesion is also noted by [Shils and Janowitz](#) (1948). They stress that the German military maintained its organizational integrity and fighting effectiveness, with very small desertion rates even in the later stages of the war. [Shils and Janowitz](#) (1948) also note that desertions were usually acts of men who had difficulties in personal adjustment. Thus, it seems unlikely that soldiers of different religions had varying degrees of commitment to the German military. The historical record shows no evidence of widespread desertion, much less of religion-specific desertion.

To be sure, the creation of a group identity in Hitler’s armies, and in armies in general, is deliberate. The army is what social psychologists refer to as a total institution ([Neitzel and Welzer, 2012](#); [Goffman, 1973](#)). “Such institutions claim total dispensation over the individual. Individuals (...) lose control over their own identities (...) Total institutions function as hermetically sealed worlds (...) (and) establish a specific form of socialization, in which group norms and responsibilities have far more influence on individuals than under normal social conditions” ([Neitzel and Welzer, 2012](#), p. 16).<sup>6</sup>

Commitment to the Nazi ideology does not appear to have been a driving force behind the *Wehrmacht*’s cohesion, although we investigate this possibility empirically below. While the role of Nazi ideology in the *Wehrmacht* has been debated substantially over the years ([Bartov, 1989](#); [Goldhagen, 1996](#); [Browning, 1992](#); [Shils and Janowitz, 1948](#); [Neitzel and Welzer, 2012](#)), the best available evidence that we are aware of suggests ideology was relatively unimportant. In a unique study, [Neitzel and Welzer](#) (2012) examine approximately 40,000 pages of transcripts from secretly recorded conversations between German prisoners of war. They find little to suggest soldiers were interested

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<sup>6</sup>[Costa and Kahn](#) (2003) also document the central role of cohesiveness in the Union Army during the American Civil War.

in ideological matters. In their words, “Most of the soldiers are scarcely interested in ideology, politics, world orders, and anything of that nature. They wage war not out of conviction, but because they are soldiers, and fighting is their job” (p. 6); “Indeed, apart from a small percentage of ideological warriors, one central characteristic of soldiers is their distance from and disinterest in the causes that led to their present situation” (p. 338). Thus, Neitzel and Welzer’s findings support [Shils and Janowitz’s](#) (1948, p. 281) interpretation of history. The latter authors argue that the unity of the German Army was not sustained by the National Socialist political convictions of its members. Rather, soldiers, as members of a social group, were keen to be accepted and esteemed by their fellow group members: “For the ordinary German soldier the decisive fact was that he was a member of a squad or section which maintained its structural integrity and which coincided roughly with the social unit which satisfied some of his major primary needs”. The attachment is also relevant as when soldiers are isolated from their usual peacetime social network, they come to depend more and more on the military primary group.

To control the behaviour of soldiers, the Nazi regime implemented draconian measures. The policies of the Court of Honour of the Imperial Army were re-established, which allowed for soldiers to be suspended from duty simply on the grounds of dishonourable attitudes ([Shils and Janowitz, 1948](#), p. 294). Soldiers were required to take an oath that they would not desert or surrender, and upheld that oath due to the fear of retaliation by German police against their family if the soldier was reported to be a deserter. However, [Shils and Janowitz](#) indicate that for a soldier, of “equal significance was his desire to maintain his pride in having been a good soldier who had done his duty” (p. 296). Propaganda among the troops was used for practical reasons, in order to keep the soldiers convinced that “they were fighting for a ‘good cause’ and defending their *Volk* (people) from the ‘devilish’ plans of their enemies” ([Bartov, 1989](#), p. 207).

Along with propaganda and group identities, the Nazi regime did not shy away from using religion to motivate soldiers. Efforts to use religious ‘priming’ seemed to apply equally to Catholic and Protestant soldiers. In wartime, each military division had exactly one Catholic priest and one Protestant parson ([Bartov, 2001](#)). The closer soldiers were to the front or danger, the more they needed spiritual encouragement “preferably in the form of someone who would repeat again and again that their dying would be in the service of a higher and profound cause” ([Bartov, 2001](#), p. 92). The high demand for religious booklets and the attendance of religious services indicated the religious need among the troops for spiritual care and it was acknowledged that “faith is still now as always one of the most important preconditions for battle” ([Bartov, 2001](#), p. 93). While it is well known that Hitler intensely disliked the Catholic Church, he also understood the motivating value of religion and sought out religious soldiers. [Faulkner Rossi](#) (2015, p. 94) writes: “As early as April 1933 Hitler said to a German Catholic bishop,

'Trouble with Poland is on the horizon. We need soldiers, devout soldiers. Devout soldiers are the most valuable. They put in everything [they have].'" Zahn (1969, p. 11) also finds that the Catholic Church promoted "faithful performance of [military] duty (as) a moral obligation" and "Catholics were encouraged as Catholics to participate in the various collections organized to meet the emergency needs of the war economy and to take special pride in the patriotism and loyalty demonstrated by the religious community in these contributions and sacrifices" (p. 18). In sum, there is widespread agreement that units, as social groups, were cohesive. There is little evidence that soldiers fought out of political-ideological considerations. To the best of our knowledge, there is also no historiographic evidence that Protestants and Catholics held differing levels of commitment to army life, nor is there evidence that they were treated differently while on duty, although we will return to these considerations empirically. These are natural questions to ask in light of recent work: Protestants were more likely to vote for the Nazi party in 1933 (Spenkuch and Tillmann, 2018), and more likely to commit antisemitic acts in the interwar period (Becker and Pascali, 2019). For now, it is worth mentioning that the Joseph Goebbels-led Nazi propaganda apparatus was used to great effect to federate Germans against the purported necessity to defend the "purity" of German blood from the out-groups and common enemies of the German people (Jews and Bolsheviks). Notions of *Volk* (people), *Vaterland* (fatherland), and *Heimat* (a German concept denoting the bond between an individual and a social unit) were "major components of the total complex of patriotic and nationalistic values underlying the commitment to the war" (Zahn, 1969, p. 14). Catholics, like other Germans, were all exhorted to fight to recover the supposed past greatness of Germany (p. 14), whose national pride had been damaged in the aftermath of World War I. We now turn to military awards as a key lever of the motivation in Hitler's armies.

### 2.3.2 Awards

Awards and decorations are important in many organizations, and even more so in the military (Besley and Ghatak, 2008; Frey, 2006, 2007; Frey and Gallus, 2017b). The tasks to be performed are unpredictable and cannot be contracted ex ante (Frey, 2006, 2007) and awards convey appreciation and recognition, establishing a special relationship to the donor and enhancing social status (Frey and Gallus, 2017b). The *Wehrmacht* used awards as incentives (Frey, 2007), and awards held a high symbolic value. The German armed forces used a large number of different awards, aiming to increase the motivation to perform.

The military environment offers some key conditions for award bestowal. First, it is difficult to formulate and monitor work effort. On a battlefield it is impossible for the High Command to monitor whether every individual soldier is doing exactly what they

are ordered. Thus, awards aimed at increasing motivation are likely to be effective in this setting. There is evidence that this was indeed the case. [Michaelis \(2007, p. 9\)](#) writes: “That soldiers were honoured and motivated by awards needs no further explanation.” German awards were designed to be displayed for all to see, especially in battle. Soldiers could request dress-down versions of their awards designed to be worn with civilian clothing ([Michaelis, 2007, p. 10](#)). German soldiers cared about the public recognition awards conferred. An Estonian volunteer remarks: “For us Estonians it was understood to defend our home country. We did not want any awards – we wanted freedom! We often had to grin when we saw our German comrades counting how many attacks they still needed to receive the Close Combat Clasp” ([Michaelis, 2007, p. 8](#)). It is thus very clear that German soldiers cared about awards enough to count how far they were, in terms of performance, from receiving a given award. German soldiers thus appear to have been willing to put themselves in harm’s way to earn an award, suggesting awards were effective in increasing motivation. This quote illustrates another important point, which we will return to in [Section 3.3](#): the award process was governed by clear rules, leaving little room for managerial discretion.

Second, the large number of soldiers increases the incentive to use symbolic rather than financial awards. For example, it would have been prohibitively expensive to provide financial rewards for the over 5,000,000 individuals who received Iron Crosses in WWII. “The medals and awards, as opposed to promotions, money or other possessions, were an extraordinarily cheap alternative for the state. The bulk of the German awards only cost one or two Reichsmark!” ([Michaelis, 2007, p. 9](#)). Third, the principal (in this case the leadership), was able to control the supply of the award. When a soldier was recommended for an award, that recommendation went to Hitler’s Award Office, which was notoriously effective at controlling the process. The Award Office exercised iron-fisted control over the distribution of awards: Hitler and the Reichschancellor had the primary right to present awards and honours: “Orders and Decorations can only be bestowed by the Führer and Reichschancellor. Further decisions will belong only to the Führer and Reichschancellor” (Paragraph 3, Section 1 of the Statute of 1 July 1937). In sum, all of these conditions are likely to have made the German military a ripe environment for an effective awards program.

## 3 Data

### 3.1 Sample Composition

Our dataset comes from military log books and personnel records housed at the German Federal Archives (*Bundesarchiv*) in Berlin ([Rass, 2003](#)). The extensive record-keeping and exceptional statistical capacity of Germany give us a plethora of information for

most soldiers in the dataset. Upon joining the army, civilian records were routinely recorded in soldier personnel files, including demographic data, passport photos, degrees, school certificates, and profession, and entered into the soldier's service record book (*Wehrstammbuch*). During the war, service record books were used to record information about awards, promotions, injuries, and squad transfers, among other variables, and, importantly, were continuously updated throughout the war. The *Wehrstammbuch* at the end of the war therefore provides an accurate depiction of the soldier's tenure in the army. The information in the *Wehrstammbuch* is complemented using other soldier-specific records, including paybooks (*Soldbuch*) and registration booklets (*Wehrpaß*). These different data sources were linked using last name, first name, and birth date as matching parameters. Appendix [Figure A.1](#) provides examples of the documents digitized by [Rass \(2003\)](#).

An estimated 18 million German males served in the Nazi armies between 1935 and 1945. The personnel records of approximately 14 million individuals were lost during the war. The sample we use in this paper pertains to 18,536 soldiers whose data were digitized from the surviving files. [Rass's \(2003\)](#) data collection effort departs from most existing wartime datasets by gathering information on individuals from a wide cross-section of soldiers from different socioeconomic background and army ranks, rather than focusing on military elites. Soldiers are sampled from three of the four main German army groups: the *Wehrmacht* (regular army), *Luftwaffe* (air force), and *Waffen-SS* (the Nazi party's armed wing). *Kriegsmarine* (navy) records were not sampled as very few of them survived the war. [Blum \(2011\)](#) and [Blum and Strebel \(2016\)](#) use sub-sets of these data to study living standards, as proxied by anthropometric measurements, between the 1900s and 1920s.

The data comprise three sub-samples. A first group of 8,460 soldiers was randomly sampled for digitization from paper-based archives. [Rass's](#) sampling procedure, for a given recruiting station, picks individual soldiers by family name in order to replicate the distribution of the population of family names in the local area. This sub-sample is therefore regionally representative and can be interpreted as random conditional on local area fixed effects, which we include in our empirical specifications. The second sub-sample corresponds to 9,903 soldiers from 68 military companies (62 *Wehrmacht* and 6 *Luftwaffe* companies). Individual companies are included in the sample based on the completeness of their soldier entry and exit rolls. Soldier-level records were retrieved for the individuals who were members of these companies during the war. As such, these 9,903 soldiers are included based solely on their membership in the designated company. Since individual soldiers were normally assigned to a given company based on geographic location, this sub-sample can also be interpreted as random conditional on local area fixed effects. The third and final sub-sample is a smaller set of 173 soldiers whose data are taken from the Belgian War Victims Service (*Service des Victimes de*

la Guerre / Dienst voor de Oorlogsslachtoffers, SVG/DOS). SVG/DOS records were searched in order to update the files of soldiers from the first two sub-samples, and in doing so, the files of an additional 173 soldiers were digitized as a by-product of the original data collection effort.

We check whether soldiers across the three sub-samples are significantly different in terms of observables. Appendix [Figures A.2 to A.4](#) respectively show the distribution of education levels, occupations, and father's occupations across sub-samples. The soldiers in each sub-sample are similar in terms of these variables. We conduct pairwise Kolmogorov-Smirnov tests and fail to reject the null that the distributions are equal in all nine cases. Since one of the sub-samples was drawn randomly, it is reassuring that soldiers in the other two samples have similar observable characteristics.

### 3.2 Representativeness

The data collection effort departs from most existing wartime datasets, with the notable exceptions of [Costa and Kahn \(2003\)](#), [Jha and Wilkinson \(2012\)](#), and [Ager et al. \(2022\)](#), by gathering information on a wide cross-section of soldiers from different socio-economic backgrounds and army ranks. As such, the soldiers represent a cut across the *Wehrmacht*, *Luftwaffe*, and *Waffen-SS*. The sample also does not suffer from issues stemming from selection on unobservables. Since Germany re-introduced military conscription in 1935, the vast majority of our soldiers are likely to have been conscripts, although this information is not always explicitly available.

Geographically, although our sample of soldiers is regionally representative, it is important to note that, due to the course of history, it does not constitute a random sample of the population of male soldiers. This is because most surviving Nazi wartime records pertain to military district (*Wehrkreis*) VI, which corresponds approximately to the current North Rhine-Westphalia federal state. Military records were initially kept at recruitment stations around Germany, and many of those stations were destroyed during the war or abandoned. Efforts to recover records began in North Rhine-Westphalia during the 1950s and spread from there ([Rass, 2003](#)). Our sample therefore includes a disproportionate number of soldiers from military district VI, which is a mainly Catholic area. This explains why the percentage Protestant in our sample (41%) differs from the share of Protestants in the overall German population at the time (two-thirds approximately).

Religious denomination data are not available for 1,433 soldiers. Since we are primarily interested in comparing mainline Protestants and Catholics, we also purge from the analysis 1,024 soldiers who do not belong to either denomination,<sup>7</sup> and 16

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<sup>7</sup>These 1,024 soldiers are broken down as follows (numbers in parentheses indicate the number of soldiers in each category): *Gottgläubigen* Nazi deists (869), non-religious (57), Neo-Apostolic (43),

soldiers who died of accidents and/or during military exercises before the start of the war in September 1939. We focus solely on those soldiers born in contemporary Germany, thus excluding another 199 soldiers. Our final dataset therefore comprises 15,421 soldiers. Our rationale for focusing on soldiers born in contemporary Germany is that all of the country falls within the former boundaries of the Holy Roman Empire. The Empire's states and territories were required to uphold the legal provisions made by the Imperial Diet, including the *cuius regio, eius religio* doctrine that followed the Peace of Augsburg. Thus, rank-and-file citizens born in the Empire could only practice one religion: the one made available to them by their local prince. We can therefore think of religious denomination as quasi-randomly assigned in the former Holy Roman Empire.

Birth location is available from [Rass \(2003\)](#) in text format. We geocode the birthplace of each soldier to its latitude and longitude; the results are shown in [Figure 1](#), where each red dot denotes the birthplace of a given soldier. Unsurprisingly, the vast majority of soldiers were born in Germany, with a visible minority born within the remainder of the blue area, which corresponds to the German Empire at its inception in 1871.<sup>8</sup> The German Empire federated Prussia and 25 other polities, including the Kingdoms of Bavaria, Saxony, and Württemberg, and the Grand Duchies of Baden and Hesse, among others. Since not all of the German Empire was part of the Holy Roman Empire, we cannot ensure that the Peace of Augsburg was upheld in all German Empire territories. Thus, we exclude soldiers born outside contemporary Germany but inside the German Empire, although the results do not change if we include them in the analysis. A small number of soldiers, which we exclude, were born outside Europe, likely because their parents were temporary migrants in their places of birth (see [Figure A.5](#) in the Appendix).

### 3.3 Awards

Our dataset includes information on 13,336 military decorations conferred between September 1939 and May 1945. These conferrals constitute an accurate record of the decorations received by each soldier over the course of the war. Such is the accuracy of the records that even decorations issued by other Axis powers, besides the German Reich, are also routinely recorded in personnel files. For example, 52 soldiers in our

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Dissenters (27), Old Catholic Church (1), Apostolic (12), Baptists (14), Adventist (1). We do not include the various other Protestant denominations in our definition of Protestant, since we are interested in comparing Catholics with the two mainstream Protestant denominations (Lutherans and Calvinists). However, the results are unaffected if we treat members of the Neo-Apostolic, Apostolic, Baptist, Adventist and Dissenting churches as Protestant and the single member of the Old Catholic Church as Catholic.

<sup>8</sup>This map was produced by the Max Planck Institute for Demographic Research and the Chair for Geodesy and Geoinformatics at the University of Rostock (2011), and is partially based on the work of [Hubatsch and Klein \(1975\)](#).



Figure 1: Soldier birthplaces.

Note. The blue area denotes the boundaries of the German Empire as of 1871. Source: Authors' calculations based on [Rass \(2003\)](#).

dataset received the Crusade Against Communism Medal (Medalia Cruciađa împotriva comunismului), a Romanian award instituted in 1942 and given to Romanian and Axis co-belligerents. There are 220 foreign awards in total, given by Italy (85), Romania (67), Bulgaria (43), Croatia (14), Finland (5), Hungary (3), and Austria (3).

Since our focus is on the German military, we exclude these foreign awards in our main analysis. Our final dataset therefore includes 13,116 award conferrals corresponding to 114 distinct decorations. [Table 1](#) displays the frequency of awards for those decorations which add up to more than 1 percent of the total, along with their German names. The 15 most frequent awards add up to about 91 percent of all decorations awarded. Appendix [Table A.1](#) lists the names and frequencies of all awards in the dataset.

Table 1: Award Information for Awards Accounting for More than 1 Percent of All Conferrals.

Award Name	N	%	Cumul.
Ostmedaille	3,016	22.99	22.99
Eisernes Kreuz II	2,472	18.85	41.84
Verwundetenabzeichen Schwarz	2,255	17.19	59.03
Kriegsverdienstkreuz	1,102	8.40	67.44
Infanteriesturmabzeichen	533	4.06	71.50
Deutsches Schutzwall-Ehrenzeichen	460	3.51	75.01
Sturmabzeichen	362	2.76	77.77
Verwundetenabzeichen Silber	357	2.72	80.49
Eisernes Kreuz I	323	2.46	82.95
Panzerkampfabzeichen Bronze	262	2.00	84.95
Panzerkampfabzeichen	262	2.00	86.95
Panzerkampfabzeichen Silber	228	1.74	88.69
Infanteriesturmabzeichen Silber	168	1.28	89.97
Kraftfahrbewährungsabzeichen Bronze	167	1.27	91.24

A key take-away from [Table 1](#) is that the Ostmedaille (Eastern Front Medal), takes the lion’s share of decorations. [Figure 2](#) shows the distribution of award conferrals over the course of the war. The blue bars correspond to monthly conferrals of the Ostmedaille; the yellow bars are for all other awards. The number of Ostmedaille given is very large between the time of the medal’s inception in May 1942 and the end of the Battle of Stalingrad in February 1943. While all medals were meant to motivate soldiers, the historical record shows that it is unlikely that the Ostmedaille corresponded to real effort in any consequential sense. Virtually every soldier who served on the Eastern Front received the Ostmedaille. Thus, there is much reason to doubt whether the Ostmedaille is correlated with effort; we therefore exclude it from our analysis, although the results are unaffected if we include it.

Award conferral in the German military was governed by clear rules, leaving lit-

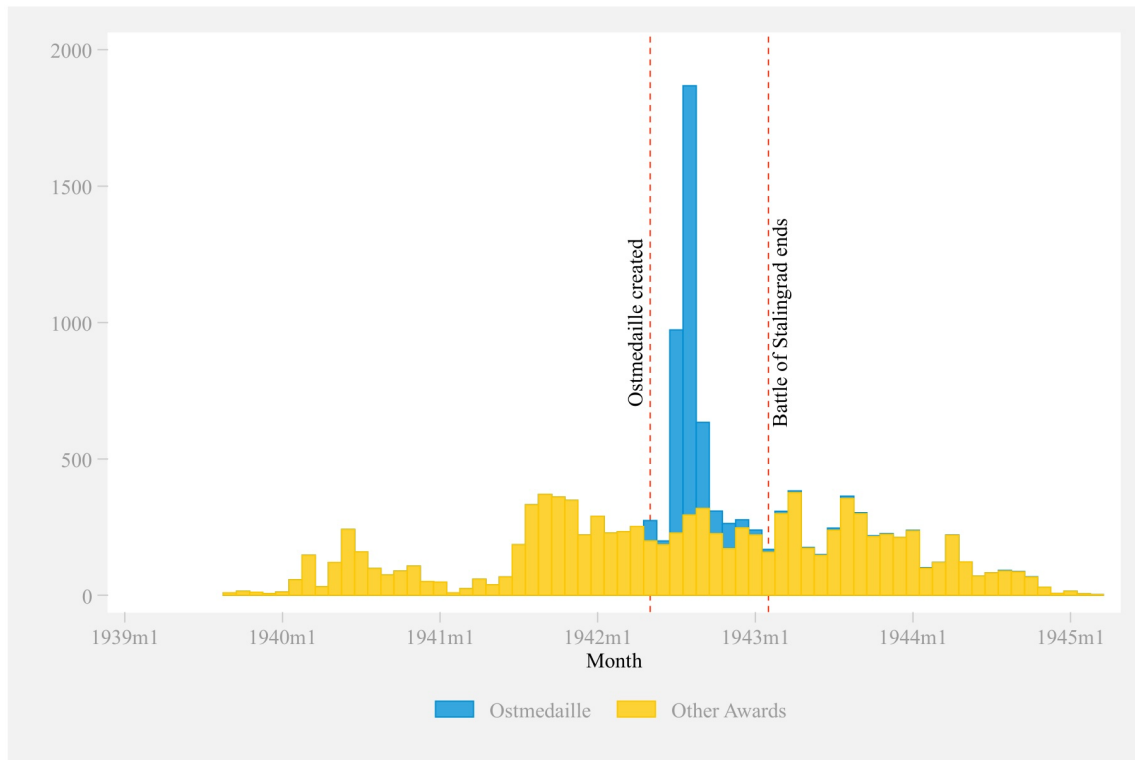


Figure 2: Monthly distribution of awards throughout the course of the war.

tle room for managerial discretion. Some awards were conferred if a soldier met a pre-determined, common-knowledge performance target. As the Estonian volunteer quoted in (Michaelis, 2007; see Section 2.3.2 above) remarks, German soldiers knew how many successful battle feats were required of them in order to achieve a Close Combat Clasp. Many awards follow similarly objective rules: for example, the Tank Destruction Badge (Sonderabzeichen für das Niederkämpfen von Panzerkampfwagen durch Einzelkämpfer) was awarded in the silver variant for the destruction of one enemy tank in battle, or in gold for the destruction of five or more tanks.

Other awards were given for less readily measurable feats, such as bravery. The Iron Cross, Nazi Germany's best-known award, falls under this category. The Iron Cross (combining the first- and second-class variants) accounts for just over 21% of awards in our dataset. During the war, it was awarded for bravery in combat action (Doehle, 1995, p. 21). The second-class Iron Cross was given for special acts of courage, while the first-class was given for exceptional acts of courage. More prestigious variations included the Knight's Cross (for battle-deciding acts of courage) and the Grand Cross (for outstanding deeds that alter the course of the war; Michaelis, 2007).

What separates an exceptional act of courage from a battle-deciding one is not readily measurable. Thus, although we are aware of no historical evidence suggesting so, we cannot fully rule out that the award process was biased in favour of Protestants. We examine this possibility in great detail below. The Nazi awards apparatus was not known

to discriminate among potential award recipients based on their personal characteristics, as it would not have been in the regime's best interest to do so. The brutally murderous regime, which sought to extract every ounce of motivation from its soldiers, would likely not have risked disenfranchising Catholic soldiers by systematically overlooking them for honours. In addition, even important awards like the Iron Cross were given to foreign citizens if they were deemed to have met the requirements, suggesting that the process was relatively unbiased. Leo Skurnik, a Finnish officer, was awarded the Iron Cross for organizing the evacuation of a German field hospital in Finland, saving numerous German soldiers. Skurnik, who was Jewish, declined the award. It is not known whether the *Wehrmacht* knew he was Jewish when they decided to award him the Iron Cross, but at least it is clear that the process was reasonably fair (Rautkallio, 1987, p. 70).

The prestige of the awards in our dataset also varies significantly. While the Iron Cross celebrates bravery, the War Merit Cross (*Kriegsverdienstkreuz*, abbreviated KVK) and the Driver Proficiency Badge were given for more routine feats, namely operational service, which may nevertheless correlate with effort. These two awards account for about 10% of conferrals in our data. The War Merit Cross was awarded with swords "for special services under enemy fire or special services rendered in military warfare" or without sword "for special services in other war tasks not under enemy fire" (Michaelis, 2007, p. 21). For example, a soldier named Wilhelm Barenscheer recounts: "In order to at least get the valuable material to Germany, we heaved a Kübelwagen and three motorcycles onto an Opel Blitz, which I then brought safely to Germany. For this I received a KVK 2nd class with swords" (Michaelis, 2007, p. 24). Such was the gap in prestige between bravery and non-bravery awards that the holders of the War Merit Cross and Driver Proficiency Badge were "scoffed at as 'base wallahs'" (Michaelis, 2007, p. 8).<sup>9</sup>

Besides the Ostmedaille, some of the awards in our dataset are location-specific. The most frequent of these are the West Wall Medal, which accounts for 3.5% of the conferrals in our data, the Crimea Campaign Shield (0.5%), and the Africa Armband (0.3%). We exclude these location-specific awards from our analysis as well. Our rationale for doing so is that location-specific decorations were often given to soldiers who served in a war theatre for a given amount of time, and thus may not be reflective of any real effort.

In sum, the award conferral process was largely formulaic and thus likely unbiased. Some awards were given for objectively measurable feats (e.g. number of aircrafts gunned down), while some were given for less readily quantifiable acts (e.g. bravery). Applications were reviewed by the Award Office (Michaelis, 2007, p. 10), and even

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<sup>9</sup>"Wallah" translates approximately to "doer" in several South Asian languages. In this context, a base wallah is a doer of relatively unglamorous tasks at the army base.

the Ostmedaille, the most liberally given award, was given based on a pre-defined set of criteria (see [Michaelis 2007](#), p. 49). The criteria for the latter were easy to meet by design, reflecting the gruesomeness of fighting conditions on the Eastern Front and thus the need to motivate soldiers by any means necessary.

### 3.4 Military Ranks and Promotions

Our dataset also includes information on the military ranks of soldiers. After extensive cleaning, we were able to classify military ranks into time-varying records for over half a million (577,621) soldier-months. The *Wehrmacht*, *Luftwaffe* and *Waffen-SS* have somewhat different hierarchical structures, with as many as 240 distinct military titles. We code these titles into nine discrete rank categories. [Table 2](#) displays information on the ranks and their frequencies, while Appendix [Tables A.2](#) to [A.5](#) display the full breakdown of ranks within each of our nine discrete rank categories.

Table 2: Distribution of Military Ranks and Equivalency with UK/US and NATO Standard Ranks.

Rank	Nearest UK/US Equivalent	NATO	N	%	Cumul.
Soldat	Private	OR-1	19,871	3.44	3.44
Obersoldat	Senior Private	OR-1	36,941	6.40	9.84
Gefreiter	Lance Corporal	OR-2	193,991	33.58	43.42
Obergefreiter	Senior Lance Corporal	OR-3	174,696	30.24	73.66
Unteroffiziere ohne Portepee	Non-Commissioned Officer	OR-4	107,435	18.60	92.26
Unteroffiziere mit Portepee	Senior Non-Commissioned Officer	OR-6	37,516	6.49	98.76
Leutnant / Oberleutnant	Commissioned Officer	OF-1	5,848	1.01	99.77
Hauptmann	Captain	OF-2	971	0.17	99.94
Stabsoffizier	Field Officer, incl. Major	OF-3	352	0.06	100.00
Total			577,621	100.00	

Notes. Unit of observation: soldier-month.

As Appendix [Figure A.6](#) shows, the distribution of ranks is approximately normal, drawing from low, middle, and high-ranking soldiers. Thus, we are confident that the sample is representative of the men who served in the German armies at the time. We are therefore able to avoid a common pitfall of studies relying on individual-level datasets in military contexts, which typically focus on high-ranking officers and thus may make inferences that are not necessarily generalizable to the population of soldiers.

We adopt a straightforward definition of promotions and code a soldier as having been promoted if his rank in a given month is strictly greater than his rank in the previous month. As a consequence of adopting a discrete coding scheme for military ranks, we necessarily abstract away from minor promotions, such as promotions, for example, from *untergefreiter* to *gefreiter* (junior lance corporal and lance corporal, respectively, which we both code as *gefreiter*). There are 11,604 promotions in total in the dataset, as well as 410 demotions. Thus, about 2.75% of soldiers were demoted at some point during the course of the war. It is reassuring to find demotions in the sample, as we know they are part of military life. Our demotion rate is in the same order of magnitude as the 2-6% demotion rate for the US Army documented by a recent RAND Corporation report (Wenger et al., 2018, p. 14).

### 3.5 Injuries

Our data provide dated records of each soldier's visit(s) to military hospitals and examination(s) by medical officers. We have a total of 7,575 such entries in the dataset. We hand-code each entry into one of three categories: combat-related, non-combat related, and unknown, as shown in Figure 3 below. Just over half of the records correspond to combat-related injuries, including trauma caused by bullets, shrapnel, or other causes such as fractures and bruises. A sizable portion of the medical visits (25% approximately) were not combat related. As is to be expected, soldiers frequently contracted infections, skin conditions, or other ailments on the battlefield. In the remaining 24% of records, it is impossible to ascertain why the soldier saw a medical officer, as no text information is entered with the record.

Since we are interested in the consequences of effort, we code as injuries only those records we could verify as combat-related injuries. We believe this is a conservative choice, which will likely under-state the true extent of injuries. As long as the true combat-related injuries of Catholics are not systematically more likely to be coded as "Unknown" than the combat-related injuries of Protestants, our results will be unaffected.

### 3.6 Deaths

From those sampled, a total of 2,332 soldiers died during the course of the war, or approximately 15% of the soldiers in our dataset. We have some indication of cause of death in only 789 cases (34% of total deaths). Since we are interested in effort-related proxies, our approach is to exclude those deaths we could reliably conclude were not combat-related. This is the case for about 15% of deaths with some known information, or 119 cases. These 119 deaths were caused by illnesses (86), suicides (19),

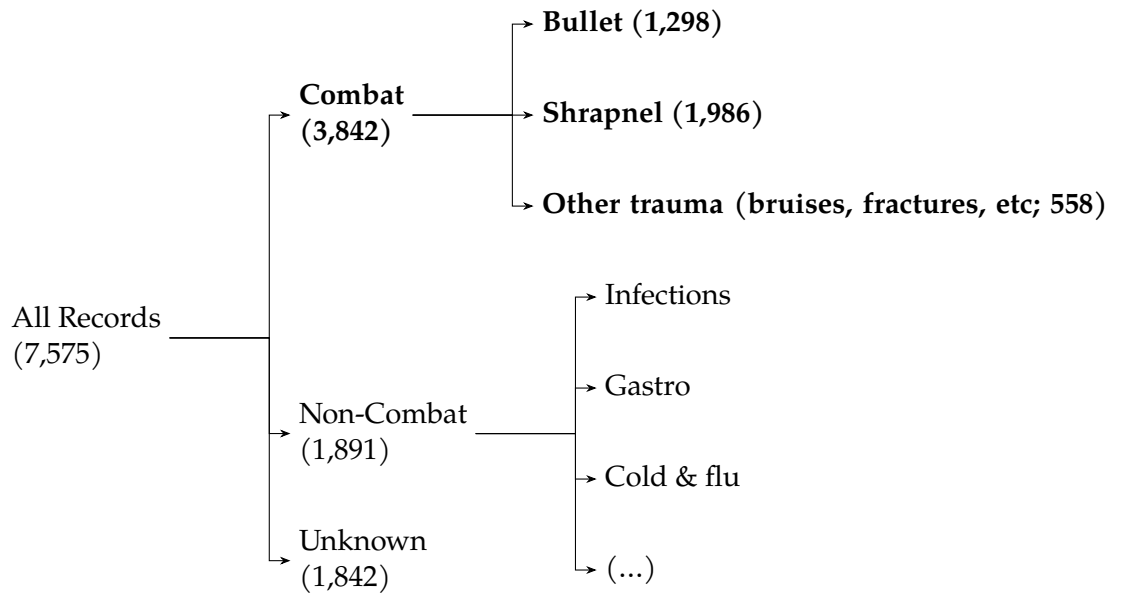


Figure 3: Breakdown of medical records.

Source: Authors' calculations based on [Rass \(2003\)](#).

executions (8), deaths in enemy captivity (5), and one death during leave of absence. Thus, while our death proxy might over-state true effort-related deaths, our estimates remain unaffected as long as the deaths of Protestant soldiers are not over-represented among those deaths for which we have no information.

## 4 Empirical Approach and Main Results

### 4.1 Raw Correlations

We begin by examining unconditional correlations between religious denomination and our effort proxies, at both the intensive and extensive margins, as shown in [Figure 4](#). On all measures, Protestant soldiers outperform Catholics at both margins. The differences across religious denominations are all statistically significant at the 1% level in t-tests, and economically meaningful. For example, Protestant soldiers are 7 percentage points more likely to receive an award, and 1.6 percentage points more likely to die than Catholic soldiers. This constitutes *prima facie* evidence in favour of the Protestant work ethic as posited by Weber.

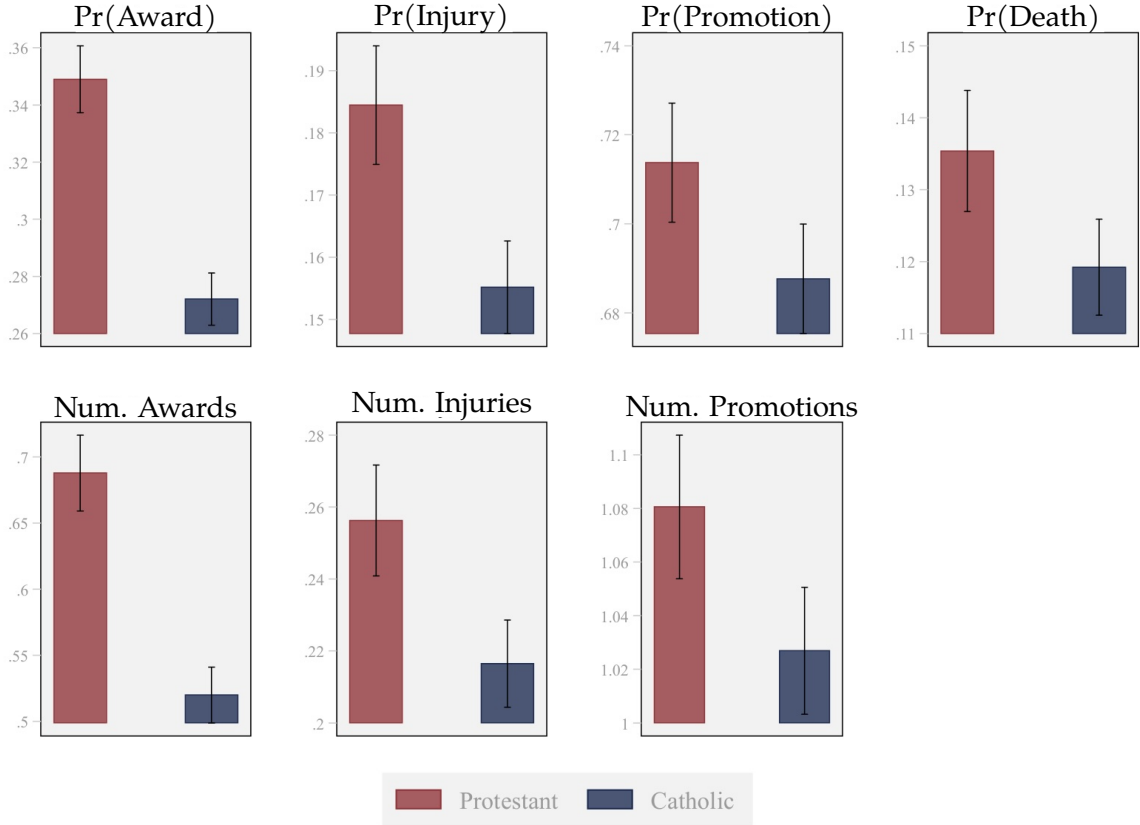


Figure 4: Effort proxies and religious denomination.

## 4.2 Baseline Regressions

With each of our effort-related outcomes  $Y$  as the dependent variable, we estimate the following equations:

$$\Pr(Y_i > 0 \mid \text{Protestant}_i) = \alpha_1 + \beta_1 \text{Protestant}_i + \delta_i + \epsilon_i \quad (1)$$

$$\ln(Y_i + 1) = \alpha_2 + \beta_2 \text{Protestant}_i + \delta_i + \mu_i \quad (2)$$

where  $Y$  alternatively denotes the number of awards, promotions, and injuries for soldier  $i$ , Protestant is a dummy variable equal to 1 for Protestant soldiers and 0 for Catholic individuals,  $\epsilon$  and  $\mu$  are stochastic error terms, and  $\delta_i$  is a set of level 1 sub-national fixed effects (states) of Germany. Thus, regression equations (1) and (2), like all regressions we estimate in this paper unless otherwise stated, control for local area fixed effects, a precaution that is necessary as discussed in [Section 3.1](#) above. State fixed effects effectively allow us to compare soldiers from the same geographic area, thus ruling out the possibility that Protestant is picking up the effect of some location-specific unobserved variable, other than religious denomination, which may correlate with soldiers' work ethic. We add a small constant (one) to the counts of awards, promotions and injuries for each soldier in Equation (2), to avoid taking the natural logarithm of 0.

We estimate Equations (1) and (2) via linear probability models and OLS in the main text, respectively, but the results are virtually identical in Appendix [Table A.6](#), where we report average marginal effects from probits and negative binomial regressions. To account for residual correlation between soldiers from similar geographic areas, we cluster standard errors at the state level throughout our cross-sectional analyses. In our panel analyses below, we cluster standard errors at the soldier level.

Under the Peace of Augsburg, religious denomination can be viewed as randomly assigned. The *cuius regio, eius religio* provision of the treaty allowed each ruler to choose one religion to be practiced on his territory, with rank-and-file subjects having no say in the matter. To the extent that soldiers in our dataset mainly descend from rank-and-file citizens of 16th century Germany, it is likely that the soldiers' religious denomination was largely determined centuries before their births. If such is the case, we can interpret the  $\beta$  coefficients in equations (1) and (2) as causal. Our results hold when we employ different identifying assumptions, as we will see below.

Panel A of [Table 3](#) displays the results. Protestants are significantly more likely, at the 1% level, to outperform Catholics on all our effort proxies at both the intensive and extensive margins. The effects of Protestantism are economically meaningful throughout, ranging from 1.8 to 7.5 percentage points across outcomes.

### 4.3 Instrumental Variables (IV) Regressions

In this section, we estimate Equations (1) and (2) under alternate identifying assumptions, setting aside the effects of the Peace of Augsburg. Instead, we rely on another source of exogenous variation in the adoption of Protestantism: the proximity of soldier birthplaces to Wittenberg, where Martin Luther was based on the eve of (and throughout) the Reformation. In doing so, we follow in the footsteps of [Becker and Woessmann \(2009\)](#) and [Cantoni \(2015\)](#), who use distance to Wittenberg as an instrument for Protestantism to study economic development at the city or county level.

The identification strategy relies on the historical pattern in the spread of Protestantism, beginning in the 15th century, in approximately concentric circles spreading away from Wittenberg and giving rise to variation in the adoption of Protestantism that is uncorrelated with local area characteristics. Indeed, [Becker and Woessmann \(2009\)](#) verify that proximity to Wittenberg does not predict a range of city-level outcomes as measured prior to the Reformation. The idea behind the instrument is that cities closer to Wittenberg were more likely to adopt the Reformation, for a variety of reasons. First, the spread of Protestant ideas should be inversely related to transportation costs, such that Protestant thought is more likely to make an impact on those polities closer to Martin Luther's place of residence. Second, religion-based alliances between neighbouring rulers are likely to create a cascading effect away from Wittenberg. Take the case of a

Table 3: Baseline Results and Instrumental Variables Results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pr(Award)	Pr(Injury)	Pr(Promotion)	Pr(Death)	ln(Awards)	ln(Promotions)	ln(Injuries)
Panel A. Baseline Results							
Protestant	0.075***	0.028***	0.026***	0.018***	0.081***	0.031***	0.023***
	[0.005]	[0.004]	[0.007]	[0.003]	[0.006]	[0.010]	[0.003]
Observations	15,421	15,421	9,860	15,421	15,421	9,860	15,421
R-squared	0.009	0.002	0.003	0.004	0.009	0.003	0.002
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B. 2SLS Results							
Protestant	0.223***	0.091***	0.163***	0.033*	0.227***	0.195***	0.073***
	[0.065]	[0.017]	[0.048]	[0.017]	[0.074]	[0.042]	[0.018]
Observations	15,413	15,413	9,854	15,413	15,413	9,854	15,413
Panel C. First Stage Results							
Dist. to Wittenberg	-0.168***	-0.168***	-0.177***	-0.168***	-0.168***	-0.177***	-0.168***
	[0.034]	[0.034]	[0.025]	[0.034]	[0.034]	[0.025]	[0.034]
Observations	15,413	15,413	9,854	15,413	15,413	9,854	15,413
R-squared	0.080	0.080	0.081	0.080	0.080	0.081	0.080
1st Stage F-test	24.76	24.76	48.50	24.76	24.76	48.50	24.76

Notes. Linear probability models in Columns (1)-(4) of Panels A and B. All regressions include a constant term. Standard errors clustered over level 1 sub-national districts. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

hypothetical local ruler deciding whether to adopt Protestantism or remain Catholic. A conversion to Protestantism is more likely if neighbouring rulers have already converted: an isolated Catholic prince surrounded by Protestant rulers is likely to see his territory attacked, and thus benefits from converting.

We estimate the following first-stage equation:

$$\text{Protestant}_i = \theta_0 + \psi \text{Distance to Wittenberg}_i + v_i \quad (3)$$

where *Distance to Wittenberg* is the distance between soldier *i*'s birthplace and Wittenberg in hundreds of kilometres, which we calculate after geocoding each soldier's birthplace to a pair of (*x*, *y*) coordinates, as shown in [Figure 1](#) above.

Panel B of [Table 3](#) displays the 2SLS estimates. The treatment effect of Protestantism is positive and highly significant at the 1% level in all specifications, except in Column (5), where Protestant is significant at the 10% level. Panel C presents the first-stage results. The Distance to Wittenberg instrument strongly predicts Protestantism: a 100 km increase in the distance between the soldier's birthplace and Wittenberg translates to a 17% decline in the probability that the soldier is a Protestant. The size of this coefficient is consistent with the findings in the previous literature (14 to 18% in [Cantoni 2015](#); 9.5% in [Becker and Woessmann 2009](#)). The F-statistic of excluded instruments comfortably clears the rule-of-thumb critical value of 10 approximately. It is worth noting that the 2SLS estimates in Panel B are larger than in Panel A, which is to be expected. The correct interpretation of the 2SLS estimates is the effect of a change in religion from Catholic to Protestant for *all* soldiers born at the same distance from Wittenberg, rather than the

usual LATE interpretation. This is the case because the instrument is not soldier-specific, but birthplace-specific, and there are multiple soldiers within the same birthplaces.

Note that we do not include local area dummies in the IV regressions, since the instrument also relies on spatial variation. However, our results do not change if we include the vector of state dummies in the IV framework. In the latter case, the identification comes from within-state distance to Wittenberg, which is very restrictive, but does not affect the results.<sup>10</sup>

#### 4.4 Panel Estimates

Since we are able to identify the dates at which soldiers die or receive injuries, promotions, and awards, we construct a soldier-by-month panel dataset running from the beginning of the war in September 1939 to the unconditional surrender of Germany in May 1945. This panel dataset allows us to rule out some key alternate explanations, to which we return below. In this sub-section, we present average monthly effects of Protestantism on our effort proxies. We focus on the extensive margin here (the probability of a soldier experiencing a given outcome), since soldiers rarely receive more than one promotion, award or injury in the same month. Having multiple observations per soldier allows us to account for soldier-specific correlations in the error structure, by clustering standard errors at the soldier level.

To build a meaningful panel, we complement the information detailed above with further data on active dates of service for each soldier. After extensive cleaning, we were able to construct precisely dated activity records for 13,912 of the 15,421 soldiers in our dataset (90%). A soldier is coded as inactive in a given month and left out of the panel dataset if he is: (i) dead; (ii) missing in action; (iii) hospitalized; (iv) on authorized leave; or (v) a prisoner of war in enemy captivity. The resulting panel includes approximately 660,000 observations. [Table 4](#) presents the regression results. We estimate linear probability models in Columns (1)-(3), where the outcomes are the probabilities of receiving an award, injury, or promotion respectively. Protestantism is positive and significant in Columns (1) and (2), where the outcome variables are awards and injuries. The coefficients are multiplied by 100, for readability. The interpretation of the coefficient in Column (1) is that Protestant soldiers are on average 0.28 percentage points more likely to receive an award in a given month. Although we find a significant aggregate effect for promotions in the cross-sectional data, we do not find a significant average monthly effect in Column (3). Although the point estimate is positive, the mean monthly effect is too small to be statistically distinguishable from zero. Column (4) is a Cox proportional hazard regression. We report the hazard ratio, which indicates that Protestant soldiers have a 4.4% higher hazard of death than Catholic soldiers in a given

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<sup>10</sup>We also estimate propensity score matching models in the Appendix; the results are similar.

month, although the effect is not statistically significant.

The panel structure of the data also allows us to explore time dynamics. We do so in [Figure 5](#), which displays local polynomial fits, over time, of the hazard rate and the probabilities of award, injury, and promotion, by religious denomination. [Figure 5](#) verifies that overall, Protestant soldiers consistently outperformed Catholics on our effort proxies throughout the course of the war.

Table 4: Panel Results.

	(1)	(2)	(3)	(4)
	Pr(Award)	Pr(Injury)	Pr(Promotion)	Pr(Death)
Protestant: Mean Monthly Effect	0.278***	0.060***	0.025	1.044
	[0.035]	[0.018]	[0.045]	[0.051]
Observations	659,189	659,189	326,778	654,438
R-squared	0.000	0.000	0.000	
State FE	Yes	Yes	Yes	Yes

Notes. Linear probability models in Columns (1)-(3). Cox proportional hazard regression in Column (4); hazard ratio reported. All regressions include a constant term. Standard errors clustered over soldiers. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

## 5 Competing Explanations

### 5.1 Ideological Commitment to Nazism

Whether German Protestants were more fanatically Nazi than Catholics has been the subject of some debate. Some scholars have contended that Protestants voted for Hitler as a matter of ideology; Seymour Martin [Lipset \(1960, p. 149\)](#) famously wrote that “the ideal-typical Nazi voter in 1932 was a middle-class, self-employed Protestant who lived either on a farm or in a small community.”<sup>11</sup> If Lipset is correct, then an alternate reading of our results would suggest that Protestant – Catholic differences in effort expenditure reflect differences in commitment to the Nazi ideology rather than a particular work ethic. Lipset is not alone in this line of thinking: in particular, [Becker and Pascali \(2019\)](#) show convincingly that the Reformation changed the geographic distribution of antisemitism. They argue that, relative to Catholics, Protestants are more likely to be antisemitic because they were in direct competition with Jews for high-skill occupations, with particular reference to moneylending. Catholics are comparatively less fervently antisemitic because of the Catholic usury ban, which meant Catholics did not compete

<sup>11</sup>For an opposing view, see [King et al. \(2008\)](#), who argue that the Protestant vote for the Nazi party (NSDAP) constitutes ordinary economic voting. Their argument is that Germans at large voted for NSDAP because of the Great Depression of 1929, with the exception of the agricultural Catholic south, where farmers were strongly opposed to NSDAP’s plans for impartible land inheritance.

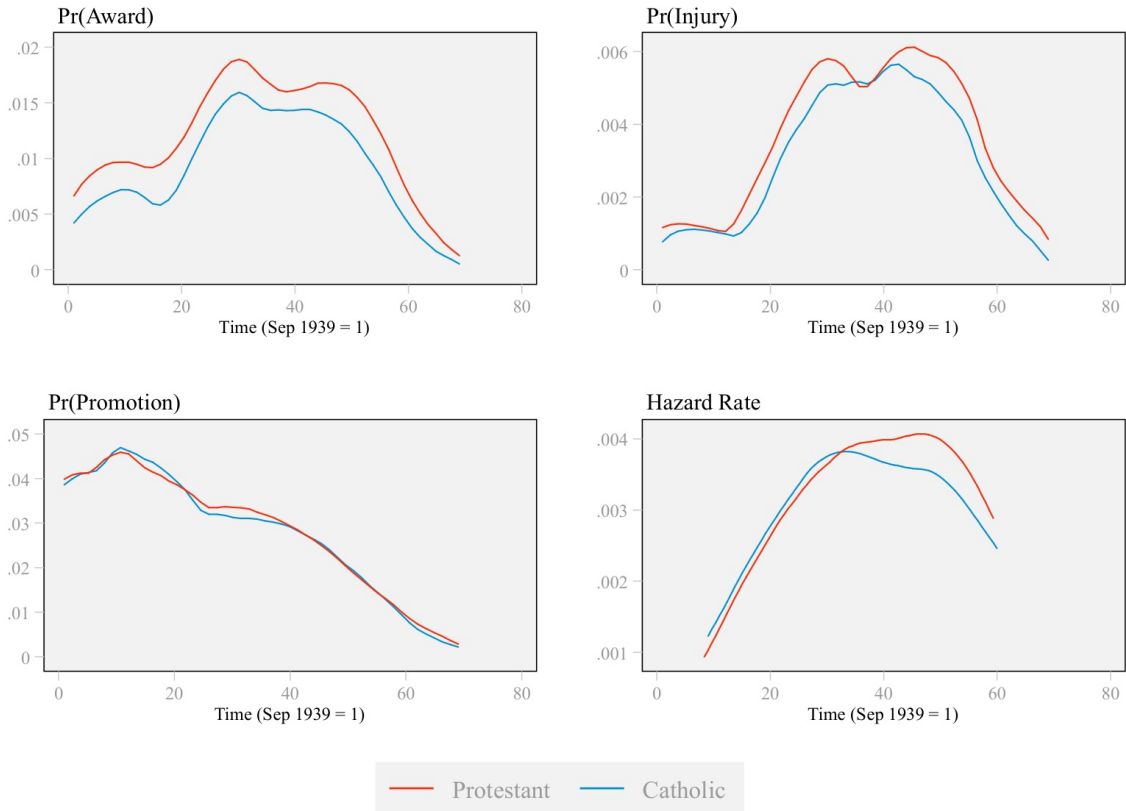


Figure 5: Local polynomial estimates of effort-related outcomes.

with Jews in moneylending.<sup>12</sup> Spenkuch and Tillmann (2018) also show that Catholic voters were more likely to vote for Hitler if a “brown priest”, who openly sympathized with the Nazi regime, was operating within 10 km of their hometown. It is therefore possible that, in Weimar Germany, Catholics were less committed to Nazism than Protestants.

Whether differences in commitment to Nazism lasted from the end of Weimar Germany all the way to the war may be unclear, however. Some historical evidence suggests that after six years of complete totalitarianism, from 1933 to 1939, Germany had coalesced into a shared identity, locked into a battle with perceived common enemies. The effectiveness of the Joseph Goebbels-led Nazi propaganda apparatus is well-known and was used by Hitler to re-define perceptions of Jewish citizens and Bolsheviks as out-groups and common enemies of the German people. Notions of *Volk* (people), *Vaterland* (fatherland), and *Heimat* (a German concept denoting the bond between an individual and a social unit) were “major components of the total complex of patriotic and nationalistic values underlying the commitment to the war” (Zahn, 1969, p. 14).

In a seminal book on social control, sociologist of religion Gordon Zahn (1969, p. 6) finds that German Catholics were in near-total “conformity to the war demands of the Nazi regime”. Zahn (1969, p. 11) also reviews Catholic periodicals and official

<sup>12</sup>Jha (2013) similarly shows that inter-ethnic complementarity reduces political violence in Gujarat.

diocese journals from the Nazi era and finds no evidence of content “which would have encouraged or even supported a refusal to help in waging the war.” Instead, the Church promoted “faithful performance of duty (as) a moral obligation” and “Catholics were encouraged as Catholics to participate in the various collections organized to meet the emergency needs of the war economy and to take special pride in the patriotism and loyalty demonstrated by the religious community in these contributions and sacrifices” (p. 18). Such was the Catholic Church’s social control on its adherents that obedience to the Church facilitated obedience to the Nazi leadership. As such, “the German Catholic who looked to his religious superiors for spiritual guidance and direction regarding service in Hitler’s wars received virtually the same answers he would have received from the Nazi ruler himself.” Members of the priesthood assumed a significant role in bolstering the morale of Catholic soldiers in war theatres as well (p. 58), and selected letters from soldiers on active duty were published in local churches to inspire local Catholic parishioners to support the war effort (p. 18).

In a pioneering study of the Catholic priests who served in the *Wehrmacht*, [Faulkner Rossi \(2015\)](#) uncovers systematic evidence against the claim that the Catholic clergy was averse to Nazism. Instead, Faulkner Rossi (pp. 78-79) finds that “(T)here was much about Nazism that Church leaders found reassuring. Bishops and priests were susceptible to the Nazi Party’s unflinchingly anti-communist and anti-Bolshevik ideology. They also warmed to the idea of a strongly centralized, even authoritarian-style government, which in the wake of the Weimar era was an immensely preferable alternative to the atheistic liberalism and chaotic parliamentarianism that had reigned after the First World War. The regime’s employment of antisemitic rhetoric was not necessarily unappealing; the Church was no stranger to anti-Jewish sentiments (...) the only time that clerics felt pressed to defend Jews from the regime was when those Jews happened to have converted to Catholicism.” Decades after the war, in 1990, Catholic priest Friedrich Dorr, who served as a chaplain in the *Wehrmacht* during World War II, stated: “Who can say: who is guilty in war? In the end? Totally guilty? For there was the thing about the Versailles Treaty. That was a great injustice to the German people. [Using] that, Hitler regained some justice and courage for the Germans. Unfortunately in a bad way...” ([Faulkner Rossi, 2015](#), p. 272).

The various pre-war territory expansion episodes provide further evidence against the claim that Catholics were intolerant of Nazism. Catholic Austria offered little resistance during the 1938 *Anschluss*, and Hitler was warmly welcomed by citizens and clergy alike when he arrived in Vienna on March 14. Church bells rang to welcome him ([Weyr, 2005](#), p. 64), and Theodor Innitzer, at the time Cardinal of Vienna, declared: “Catholics (...) are asked on Sunday to offer thanks to God for the bloodless course of the great political change (...) Naturally all orders of officials should be fulfilled

willingly”<sup>13</sup>. Another telling episode is the 1935 referendum in Saar, a historically 90% Catholic region,<sup>14</sup> which nevertheless overwhelmingly voted in favour of re-joining Germany with approximately 91% of voters in favour ([Direct Democracy, 2005](#)).

### 5.1.1 Individual-Level Fanaticism Proxies

We investigate empirically whether our previous results are driven by differences in fanaticism. We do so using several complementary approaches. First, in [Table 5](#), we make use of individual-level data on membership in four key Nazi organizations. For a subset of soldiers, we have information on whether the individual was a member of the Hitler Youth, the Nazi party (NSDAP), the *Schutzstaffel* (SS), and the *Sturmabteilung* (SA).

*Protestant* remains positive and highly significant across the board when we control for the membership dummies. The point estimates shown in [Table 5](#) are, on average, 11% smaller than their unconditional analogues from Panel A of [Table 3](#), and larger in one case. Thus, it appears likely that fanaticism as proxied by membership in Nazi organizations may explain a portion of the Protestant performance gap. It is worth noting, however, that if the idea that Protestants are more likely to be fanatically Nazi is to be taken seriously, then a reduction in the point estimates is to be expected purely on a mechanical basis. Nazi organization membership, in this framework, suffers from what [Angrist and Pischke \(2009\)](#) term the bad control problem, which can result in attenuation bias for the coefficient of *Protestant*. That Protestants still appear to outperform Catholics despite the downward bias constitutes a strong basis, in our view, for the argument that fanaticism is unlikely to be the main driver of the observed differences.

### 5.1.2 The *Gottgläubigen*

The *Gottgläubigen* (God-believers) offer an interesting alternate control group against which to test Weber’s work ethic hypothesis. The *Gottgläubigen* are Nazi deists who formally renounced their previous religion in order to advance their careers in the Nazi state apparatus. For example, the SS threatened their members with expulsion unless they formally abandoned their church ([Ziegler, 2014](#), p. 86). In this section, we re-code our *Protestant* dummy to be equal to 1 if the soldier is Protestant, 0 if he is *Gottgläubig*, and undefined otherwise. Thus we compare Protestants to *Gottgläubigen*; our rationale for doing so is that the latter group is more likely to comprise individuals that are committed enough to Nazism to take the significant step of abandoning their religion. *Gottgläubigen* are therefore more likely to be fanatically Nazi than Catholics, which

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<sup>13</sup>Chicago Daily Tribune, Monday March 14, 1938, p. 4.

<sup>14</sup>This number is the percentage of Catholics in the Trier administrative district of Prussia (regierungsbezirke) in 1871, which we calculate using the Ifo Prussian Economic History Database.

Table 5: Accounting for Membership in Nazi Organizations.

	(1) Pr(Award)	(2) Pr(Injury)	(3) Pr(Promotion)	(4) Pr(Death)	(5) ln(Awards)	(6) ln(Promotions)	(7) ln(Injuries)
Protestant	0.060*** [0.008]	0.025*** [0.006]	0.023* [0.013]	0.017*** [0.004]	0.063*** [0.008]	0.034** [0.014]	0.018*** [0.005]
HJ Member	0.082*** [0.006]	0.065*** [0.012]	-0.013 [0.012]	0.028*** [0.008]	0.103*** [0.011]	-0.014 [0.008]	0.059*** [0.010]
SA Member	0.192*** [0.015]	0.084*** [0.018]	0.130*** [0.027]	0.043*** [0.006]	0.207*** [0.023]	0.133*** [0.034]	0.070*** [0.015]
SS Member	0.168*** [0.016]	0.069*** [0.011]	0.165*** [0.024]	0.025 [0.023]	0.163*** [0.027]	0.182*** [0.021]	0.060*** [0.008]
NSDAP Member	0.050*** [0.013]	0.014* [0.008]	0.032 [0.019]	-0.024*** [0.006]	0.056*** [0.014]	0.029 [0.023]	0.016* [0.008]
Observations	7,018	7,018	4,182	7,018	7,018	4,182	7,018
R-squared	0.028	0.010	0.027	0.008	0.027	0.025	0.009

Notes. Linear probability models in Columns (1)-(4). All regressions include a constant term and a set of state fixed effects. Standard errors clustered over states. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

assuages concerns that the coefficient of *Protestant*, in our previous sets of estimates, reflects differences in fanaticism rather than differences in work ethic. Panel A of Table 6 shows that Protestants outperform even the very committed *Gottgläubigen*, thus making it unlikely that Protestants outperform Catholics due to differences in Nazi ideology.

Table 6: *Gottgläubigen*, Conscripts, and Volunteers.

	(1) Pr(Award)	(2) Pr(Injury)	(3) Pr(Promotion)	(4) Pr(Death)	(5) ln(Awards)	(6) ln(Promotions)	(7) ln(Injuries)
Panel A. Protestants vs <i>Gottgläubigen</i>							
Protestant	0.100*** [0.006]	0.061*** [0.004]	0.027* [0.014]	0.030*** [0.006]	0.114*** [0.007]	0.044*** [0.013]	0.052*** [0.003]
Observations	7,188	7,188	4,926	7,188	7,188	4,926	7,188
R-squared	0.007	0.005	0.003	0.004	0.008	0.004	0.005
Panel B. Conscripts							
Protestant	0.148*** [0.015]	0.095*** [0.008]	0.187*** [0.020]	0.020 [0.016]	0.145*** [0.012]	0.148*** [0.020]	0.056*** [0.005]
Observations	746	746	367	746	746	367	746
R-squared	0.024	0.019	0.049	0.011	0.020	0.036	0.010
Panel C. Volunteers							
Protestant	0.135*** [0.030]	0.116*** [0.030]	0.071 [0.093]	-0.065 [0.055]	0.177*** [0.005]	0.048 [0.056]	0.097** [0.034]
Observations	124	124	100	124	124	100	124
R-squared	0.054	0.036	0.151	0.058	0.061	0.137	0.029

Notes. Linear probability models in Columns (1)-(4). All regressions include a constant term and a set of state fixed effects. Standard errors clustered over states. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

### 5.1.3 Volunteers and Conscripts

Hitler re-introduced military conscription in March 1935, in violation of the Versailles treaty. Our data do not detail mode of enrolment for all soldiers; however, we could determine with confidence whether 870 soldiers were in fact conscripts or volunteers. Text

records for the former include the words *Wehrpflichtiger* or *Dienstpflichtiger* (obligated to serve), while the latter are referred to as *Freiwilligen* (free-willers). In this section, we restrict our attention to soldiers in each category. Our motivation for doing so is that these soldiers would likely have been similarly motivated or unmotivated to serve. We think comparing volunteers, in particular, largely mitigates concerns about unobserved fanaticism, since it is hard to imagine why, for example, a fervently anti-Nazi Catholic individual would volunteer in the first place.

We look at conscripts and volunteers in Panels B and C of [Table 6](#). Most coefficients are positive and significant, even in the much smaller sample of volunteers ( $N = 124$ ). If anything, those effects that could be precisely estimated tend to be larger than the baseline results of [Table 3](#) Panel A.

#### 5.1.4 The Cistercian Work Ethic

A recent paper by [Andersen et al. \(2017\)](#) argues that the Protestant work ethic had pre-Reformation roots. Specifically, they emphasize the historical role of the Cistercians, a Catholic order which was known for its strict work ethic and thrift, and appeared in Europe in the 11th century, long before Luther and Calvin's Reformation. [Andersen et al. \(2017\)](#) present compelling evidence that Cistercian presence accelerated productivity growth in England and had long-lasting effects on cultural values across Europe. In order to check whether Cistercian presence may be affecting our results, we drop the state fixed effects and instead control for the state-level share of Cistercian monasteries as calculated by [Andersen et al. \(2017\)](#). Our previous results are unaffected ([Appendix Table A.7](#)).

#### 5.1.5 Other Potential Explanations

In this section, we control for a wide range of covariates which may correlate with both effort provision and religious denomination. The results are presented in [Table 7](#) and survive the inclusion of these key covariates. We briefly discuss our rationale for including these controls below. It is worth noting that some of the controls we include suffer from [Angrist and Pischke's \(2009\)](#) bad control problem (see discussion in [Section 5.1.1](#) above); even then, we are still able to discern positive effects of Protestantism across the board. The estimates in [Table 7](#) should therefore be seen as quite conservative. In addition to the factors discussed below, we also control for membership in Nazi organizations.

*Human Capital and Socio-Economic Status.* [Becker and Woessmann \(2009\)](#) highlight human capital differences between Catholics and Protestants as a key driver of Protestant economic performance. We therefore check whether our results may be attributable to human capital. In this context, human capital may help soldiers navigate

Table 7: Sensitivity to Covariates. Standard Errors Omitted for Legibility.

	(1) Pr(Award)	(2) Pr(Injury)	(3) Pr(Promotion)	(4) Pr(Death)	(5) ln(Awards)	(6) ln(Promotions)	(7) ln(Injuries)
Protestant	0.044***	0.014***	0.029**	0.004	0.048***	0.027***	0.013**
Education (Ref. = University)							
Elementary School	-0.013	0.007	-0.070*	-0.009	0.056**	-0.017	0.023
Secondary School	0.038	0.004	-0.010	0.016	0.097**	0.029	0.008
High School	0.000	-0.009	0.022	0.001	0.064*	0.089	0.007
Trade School	-0.047*	0.019	-0.021	-0.026	0.027*	0.006	0.039
Occupation (Ref. = Scientist)							
Manager	0.101**	-0.011	-0.128**	0.044*	0.110**	-0.049	-0.017
Cleric	0.069***	0.019	-0.054*	0.015	0.077***	-0.047	0.015
Craftsman	0.094***	0.041**	-0.144***	0.030*	0.096***	-0.127***	0.036***
Farmer	0.092***	0.051**	-0.064	0.028	0.090***	-0.070**	0.034**
Labourer	0.154***	0.074***	-0.146***	0.033**	0.148***	-0.122**	0.071***
Unemployed	0.012	-0.008	-0.083***	0.014	0.028	-0.020	0.004
Father's Occupation (Ref. = Scientist)							
Father: Manager	-0.005	-0.043**	-0.101***	0.035**	0.004	-0.144***	-0.020
Father: Cleric	0.018	-0.029	0.019	-0.010	0.014	-0.030	-0.022
Father: Craftsman	-0.045	-0.069**	-0.007	0.006	-0.042	-0.047	-0.048**
Father: Farmer	-0.067*	-0.115***	-0.040*	-0.008	-0.073*	-0.083**	-0.084***
Father: Labourer	-0.044**	-0.055***	-0.060*	0.048**	-0.031	-0.092**	-0.027**
Father: Unemployed	0.023	-0.041	0.024	0.063***	0.046	0.029	-0.030
Ethnicity (Ref. = Alsace-Lorraine)							
German	0.175***	0.109***	0.056	0.073***	0.164***	0.144	0.084***
Ostbelgier	0.066	0.168***	0.307	0.080	0.063	0.341	0.122**
Luxembourger	0.039	0.056*		-0.034	0.043*		0.036
Health: Height	-0.073	-0.043	0.255**	0.040	-0.164***	0.276**	-0.084*
Nazi org. membership							
SA Member	0.137***	0.085***	0.092***	0.024**	0.148***	0.075**	0.073***
SS Member	0.142***	0.119***	0.113	-0.006	0.140***	0.134*	0.099***
HJ Member	0.080***	0.061***	-0.044**	0.025**	0.101***	-0.038**	0.055***
NSDAP Member	0.026	0.013	0.001	-0.035***	0.044*	0.025	0.018*
Observations	4,578	4,578	2,489	4,578	4,578	2,489	4,578
R-squared	0.029	0.016	0.042	0.013	0.028	0.041	0.016
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Linear probability models in Columns (1)-(4). All regressions include a constant term. Standard errors clustered over states; omitted to preserve space. See Appendix Table A.10 for full results. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

the awards and promotion processes, but also increases the opportunity cost of fighting. Soldiers who invested more in their civilian life may therefore be expected to exert less effort in wartime, as the opportunity cost of dying is comparatively high. We have information on educational achievement for a subset of soldiers, as well as socio-economic status as proxied by occupation and father's occupation. Less educated soldiers are generally more likely to perform well than university-educated ones (the reference category), as indicated by the largely positive point estimates. A similar pattern can be seen with respect to occupation, with soldiers in most occupations likely to outperform scientists.

**Nationality.** Appeals to nationalism were of course key to motivate soldiers and the German public, to protect the supposed purity of the German nation. A small fraction of soldiers in our data, although born in Germany, belong to different, largely Catholic national groups. These groups are Luxembourgers, *Ostbelgien* (Eastern Belgians from the Eupen-Malmedy region), and Alsace-Lorraine, which was annexed by the German Empire in 1871. We therefore control for nationality in [Table 7](#).

**Health.** [Blum and Strebel \(2016\)](#) show that Protestants acquired a significant height advantage over Catholics during World War I, as the latter group was better able to deal with the food shortages that plagued Germany at the time. Thus, it is plausible that the patterns we have documented so far simply reflect the health status of Protestant soldiers, and had little to do with work ethic, leading us to control for height as a proxy for health status.

### 5.1.6 Randomization Inference Estimates

While we have ruled out a number of observable alternate explanations, it is possible that some unobserved soldier-specific characteristic may be driving our results. We therefore implement randomization inference estimates in this section. Our procedure generates placebo religious denominations and randomly assigns each soldier to be either Catholic or Protestant. We do so while preserving the original 59%–41% Catholic – Protestant split in the data. We perform this randomization procedure 1,000 times to obtain the empirical distribution of the coefficient of the placebo Protestant dummies. We then compare our standardized estimates of actual Protestantism from Panel A of [Table 3](#) to the distribution of standardized placebo Protestant coefficients in [Figure 6](#).

The solid red line corresponds to the 97.5th percentile of the distribution of placebo Protestant coefficients, which is calculated as the mean plus two standard deviations. The dashed red line is the coefficient of the actual Protestant dummy from [Table 3](#) Panel A. The coefficient of actual Protestantism lies beyond the 97.5th percentile for awards, injuries and deaths at both the extensive and intensive margin, implying randomization inference  $p$ -values smaller than 0.025. For promotions, actual Protestantism is at

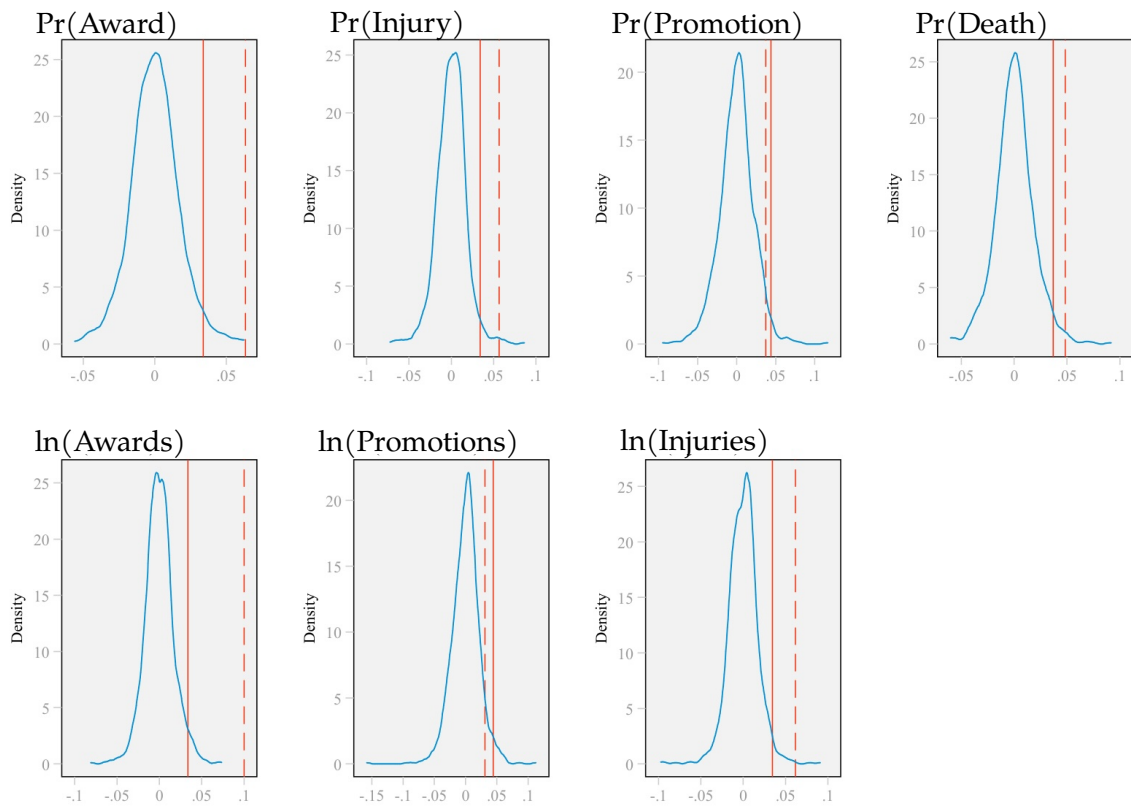


Figure 6: Randomization inference estimates.

Note. The blue curve is the distribution of placebo Protestant coefficients. The solid line is the 97.5th percentile of the latter distribution. The dashed line is actual Protestantism.

the 96.4th and 93.9th percentile of the placebo distribution, implying randomization inference  $p$ -values below 0.036 and 0.061 respectively at each margin. Thus, our randomization inference estimates show that actual Protestantism predicts outcomes on the battlefield above and beyond placebo religion, offering some reassurance that our previous estimates are in fact detecting the effects of Protestantism and not those of another variable.

## 5.2 Opportunities for Glory

So far, we have documented a robust association between Protestantism and wartime effort-related outcomes which are not easily explained by differences in commitment to Nazism, unobserved local-level heterogeneity, soldier health, or the opportunity cost of fighting. We now turn to the possibility that Catholic soldiers did not in fact expend less energy than their Protestant counterparts, but were instead discriminated against, or at least not afforded the same opportunities for glory as Protestant soldiers.

To be sure, it is well known that Hitler intensely disliked the Catholic Church. This animosity, however, likely had more to do with the political economy of power than with ideology. Hitler systematically tried to eradicate any form of alternate authority over the hearts and minds of Germans. Being a consolidated single entity, the Roman Catholic Church posed more of a threat to the Nazi regime than the comparatively more fractionalized Protestant churches. Hitler did in fact understand that he could leverage the power of the Roman Catholic Church over its adherents, for his own military purposes. Hitler understood the motivating value of religion and sought out religious soldiers: [Faulkner Rossi \(2015, p. 94\)](#) writes: “As early as April 1933 Hitler said to a German Catholic bishop, ‘Trouble with Poland is on the horizon. We need soldiers, devout soldiers. Devout soldiers are the most valuable. They put in everything [they have].’” Chaplains were also always available for practicing Catholics in the army, so that they could receive the support they needed in order to keep fighting, thus making it unlikely that Hitler blindly repressed Catholicism.

In [Section 5.1.2](#) above, we saw that Protestants outperformed the Nazi “careerist” *Gottgläubigen*; this also speaks to discrimination. If one thinks soldiers are subject to unequal treatment, then one would expect the presumably well-connected *Gottgläubigen* to be on the receiving end of favourable treatment and experience better outcomes than rank-and-file Protestants. As we saw, that was not the case. In this section, we check whether we still find differences in performance once we account for time-varying opportunities for glory.

### 5.2.1 Squad Fixed Effects Estimates

We can track the squad assignments of a sub-set of soldiers during the course of the war. This approach allows us to evaluate whether Protestant soldiers outperformed co-serving Catholic soldiers within the same squad as shown in [Table 8](#).

Table 8: Squad Fixed Effects Estimates.

	(1) Pr(Award)	(2) Pr(Promotion)	(3) Pr(Injury)	(4) Pr(Award)	(5) Pr(Promotion)	(6) Pr(Injury)	(7) Pr(Award)	(8) Pr(Promotion)	(9) Pr(Injury)
Protestant: Monthly Effect	0.256*** [0.090]	0.249*** [0.089]	0.248*** [0.089]	0.249*** [0.089]	0.034 [0.053]	0.100 [0.093]	0.248*** [0.089]	0.042 [0.053]	0.087 [0.093]
Observations	148,179	148,179	148,179	148,179	148,179	97,000	148,179	148,179	97,000
R-squared	0.009	0.023	0.082	0.023	0.020	0.022	0.082	0.065	0.075
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Squad FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE		Yes		Yes	Yes	Yes			
Squad × Month FE			Yes				Yes	Yes	Yes

Notes. Linear probability models. All regressions include a constant term. Standard errors clustered over soldiers. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

In an average month, the average squad comprises 1,580 men approximately. Since we are interested in within-squad comparisons, we exclude those squad-months with fewer than 10 individuals, as they are likely uninformative. In [Table 8](#), Columns (1)-(3), we include a full set of squad fixed effects in the regressions. Each squad dummy is equal to one in a given month if the soldier is a member of the squad, and zero otherwise. Controlling for unobserved squad-level heterogeneity in this fashion, we find that Protestant is positive across the board, albeit imprecisely estimated in Columns (2) and (3). In Columns (4)-(6), we include, in addition to the squad fixed effects, a full set of month fixed effects. This set up is quite restrictive: the coefficient of Protestant indicates that, even when holding month and squad constant, Protestant soldiers outperform Catholics. We push this logic further in Columns (7)-(9), where we include squad-by-month fixed effects, thus ensuring common support. In these last three columns, we are comparing outcomes for Protestant and Catholic soldiers who served in the same squad at the same time, and still find positive effects of Protestantism. Thus, even in the very restrictive set-up which ensures we are only comparing individuals exposed to the same unobserved time-varying shocks, we still find a positive effect of Protestantism.

### 5.2.2 Kin Bias

We now ask whether soldiers of different religious denominations were afforded different opportunities to prove themselves by army leadership. For example, it could be that Catholic soldiers were (rightly or wrongly) perceived as less hard-working and competent soldiers, and thus assigned low-reward tasks, which might then lead to fewer awards, promotions and injuries. To the extent that such a bias exists, we think Catholic squad leaders would be less likely to discriminate in this fashion against their fellow

Catholics. We check whether that is the case empirically in [Figure 7](#).

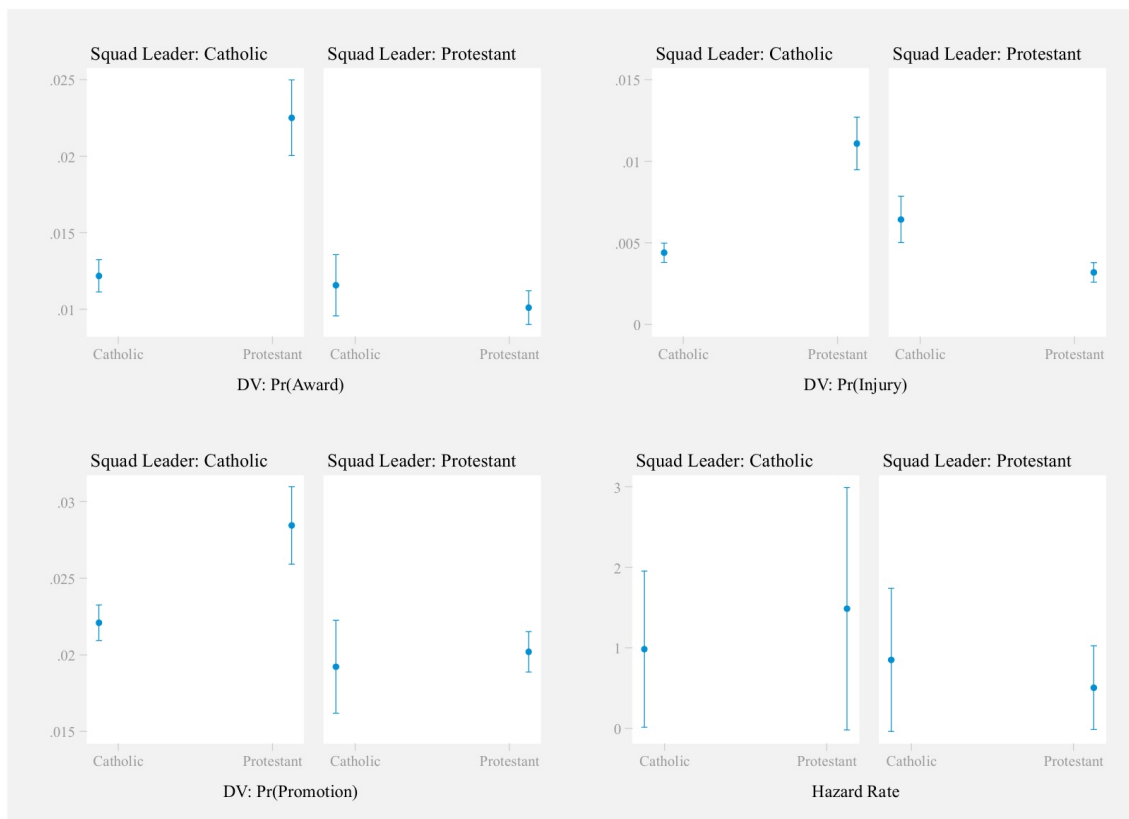


Figure 7: Predicted probabilities: Religious denominations of soldiers and squad leaders.

As a proxy for the religion of the squad leader, we use the religion of the highest ranked soldier in each squad-month. The results are informative: we find no evidence to suggest that Catholics do any better when serving under a Catholic leader than when serving under a Protestant one. The key finding that emerges from [Figure 7](#), however, is that minority status matters for Protestants. In Catholic-led squads, Protestant soldiers outperform Catholics significantly. This is consistent with the work of [Nunziata and Rocco \(2016\)](#) on entrepreneurship in contemporary Switzerland. They argue that adherence to the precepts of one’s religion is stronger when one finds herself in the minority group. Our findings here are consistent with this interpretation: Protestants, when in the minority, appear to exert more effort than when they are in the majority, and also more effort than Catholics.

## 6 Mechanisms

### 6.1 Social control and horizontal spill-overs

The literature ([Arruñada, 2010](#); [Glaeser and Glendon, 1998](#)) suggests that members of Protestant societies exert mutual social control over one another, policing each other’s

behaviour. Mutual social control likely stems from the elimination of confession. In Catholic societies, wrong-doing can be confessed to priests and appropriate penitence given. Thus, Catholics arguably have a moral hazard problem: they have the “outside option” of atonement, which creates an incentive not to behave in the first place. Protestants do not have the latter option and thus mutually enforce each other’s behaviour.

If the social control mechanism holds, then the work ethic should spill over to Catholics: Catholics from majority Protestant areas should work harder, as they have been exposed to more effort-oriented cultures. We construct a dummy for historically majority Protestant county of origin, using the Ifo Prussian Economic History Database (iPEHD). We then interact this dummy with our Protestant dummy and plot the predicted probabilities of each outcome in Figure 8. Our prediction finds support in the data: Catholics from majority Protestant areas are generally not different from Protestants. On the other hand, Protestants experience similar wartime outcomes regardless of the majority religion in their home county.

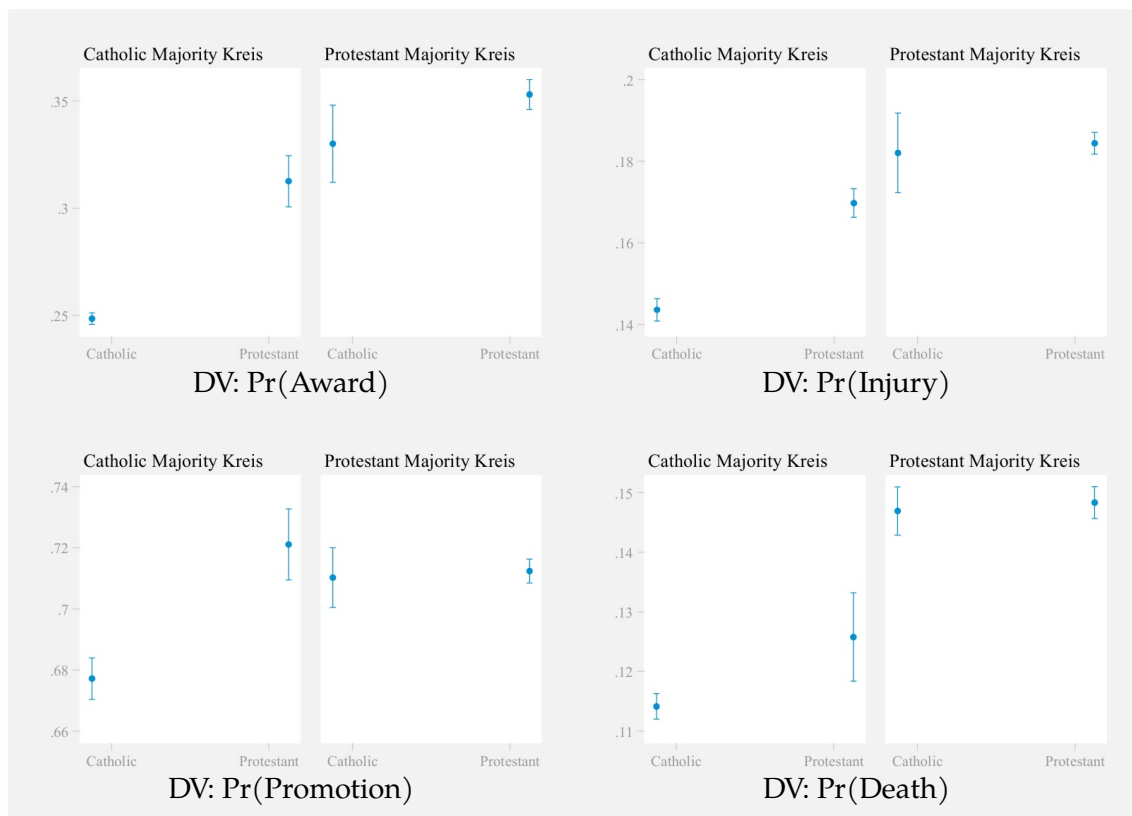


Figure 8: Wartime outcomes by religious denomination and majority religion in home kreis.

Next, we exploit the heterogeneity in award prestige to study whether Protestants strive for status more than Catholics. Based on our reading of the historiographic evidence, chiefly Michaelis (2007), we rank the military distinctions for which we have information from least to most prestigious: (1) War Merit Cross; (2) Achievement

Badge; (3) Combat Award; (4) Combat Badge; (5) Iron Cross 2nd Class; and (6) Iron Cross 1st Class. We estimate the effect of Protestantism on winning each of these awards and plot the resulting coefficients in Figure 9. As we move towards the right of Figure 9, awards become more prestigious, and the Protestant – Catholic gap increases, which indicates status concerns. This is consistent with Glaeser and Glendon (1998), who discuss the role of status at length for Protestants, and with Ager et al. (2022), who explore status competition between *Luftwaffe* pilots at length.

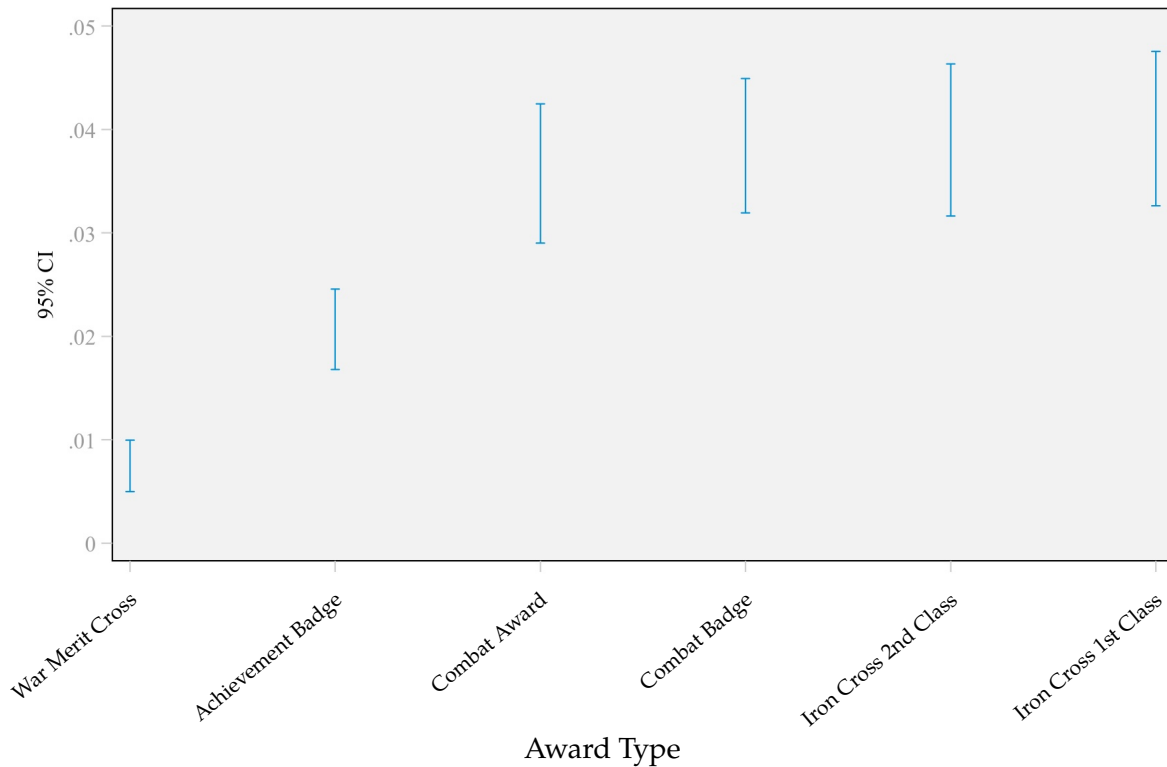


Figure 9: Confidence intervals for the effect of *Protestant* for each award.

Note. Awards ranked from least (left) to most (right) prestigious.

## 6.2 A Tale of Two Protestantisms

If religious beliefs are in fact affecting work ethic, as our results suggest, then we would expect differences between Calvinist and Lutheran Protestants. To be sure, the two main strands of Protestantism have co-existed relatively harmoniously in the period of interest. They are organized today under the broad umbrella of the Evangelical Church in Germany (German acronym: EKD), and their adherents have been counted as members of the same religion in the Prussian census since the early 19th century. Thus, we do not expect either group to have been treated any differently by army leadership or the Nazi regime at large. As discussed above, salvation is pre-ordained in

Calvinism, thereby creating salvation anxiety. Thus, Calvinists work in order to find out about their state of grace. This theoretical argument was formalized by [Alaoui and Sandroni \(2018\)](#), who employ [Kreps and Porteus \(1978\)](#) utility functions to model Calvinist utility. Kreps-Porteus utility functions modify Von Neumann–Morgenstern utility functions to allow for preferences for early resolution of uncertainty. Calvinists work in order to obtain signals about their state of grace, with success shifting Bayesian posteriors of grace. Based on the theoretical work of [Alaoui and Sandroni \(2018\)](#), we can make two testable predictions for the soldiers in our data: (1) Calvinists are expected to exert more effort than Lutherans; and (2) Calvinists should exert effort earlier on during the war than Lutherans. For a small sample of soldiers, we know with certainty whether the soldier declared his religious affiliation as *Reformiert* (Calvinist, N = 121) or *Lutherisch* (Lutheran, N = 145). We find support for prediction (1) in [Table 9](#). Calvinists outperform Lutherans on the probability of receiving an award, for example, by a statistically significant 3 percentage points. All point estimates are positive, although several cannot be precisely estimated.

Table 9: Calvinists and Lutherans.

	(1) Pr(Award)	(2) Pr(Injury)	(3) Pr(Promotion)	(4) Pr(Death)	(5) ln(Awards)	(6) ln(Promotions)	(7) ln(Injuries)
Calvinist = 1; Lutheran = 0	0.030*** [0.009]	0.039 [0.052]	0.048 [0.052]	0.024** [0.009]	0.065 [0.044]	0.032 [0.033]	0.030 [0.043]
Observations	266	266	202	266	266	202	266
R-squared	0.035	0.032	0.064	0.044	0.040	0.077	0.034
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Linear probability models. All regressions include a constant term. Standard errors clustered over states. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

We make use of the panel structure of the data to examine prediction (2) in [Figure 10](#). We find support for the proposition that Calvinists exert effort earlier on in the war process than Lutherans for awards, injuries, and deaths, which is consistent with the view that Calvinists work in order to find out about their state of grace, as argued by [Alaoui and Sandroni \(2018\)](#).

One important mechanism we cannot explore with our dataset is whether Protestants outperformed Catholics on the battlefield due to higher risk tolerance. We attempt to shed light on this question in [Table 10](#), where we draw on three other datasets to compare the risk preferences of contemporary Catholic and Protestant Germans. Specifically, we examine responses to risk-related survey questions (rescaled between 0 and 1) from the World Values Surveys ([Inglehart et al., 2014](#)) and the youth and adult samples of the German Socio-Economic Panel (GSOEP) ([Goebel et al., 2019](#)). We find no significant differences in any of the three datasets. One of the three point estimates is small and positive, another is small and negative, and the highest-powered estimate (from the adult GSOEP) is almost exactly zero. It is therefore unlikely that differences in risk

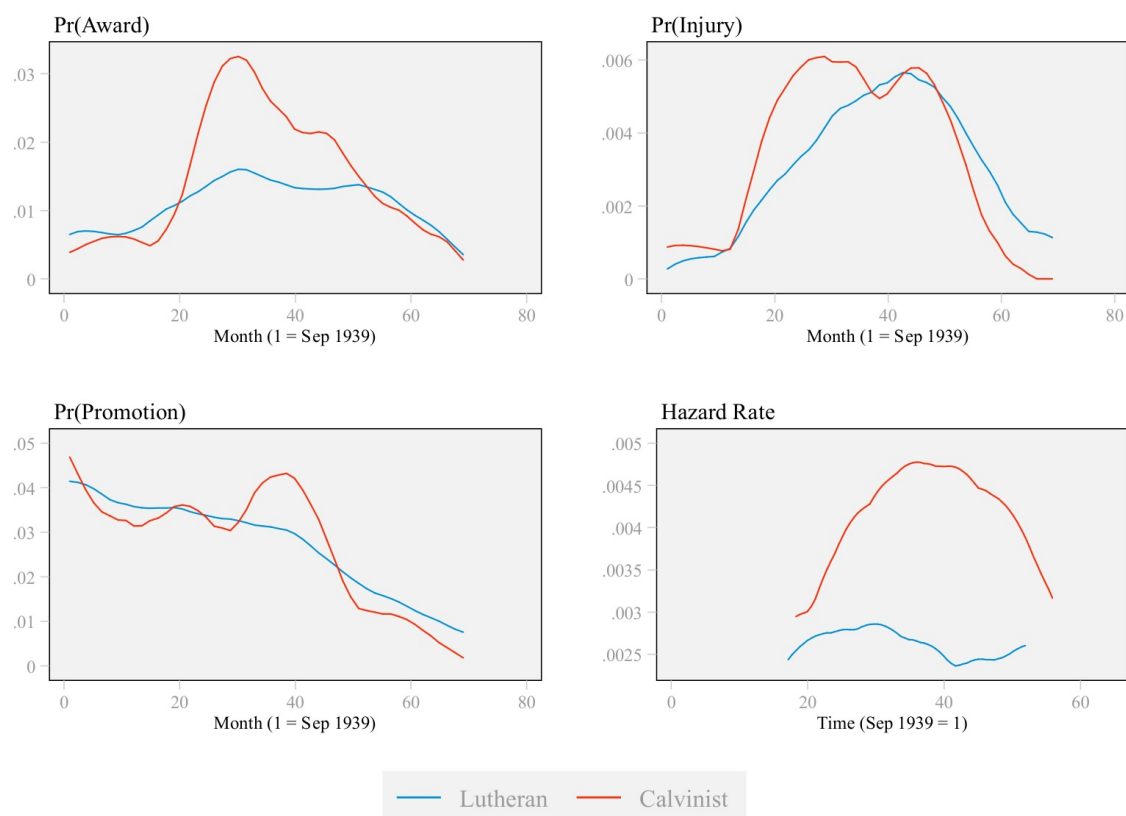


Figure 10: Time patterns for Lutheran and Calvinist adherents.

preferences mediate the effect of Protestantism on battlefield outcomes.

## 7 Concluding Remarks

This study has examined Max Weber's Protestant work ethic hypothesis, which has proven to be one of the most hotly debated theories across economics, sociology, and psychology. We found robust empirical support for the notion that Protestants exert more effort in the workplace than Catholics. Using data at the lowest possible level of aggregation (the individual) for over 15,000 soldiers in Nazi Germany's armies, we were able to examine outcomes of salient effort exertion decisions, where individual soldiers had much at stake, cross-sectionally as well as in a monthly panel of over 600,000 observations. Our results cannot be explained by differences in fanaticism, discrimination against Catholic soldiers, nor a number of other competing explanations. We find evidence to suggest that the Protestant ethic operates through local norms, as we found Catholics from majority-Protestant areas to be largely indistinguishable from Protestants. Prestige also matters for Protestants, as the denomination gap in outcomes increases with the prestige of military decorations. While Weber's assertion that the Protestant work ethic was the root cause of the economic development of Protestant regions has not been supported in recent research, our results show that Weber was likely

Table 10: Risk Preferences and Religious Denomination in Contemporary Germany.

Question	Statistic	Protestant	Catholic	Mean Difference
Adventure and taking risks is important World Values Survey (Schwartz)	Mean	0.717	0.696	0.021
	SE	[.010]	[.012]	
	N	1,217	832	
Personal willingness to take risks GSOEP (youth sample)	Mean	0.606	0.618	-0.012
	SE	[.011]	[.011]	
	N	352	343	
Personal willingness to take risks GSOEP (adult sample)	Mean	0.482	0.478	0.004
	SE	[.003]	[.003]	
	N	6,808	5,809	

Note. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10% levels respectively.

correct as far as the existence of the Protestant work ethic is concerned. Considering that social norms which promote effort can help solve large-scale coordination problems (Congleton, 1991), we view our results as informative to understanding Protestant economic development.

## References

- Ager, P., Bursztyn, L., Leucht, L., and Voth, H.-J. (2022). Killer Incentives: Rivalry, Performance and Risk-Taking among German Fighter Pilots, 1939–45. *Review of Economic Studies*, 89(5):2257–2292.
- Ager, P. and Ciccone, A. (2017). Agricultural Risk and the Spread of Religious Communities. *Journal of the European Economic Association*, 16(4):1021–1068.
- Akbulut-Yuksel, M. and Yuksel, M. (2015). The Long-Term Direct and External Effects of Jewish Expulsions in Nazi Germany. *American Economic Journal: Economic Policy*, 7(3):58–85.
- Akçomak, İ. S., Webbink, D., and ter Weel, B. (2016). Why Did the Netherlands Develop So Early? The Legacy of the Brethren of the Common Life. *The Economic Journal*, 126(593):821–860.
- Akerlof, G. A. and Kranton, R. E. (2005). Identity and the Economics of Organizations. *Journal of Economic Perspectives*, 19(1):9–32.
- Alaoui, L. and Sandroni, A. (2018). Predestination and the Protestant Ethic. *Journal of the European Economic Association*, 16(1):45–76.
- Andersen, T. B., Bentzen, J., Dalgaard, C.-J., and Sharp, P. (2017). Pre-Reformation Roots of the Protestant Ethic. *The Economic Journal*, 127(604):1756–1793.
- Angrist, J. D. and Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press, Princeton.
- Arruñada, B. (2010). Protestants and Catholics: Similar Work Ethic, Different Social Ethic. *The Economic Journal*, 120(547):890–918.
- Arslan, M. (2001). The Work Ethic Values of Protestant British, Catholic Irish and Muslim Turkish Managers. *Journal of Business Ethics*, 31(4):321–339.
- Azoulay, P., Stuart, T., and Wang, Y. (2014). Matthew: Effect or Fable? *Management Science*, 60(1):92–109.
- Azzi, C. and Ehrenberg, R. (1975). Household Allocation of Time and Church Attendance. *Journal of Political Economy*, 83(1):27–56.
- Barro, R. J. and McCleary, R. M. (2003). Religion and Economic Growth across Countries. *American Sociological Review*, 68(5):760–781.
- Barro, R. J. and McCleary, R. M. (2005). Which Countries Have State Religions? *The Quarterly Journal of Economics*, 120(4):1331–1370.

- Barro, R. J. and McCleary, R. M. (2019). *The Wealth of Religions: The Political Economy of Believing and Belonging*. Princeton University Press, Princeton.
- Bartov, O. (1989). Daily Life and Motivation in War: The Wehrmacht in the Soviet Union. *Journal of Strategic Studies*, 12(2):200–214.
- Bartov, O. (2001). *The Eastern Front, 1941–45, German Troops and the Barbarisation of Warfare*. Palgrave, New York.
- Basten, C. and Betz, F. (2013). Beyond Work Ethic: Religion, Individual, and Political Preferences. *American Economic Journal: Economic Policy*, 5(3):67–91.
- Becker, S. O. and Pascali, L. (2019). Religion, Division of Labor, and Conflict: Anti-Semitism in Germany over 600 Years. *American Economic Review*, 109(5):1764–1804.
- Becker, S. O., Pfaff, S., and Rubin, J. (2016). Causes and Consequences of the Protestant Reformation. *Explorations in Economic History*, 62:1–25.
- Becker, S. O. and Woessmann, L. (2009). Was Weber Wrong? A Human Capital Theory of Protestant Economic History. *The Quarterly Journal of Economics*, 124(2):531–596.
- Becker, S. O. and Woessmann, L. (2018). Social Cohesion, Religious Beliefs, and the Effect of Protestantism on Suicide. *Review of Economics and Statistics*, 100(3):377–391.
- Bénabou, R. and Tirole, J. (2006a). Belief in a Just World and Redistributive Politics. *The Quarterly Journal of Economics*, 121(2):699–746.
- Bénabou, R. and Tirole, J. (2006b). Incentives and Prosocial Behavior. *American Economic Review*, 96(5):1652–1678.
- Besley, T. and Ghatak, M. (2008). Status Incentives. *American Economic Review*, 98(2):206–211.
- Blum, M. (2011). Government Decisions before and during the First World War and the Living Standards in Germany during a Drastic Natural Experiment. *Explorations in Economic History*, 48(4):556–567.
- Blum, M. and Strebel, C. (2016). Max Weber and the First World War: Protestant and Catholic Living Standards in Germany, 1915–1919. *Journal of Institutional Economics*, 12(3):699–719.
- Borjas, G. J. and Doran, K. B. (2015). Prizes and Productivity: How Winning the Fields Medal Affects Scientific Output. *Journal of Human Resources*, 50(3):728–758.

- Botticini, M. and Eckstein, Z. (2007). From Farmers to Merchants, Conversions and Diaspora: Human Capital and Jewish History. *Journal of the European Economic Association*, 5(5):885–926.
- Browning, C. R. (1992). *Ordinary Men: Reserve Police Battalion 101 and the Final Solution in Poland*. HarperCollins, New York.
- Bryan, G., Choi, J. J., and Karlan, D. (2021). Randomizing Religion: The Impact of Protestant Evangelism on Economic Outcomes. *The Quarterly Journal of Economics*, 136(1):293–380.
- Calvin, J. (1845). *Institutes of the Christian Religion*. Calvin Translation Society, Edinburgh. Translated by Henry Beveridge. Originally published 1541.
- Cantoni, D. (2012). Adopting a New Religion: The Case of Protestantism in 16th Century Germany. *The Economic Journal*, 122(560):502–531.
- Cantoni, D. (2015). The Economic Effects of the Protestant Reformation: Testing the Weber Hypothesis in the German Lands. *Journal of the European Economic Association*, 13(4):561–598.
- Cantoni, D., Dittmar, J., and Yuchtman, N. (2018). Religious Competition and Reallocation: The Political Economy of Secularization in the Protestant Reformation. *The Quarterly Journal of Economics*, 133(4):2037–2096.
- Cavalcanti, T. V., Parente, S. L., and Zhao, R. (2006). Religion in Macroeconomics: A Quantitative Analysis of Weber’s Thesis. *Economic Theory*, 32(1):105–123.
- Chan, H. F., Frey, B. S., Gallus, J., and Torgler, B. (2014). Academic Honors and Performance. *Labour Economics*, 31:188–204.
- Chuah, S.-H., Gächter, S., Hoffmann, R., and Tan, J. H. W. (2016). Religion, Discrimination and Trust Across Three Cultures. *European Economic Review*, 90:280–301.
- Chusmir, L. H. and Koberg, C. S. (1988). Religion and Attitudes toward Work: A New Look at an Old Question. *Journal of Organizational Behavior*, 9(3):251–262.
- Congleton, R. D. (1991). The Economic Role of a Work Ethic. *Journal of Economic Behavior & Organization*, 15(3):365–385.
- Costa, D. L. and Kahn, M. E. (2003). Cowards and Heroes: Group Loyalty in the American Civil War. *The Quarterly Journal of Economics*, 118(2):519–548.
- Davie, G. (2007). *The Sociology of Religion*. Sage Publications, Los Angeles.

- Delacroix, J. and Nielsen, F. (2001). The Beloved Myth: Protestantism and the Rise of Industrial Capitalism in Nineteenth-Century Europe. *Social Forces*, 80(2):509–553.
- Direct Democracy (2005). Deutschland (Saargebiet), 13. Januar 1935: Status. Database and Search Engine for Direct Democracy, <https://www.sudd.ch>.
- Doehle, H. (1995). *Medals & Decorations of the Third Reich*. Reddick Enterprises, Denison.
- Ekelund, Robert B., J., Herbert, R. F., Tollison, R. D., Anderson, G., and Davidson, A. (1996). *Sacred Trust: The Medieval Church as an Economic Firm*. Oxford University Press, Oxford.
- Elinder, M. and Erixson, O. (2012). Gender, Social Norms, and Survival in Maritime Disasters. *Proceedings of the National Academy of Sciences*, 109(33):13220–13224.
- Faulkner Rossi, L. (2015). *Wehrmacht Priests: Catholicism and the Nazi War Machine*. Harvard University Press, Cambridge, MA.
- Ferguson, T. and Voth, H.-J. (2008). Betting on Hitler—the Value of Political Connections in Nazi Germany. *The Quarterly Journal of Economics*, 123(1):101–137.
- Finke, R. and Stark, R. (1992). *The Churching of America, 1776–1990: Winners and Losers in Our Religious Economy*. Rutgers University Press, New Brunswick, NJ.
- Finley, T. and Koyama, M. (2018). Plague, Politics, and Pogroms: The Black Death, Rule of Law, and the Persecution of Jews in the Holy Roman Empire. *The Journal of Law and Economics*, 61(2):253–277.
- Frey, B. S. (2006). Giving and Receiving Awards. *Perspectives on Psychological Science*, 1(4):377–388.
- Frey, B. S. (2007). Awards as Compensation. *European Management Review*, 4(1):6–14.
- Frey, B. S. and Gallus, J. (2017a). *Honours versus Money: The Economics of Awards*. Oxford University Press, Oxford.
- Frey, B. S. and Gallus, J. (2017b). Towards an Economics of Awards. *Journal of Economic Surveys*, 31(1):190–200.
- Frey, B. S., Savage, D. A., and Torgler, B. (2010). Interaction of Natural Survival Instincts and Internalized Social Norms Exploring the Titanic and Lusitania Disaster. *Proceedings of the National Academy of Sciences*, 107(11):4862–4865.
- Geerling, W., Magee, G. B., and Brooks, R. (2015). Cooperation, Defection and Resistance in Nazi Germany. *Explorations in Economic History*, 58:125–139.

- Geerling, W., Magee, G. B., and Smyth, R. (2016). Sentencing, Judicial Discretion, and Political Prisoners in Pre-War Nazi Germany. *Journal of Interdisciplinary History*, 46(4):517–542.
- Glaeser, E. L. and Glendon, S. (1998). Incentives, Predestination and Free Will. *Economic Inquiry*, 36(3):429–443.
- Goebel, J., Grabka, M. M., Liebig, S., Kroh, M., Richter, D., Schröder, C., and Schupp, J. (2019). The German Socio-Economic Panel Study (SOEP). *Jahrbücher für Nationalökonomie und Statistik*, 239(2):345–360.
- Goffman, E. (1973). *Asylums: Essays on the Social Situation of Mental Patients and Other Inmates*. Penguin, London. Originally published 1961 by Aldine.
- Goldhagen, D. J. (1996). *Hitler's Willing Executioners: Ordinary Germans and the Holocaust*. Knopf, New York.
- Greenberg, J. (1977). The Protestant Work Ethic and Reactions to Negative Performance Evaluations on a Laboratory Task. *Journal of Applied Psychology*, 62(6):682–690.
- Homola, M., Knudsen, D., and Marshall, H. (1987). Religion and Socio-Economic Achievement. *Journal for the Scientific Study of Religion*, 26(2):201–217.
- Hood, R. W., Hill, P. C., and Spilka, B. (2009). *The Psychology of Religion: An Empirical Approach*. The Guilford Press, New York.
- Hornung, E. (2014). Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia. *American Economic Review*, 104(1):84–122.
- Hrebiniak, L. G. and Alutto, J. A. (1972). Personal and Role-Related Factors in the Development of Organizational Commitment. *Administrative Science Quarterly*, 17(4):555–573.
- Hubatsch, W. and Klein, T. (1975). *Grundriß zur deutschen Verwaltungsgeschichte 1815–1945*. Johann-Gottfried-Herder-Institut, Marburg.
- Iannaccone, L. R. (1988). A Formal Model of Church and Sect. *American Journal of Sociology*, 94(S1):S241–S268.
- Iannaccone, L. R. (1991). The Consequences of Religious Market Structure: Adam Smith and the Economics of Religion. *Rationality and Society*, 3(2):156–177.
- Iannaccone, L. R. (1992). Sacrifice and Stigma: Reducing Free-Riding in Cults, Communes, and Other Collectives. *Journal of Political Economy*, 100(2):271–291.

- Iannaccone, L. R. (1998). Introduction to the Economics of Religion. *Journal of Economic Literature*, 36(3):1465–1495.
- Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., Norris, P., Ponarin, E., and Puranen, B. (2014). World Values Survey: Round Six – Country-Pooled Datafile 2010–2014.
- Iyer, S. (2016). The New Economics of Religion. *Journal of Economic Literature*, 54(2):395–441.
- Iyigun, M. (2008). Luther and Suleyman. *The Quarterly Journal of Economics*, 123(4):1465–1494.
- Jha, S. (2013). Trade, Institutions, and Ethnic Tolerance: Evidence from South Asia. *American Political Science Review*, 107(4):806–832.
- Jha, S. and Wilkinson, S. (2012). Does Combat Experience Foster Organizational Skill? Evidence from Ethnic Cleansing during the Partition of South Asia. *American Political Science Review*, 106(4):883–907.
- Johnson, N. D. and Koyama, M. (2017). States and Economic Growth: Capacity and Constraints. *Explorations in Economic History*, 64:1–20.
- King, G., Rosen, O., Tanner, M., and Wagner, A. F. (2008). Ordinary Economic Voting Behavior in the Extraordinary Election of Adolf Hitler. *The Journal of Economic History*, 68(4):951–996.
- Kleiber, D. A. and Crandall, R. (1981). Leisure and Work Ethics and Locus of Control. *Leisure Sciences*, 4(4):477–485.
- Krepinevich, A. F. (1994). Cavalry to Computer: The Pattern of Military Revolutions. *The National Interest*, 37:30–42.
- Kreps, D. M. and Porteus, E. L. (1978). Temporal Resolution of Uncertainty and Dynamic Choice Theory. *Econometrica*, 46(1):185–200.
- Kuran, T. (2004). *Islam and Mammon: The Economic Predicaments of Islamism*. Princeton University Press, Princeton.
- Lenski, G. E. (1961). *The Religious Factor: A Sociological Study of Religion's Impact on Politics, Economics, and Family Life*. Doubleday, Garden City, NY.
- Levy, G. and Razin, R. (2014). Rituals or Good Works: Social Signaling in Religious Organizations. *Journal of the European Economic Association*, 12(5):1317–1360.

- Lewbel, A., Dong, Y., and Yang, T. T. (2012). Comparing Features of Convenient Estimators for Binary Choice Models with Endogenous Regressors. *Canadian Journal of Economics*, 45(3):809–829.
- Lipset, S. M. (1960). *Political Man: The Social Bases of Politics*. Doubleday, New York.
- Max Planck Institute for Demographic Research (MPIDR) and Chair for Geodesy and Geoinformatics, University of Rostock (CGG) (2011). MPIDR Population History GIS Collection. Rostock: MPIDR. Partly based on Hubatsch and Klein (1975).
- Mayer, A. J. and Sharp, H. (1962). Religious Preference and Worldly Success. *American Sociological Review*, 27(2):218–227.
- McCleary, R. M., editor (2011). *The Oxford Handbook of the Economics of Religion*. Oxford University Press, Oxford.
- McCleary, R. M. and Barro, R. J. (2006). Religion and Economy. *Journal of Economic Perspectives*, 20(2):49–72.
- Michaelis, R. (2007). *Deutsche Kriegsauszeichnungen 1939–1945*. Dörfler Verlag GmbH, Eggolsheim.
- Michalopoulos, S., Naghavi, A., and Prarolo, G. (2016). Islam, Inequality and Pre-Industrial Comparative Development. *Journal of Development Economics*, 120:86–98.
- Millett, A. R., Murray, W., and Watman, K. H. (1986). The Effectiveness of Military Organizations. *International Security*, 11(1):37–71.
- Murray, W. (1999). Does Military Culture Matter? *Orbis*, 43(1):27–42.
- Neckermann, S., Cueni, R., and Frey, B. S. (2014). Awards at Work. *Labour Economics*, 31:205–217.
- Neitzel, S. and Welzer, H. (2012). *Soldaten: On Fighting, Killing, and Dying. The Secret WWII Transcripts of German Prisoners of War*. Alfred A. Knopf, New York.
- Nobel, R. (2003). The German Army 1914–45: The Imperfect Military Learning Organisation. *Australian Defence Force Journal*, 162:39–52.
- Noll, M. A. (2011). *Protestantism: A Very Short Introduction*. Oxford University Press, Oxford.
- Nunn, N. (2010). Religious Conversion in Colonial Africa. *American Economic Review*, 100(2):147–152.

- Nunziata, L. and Rocco, L. (2016). A Tale of Minorities: Evidence on Religious Ethics and Entrepreneurship. *Journal of Economic Growth*, 21(2):189–224.
- Nunziata, L. and Rocco, L. (2018). The Protestant Ethic and Entrepreneurship: Evidence from Religious Minorities in the Former Holy Roman Empire. *European Journal of Political Economy*, 51:27–43.
- Okoye, D., Akbulut-Yuksel, M., and Yuksel, M. (2019). Social Changes in Impressionable Years and Adult Political Attitudes: Evidence from Jewish Expulsions in Nazi Germany. *Economic Inquiry*, 58(1):184–208.
- Pascali, L. (2016). Banks and Development: Jewish Communities in the Italian Renaissance and Current Economic Performance. *Review of Economics and Statistics*, 98(1):140–158.
- Placher, W. C. (1983). *A History of Christian Theology: An Introduction*. Westminster Press, Philadelphia.
- Rass, C. (2003). “Menschenmaterial”: Deutsche Soldaten an der Ostfront. *Innenansichten einer Infanteriedivision 1939–1945*. Verlag Schöningh, Paderborn.
- Rautkallio, H. (1987). *Finland and the Holocaust: The Rescue of Finland’s Jews*. Holocaust Library, New York.
- Ray, J. J. (1982). The Protestant Ethic in Australia. *The Journal of Social Psychology*, 116(1):127–138.
- Rubin, J. (2014). Printing and Protestants: An Empirical Test of the Role of Printing in the Reformation. *Review of Economics and Statistics*, 96(2):270–286.
- Rubin, J. (2017). *Rulers, Religion, and Riches: Why the West Got Rich and the Middle East Did Not*. Cambridge University Press, Cambridge.
- Satyanath, S., Voigtländer, N., and Voth, H.-J. (2017). Bowling for Fascism: Social Capital and the Rise of the Nazi Party. *Journal of Political Economy*, 125(2):478–526.
- Savage, D. and Torgler, B. (2015). *The Times They Are A Changin’: The Effect of Institutional Change on Cooperative Behaviour at 26,000ft over Sixty Years*. Palgrave MacMillan, London.
- Schaltegger, C. A. and Torgler, B. (2010). Work Ethic, Protestantism, and Human Capital. *Economics Letters*, 107(2):99–101.
- Shils, E. A. and Janowitz, M. (1948). Cohesion and Disintegration in the Wehrmacht in World War II. *Public Opinion Quarterly*, 12(2):280–315.

- Spenkuch, J. L. (2017). Religion and Work: Micro Evidence from Contemporary Germany. *Journal of Economic Behavior & Organization*, 135:193–214.
- Spenkuch, J. L. and Tillmann, P. (2018). Elite Influence? Religion and the Electoral Success of the Nazis. *American Journal of Political Science*, 62(1):19–36.
- Stake, J. E. (1983). Factors in Reward Distribution: Allocator Motive, Gender, and Protestant Ethic Endorsement. *Journal of Personality and Social Psychology*, 44(2):410–418.
- Stark, R. and Finke, R. (2000). *Acts of Faith: Explaining the Human Side of Religion*. University of California Press, Berkeley.
- Tawney, R. H. (1926). *Religion and the Rise of Capitalism: A Historical Study*. Harcourt, Brace, New York.
- Traversa, D. J. (1995). Motivational Factors in Combat: A Comparison of German and American Soldiers in World War II Using Content Analysis. Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.
- van Hoorn, A. and Maseland, R. (2013). Does a Protestant Work Ethic Exist? Evidence from the Well-Being Effect of Unemployment. *Journal of Economic Behavior & Organization*, 91:1–12.
- Vecchio, R. P. (1980). A Test of a Moderator of the Job Satisfaction–Job Quality Relationship: The Case of Religious Affiliation. *Journal of Applied Psychology*, 65(2):195–201.
- Voigtländer, N. and Voth, H.-J. (2012). Persecution Perpetuated: The Medieval Origins of Anti-Semitic Violence in Nazi Germany. *The Quarterly Journal of Economics*, 127(3):1339–1392.
- Voigtländer, N. and Voth, H.-J. (2015). Nazi Indoctrination and Anti-Semitic Beliefs in Germany. *Proceedings of the National Academy of Sciences*, 112(26):7931–7936.
- Voigtländer, N. and Voth, H.-J. (2025). Highway to Hitler. *American Economic Journal: Applied Economics*, 18(1):120–159.
- Waldinger, F. (2010). Quality Matters: The Expulsion of Professors and the Consequences for PhD Student Outcomes in Nazi Germany. *Journal of Political Economy*, 118(4):787–831.
- Waldinger, F. (2012). Peer Effects in Science: Evidence from the Dismissal of Scientists in Nazi Germany. *Review of Economic Studies*, 79(2):838–861.
- Weber, M. (1904). *The Protestant Ethic and the Spirit of Capitalism*. Unwin Hyman, London.

- Wenger, J. W., O'Connell, C., Constant, L., and Lohn, A. J. (2018). The Value of Experience in the Enlisted Force. Research Report RR-2211-A, RAND Corporation, Santa Monica, CA.
- Weyr, T. (2005). *The Setting of the Pearl: Vienna under Hitler*. Oxford University Press, New York.
- Zahn, G. C. (1969). *German Catholics and Hitler's Wars: A Study in Social Control*. E.P. Dutton, New York.
- Ziegler, H. F. (2014). *Nazi Germany's New Aristocracy: The SS Leadership, 1925–1939*. Princeton University Press, Princeton. Originally published 1989.

APPENDIX TO:  
**Protestantism and Effort Expenditure on the Battlefield: Soldier-Level  
Evidence from World War II**

Tony Beaton   Ahmed Skali   Benno Torgler



Figure A.1: Digitized materials: examples.

Note. In order from top-left to bottom-right: Wehrstammbuch front pages, Wehrpass front pages, Soldbuch front pages, Soldbuch personal data (including religious denomination). Source: Rass and Rohrkamp (2009).

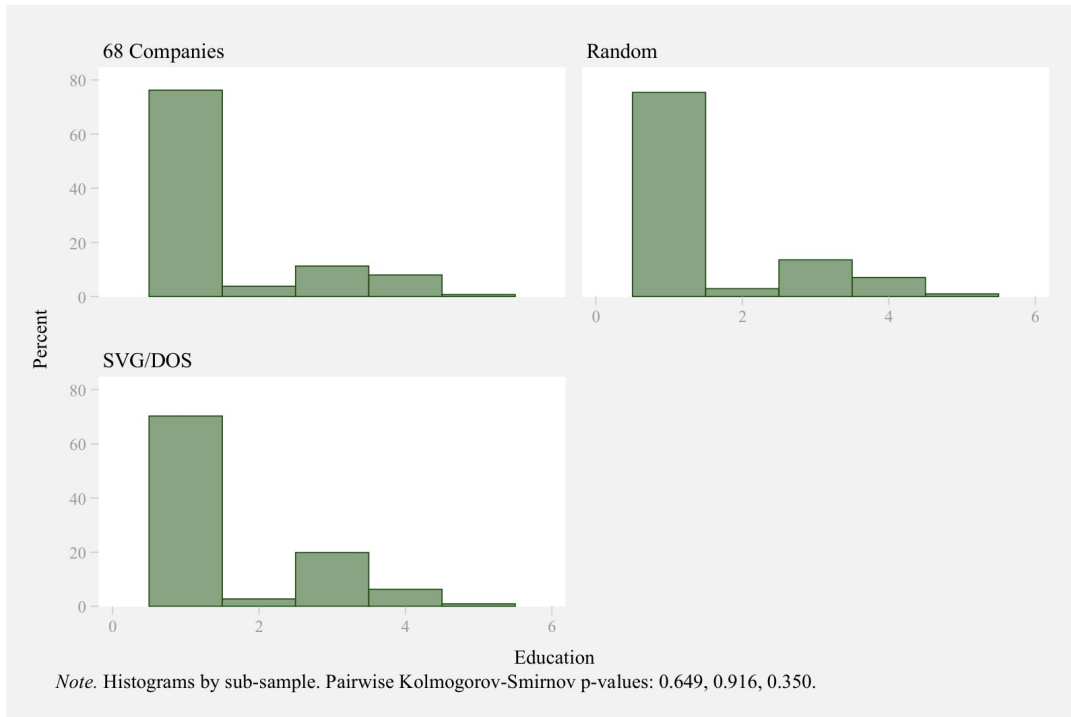


Figure A.2: Distribution of education levels by sub-sample.

Note. Discrete categories from left to right: primary, middle, vocational, high school, university. Source: Authors' calculations based on [Rass \(2003\)](#).

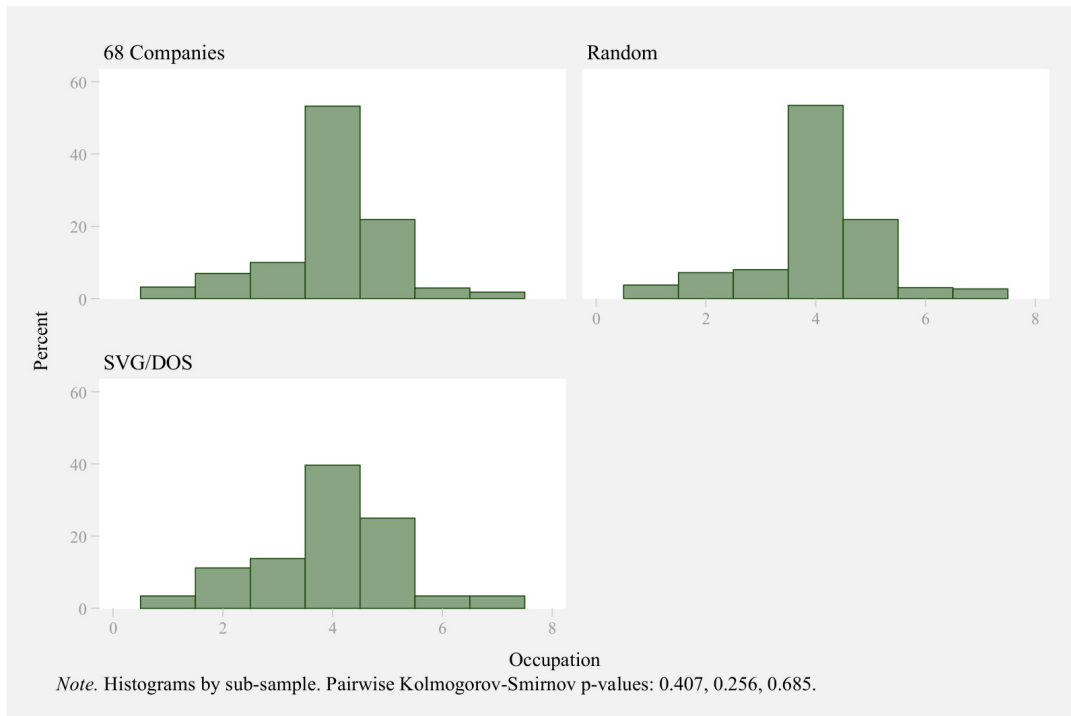


Figure A.3: Distribution of occupations by sub-sample.

Note. Discrete categories from left to right: unemployed, manual labour, agriculture, crafts, clerical, managerial, scientist. Source: Authors' calculations based on [Rass \(2003\)](#).

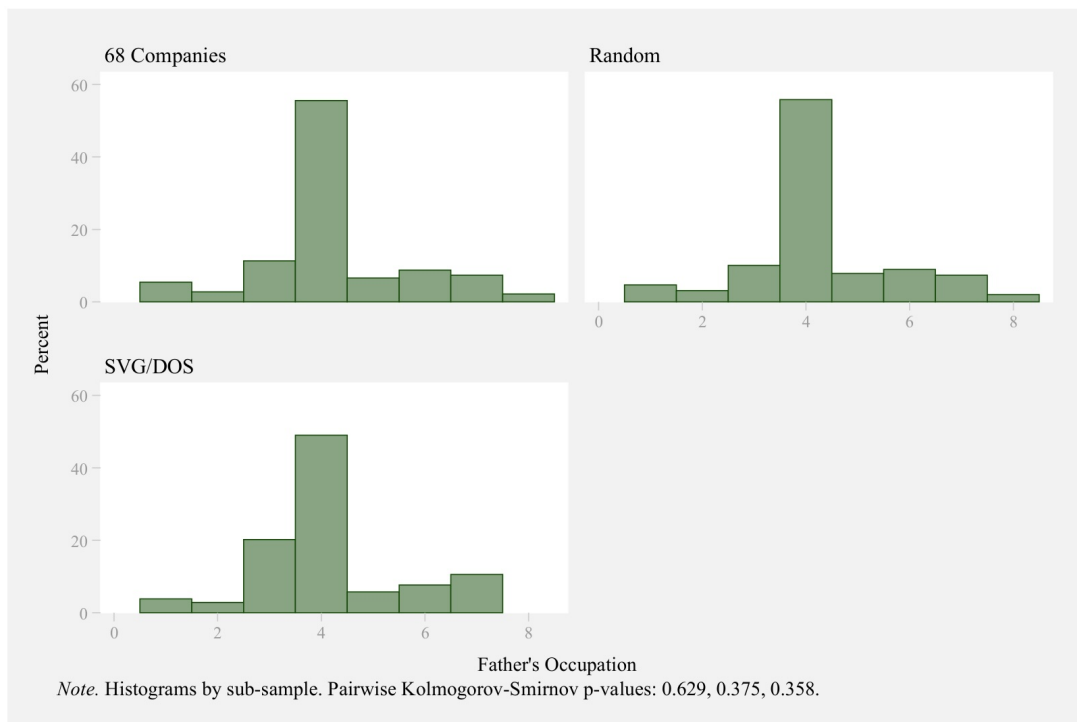


Figure A.4: Distribution of father's occupations by sub-sample.

Note. Discrete categories from left to right: unemployed, manual labour, agriculture, crafts, plant and machine operator, clerical, managerial, scientist. Source: Authors' calculations based on [Rass \(2003\)](#).



Figure A.5: Soldier birthplaces, worldwide.

Source: Authors' calculations based on [Rass \(2003\)](#).

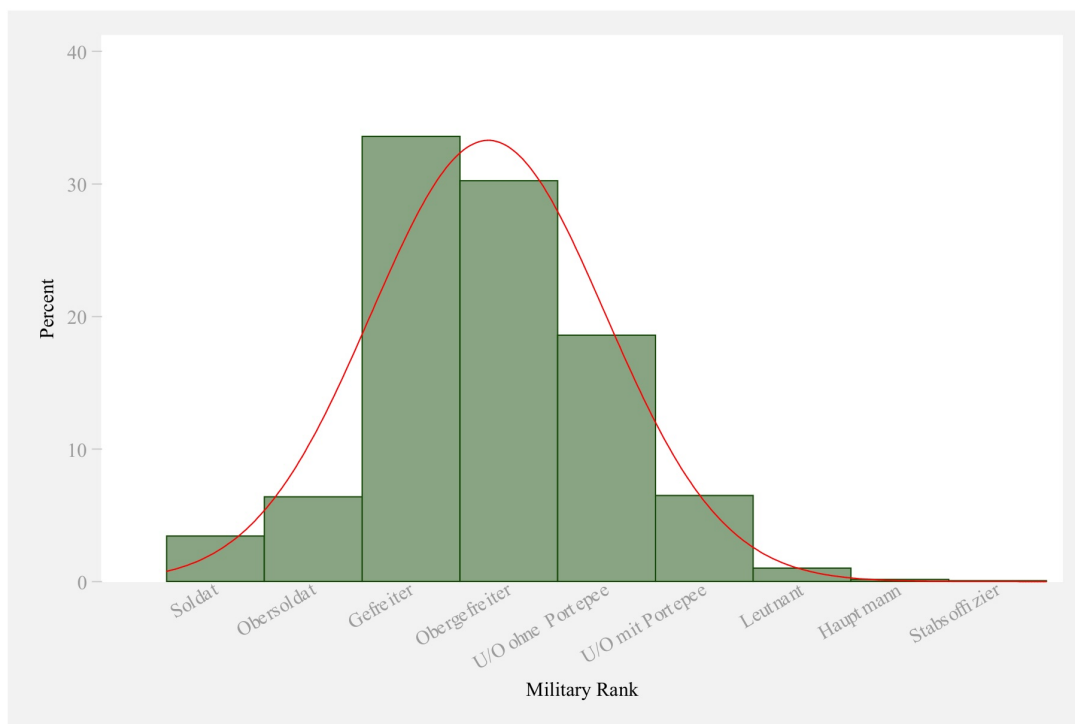


Figure A.6: Distribution of military ranks, from lowest to highest.

Note. Normal distribution shown in red.

Table A.1: Full List of Awards.

Award name	N
Ostmedaille	3,016
Eisernes Kreuz II	2,472
Verwundetenabzeichen Schwarz	2,255
Kriegsverdienstkreuz	1,102
Infanteriesturmabzeichen	533
Deutsches Schutzwall-Ehrenzeichen	460
Sturmabzeichen	362
Verwundetenabzeichen Silber	357
Eisernes Kreuz I	323
Panzerkampfabzeichen Bronze	262
Panzerkampfabzeichen	262
Panzerkampfabzeichen Silber	228
Infanteriesturmabzeichen Silber	168
Kraftfahrbewährungsabzeichen Bronze	167
Infanteriesturmabzeichen Bronze	118
Kampfabzeichen der Flakartillerie	116
Nahkampfspange Bronze	89
Verwundetenabzeichen	72
Flakkampfabzeichen	70
Krimschild	67
Tätigkeitsabzeichen Flakartillerie	62
Erdkampfabzeichen der <i>Luftwaffe</i>	50
Kraftfahrbewährungsabzeichen Silber	45
Ärmelband Afrika	34
Goldkordel als Umrandung des Ärmeltätigkeitsabzeichens für Kraftfahrpersonal der <i>Luftwaffe</i>	29
Kraftfahrbewährungsabzeichen	27
Verwundetenabzeichen Gold	27
Frontflugschleife Bronze	22
Kraftfahrbewährungsabzeichen Gold	21
Panzerkampfabzeichen II. Stufe	17
Frontflugschleife Silber	16
Nahkampfspange Silber	15
Fallschirmschützenabzeichen	14
Sturmabzeichen Silber	14
Heeresflakabzeichen	12
Fliegerschützenabzeichen	12
Demjanskschild	12
Flugzeugführerabzeichen	9
Nahkampfspange	8
Wappen der 16. Pz. Div.	8
Frontflugschleife Gold	8
Frontflugschleife für Kampfflieger Bronze	7
Fliegerschützenabzeichen für Bordfunker	6
Dienstauszeichnung IV. Klasse	5
Panzervernichtungsabzeichen	5
Luftschutzhonorenzeichen 2. Stufe	5
Frontflugschleife für Kampfflieger Silber	5
Kriegsverdienstmedaille	4
Schützenschnur	4
Flaktätigkeitsabzeichen	4
Frontflugschleife für Transportflieger Gold	3
Treudienstehrenzeichen Silber	3
Ärmelband Kreta	3
Narvikschild	3
Sturmabzeichen für schwere Waffen	3

Award name	N
Pioniersturmbzeichen	3
Frontflugschleife für Aufklärer Bronze	3
Minensuchabzeichen	3
Fliegerschützenabzeichen für Bordmechaniker und Bordschützen	3
Ehrenkreuz für Frontkämpfer	3
Spange zum EK II	3
Ehrenpokal für besondere Leistungen im Luftkrieg	3
U-Boot-Kriegsabzeichen	3
Beobachterabzeichen der <i>Luftwaffe</i>	3
Frontflugschleife für Transportflieger Bronze	2
Schützenehrenzeichen	2
Deutsches Kreuz Gold	2
Ritterkreuz zum EK	2
Schützenschnur 2. Stufe	2
Ehrenschild des Luftgaukdos. Norwegen	2
Frontflugschleife für Nachtjäger Bronze	2
Tätigkeitsabzeichen für Truppennachrichtenpersonal	2
Frontflugschleife für Transportflieger Silber	2
Reserve-Sturmbzeichen	2
SS-Dienstauszeichnung 4. Stufe	2
Schützenschnur 1. Stufe	2
Tätigkeitsabzeichen für Kraftfahrpersonal	2
Erinnerungsmedaille Österreich	2
Verdienstabzeichen IV. Klasse	2
Ärmelabzeichen für Nachrichtenpersonal	1
Bordschützenabzeichen	1
Polizeidienstauszeichnung 2. Stufe	1
Medaille für deutsche Volkspflege	1
Frontflugschleife für Aufklärer Gold	1
Ehrenplakette des Luftgaustabes für besondere Leistungen	1
Dienstauszeichnung der NSDAP Bronze	1
Dienststellungsabzeichen für G. U.	1
Goldkordel für fliegendes technisches Personal	1
SA-Wehrabzeichen Bronze	1
Verdienstabzeichen	1
Horchertätigkeitsabzeichen	1
Schützenschnur mit Goldkordelumrandung	1
Frontflugschleife für Kampfflieger Gold	1
Flugmeldetätigkeitsabzeichen	1
Tätigkeitsabzeichen für Fernsprecher	1
Frontflugschleife für Aufklärer Silber	1
Ärmeltätigkeitsabzeichen für Kraftfahrpersonal der <i>Luftwaffe</i>	1
Panzerkampfabzeichen III. Stufe	1
Frontflugschleife für Jäger Bronze	1
Erinnerungsmedaille für Errettung aus Gefahr	1
Memelmedaille	1
Nahkampfspange Gold	1
Tätigkeitsabzeichen für E.-Messleute mit Goldkordelumrandung	1
Kubanschild	1
Frontflugschleife für Nachtjäger Silber	1
Ehrennadel der SS-Heimwehr Danzig	1
Tapferkeitsauszeichnung für die Angehörigen der Ostvölker II. Klasse Silber	1
Tapferkeitsauszeichnung für die Angehörigen der Ostvölker II. Klasse	1
Frontflugschleife für Transportflieger	1
Bandenkampfabzeichen	1
Grubenwehr-Ehrenzeichen	1
Goldkordel für technisches Personal der Fliegertruppe	1

Award name	N
Ehrenplakette für technische Leistungen im Süden	1

Table A.2: Ranks and Sub-Ranks: Soldat, Obersoldat, Gefreiter.

Soldat Sub-Rank	Obersoldat N Sub-Rank	Gefreiter N Sub-Rank	N		
Schütze	7,114	Oberschütze	22,507	Gefreiter	180,097
Kanonier	2,702	Oberkanonier	3,649	Sturmmann	11,850
Grenadier	1,965	Oberfunker	2,929	Sanitätsgefreiter	1,768
Flieger	1,303	Obergrenadier	1,545	Matrosengefreiter	171
Funker	1,187	Panzererschütze	1,513	Marinegefreiter	51
Pionier	987	Oberpionier	1,245	Untergefreiter	14
Panzergranadier	831	Oberreiter	901	Funkgefreiter	13
Sanitätssoldat	725	Obersoldat	863	Heizergefreiter	11
Panzerschütze	481	Oberkraftfahrer	388	Gefreiter-Fahnenjunker	7
Soldat	475	ROB	373	Fallschirmgefreiter	6
Kraftfahrer	384	Panzerbergrenadier	287	Abwehrgefreiter	3
Reiter	308	Sanitätsobersoldat	190		
SS-Mann	217	Hilfsfeldpolizeibeamter	129		
Matrose	169	Oberartilleriematrose	110		
Kapitulantenanwärter	147	RUB	69		
Jäger	143	Flugzeugobermatrose	69		
Sanitätsdienstgrad	117	Oberfahrer	64		
Baupionier	88	Bauobersoldat	50		
Handwerker	71	Oberfüsilier	43		
Unterfeldmeister	70	Oberbausoldat	17		
Flakwehmann	54				
Kriegstechniker	40				
Musketier	39				
KOB	37				
SS-Anwärter	29				
Flakscharfschütze	28				
Füsilier	22				
Krankenträger	21				
E.-Messmann	19				
Luftwaffenoberhelfer	18				
Unterschütze	17				
Kraftfahrzeugvorhandwerker	14				
Feldmeister	12				
SS-Rekrut	9				
Panzerfunkwart	8				
Kfz-Wart II	8				
Staffelmann	5				
RAD Hilfsausbilder	3				
SS-Reservist	2				
Sanitäter	2				

Table A.3: Ranks and Sub-Ranks: Obergefreiter. Unteroffiziere ohne Portepee.

Obergefreiter Sub-Rank	N	Unteroffiziere ohne Portepee Sub-Rank	N
Obergefreiter	153,955	Unteroffizier	95,029
Rottenführer	7,641	Unterscharführer	5,863
Stabsgefreiter	7,254	Sanitätsunteroffizier	2,416
RAD Vormann	2,952	Unterfeldwebel	582
Sanitätsobergefreiter	1,573	Fahnenjunker	472
RAD Obervormann	678	RAD Truppführer	434
Unterführer	249	Oberjäger	418
Rottenfuhrer	79	RAD Hauptvormann	243
Matrosenobergefreiter	59	Waffenunteroffizier	171
Hauptgefreiter	56	Geräteunteroffizier	165
Obersanitätsgefreiter	43	Scharführer	157
SS-Führerbewerber	35	RAD Untertruppführer	135
Marineobergefreiter	30	Feldwebel-Fahnenjunker	113
Kriegshilfswerkmeister	26	Schirrunteroffizier	105
Funkobergefreiter	19	Unteroffizier-Fahnenjunker	105
Fuhrerbewerber	14	Funkunteroffizier	104
Geräteverwalter	11	Bootsmannsmaat	77
Matrosenhauptgefreiter	11	RAD Unteroffizier	75
Sanitätsstabsgefreiter	10	Waffenunteroffiziersanwärter	69
Oberstabsgefreiter	1	Oberbootsmannsmaat	51
Oberjägeranwärter	50		
Unterwachtmeister	46		
Panzerwart I	46		
Musiker-Unteroffizier	45		
Bootsmaat	44		
Unteroffiziersbewerber	42		
UO	40		
Obermaschinenmaat	39		
Stabsunteroffizier	35		
Wachtmeister-Fahnenjunker	31		
Sanitätsunteroffizier-Fahnenjunker	30		
Maschinenmaat	30		
Standartenjunker	27		
Feuerwerkerunteroffizier	26		
Junker	25		
RAD Unterführer	23		
Feldkoch-Unteroffizier	23		
Panzerwart II	18		
Unterscharführeranwärter	12		
Vorhandwerker	9		
Unterscharfuhrer	7		
Sanitätsunteroffiziersanwärter	3		

Table A.4: Ranks and Sub-Ranks: Unteroffiziere mit Portepee.

Unteroffiziere mit Portepee Sub-Rank	N	Unteroffiziere mit Portepee, ctd. Sub-Rank	N
Feldwebel	16,043	Vizefeldwebel	25
Oberfeldwebel	5,607	Stabsfunkmeister	24
Wachtmeister	4,646	Wehrmachtsbeamtenanwärter	21
Stabsfeldwebel	1,725	Scharfschütze	19
Oberwachtmeister	1,612	Baufeldwebel	19
Oberscharführer	1,167	Zeugmeister	15
Sanitätsfeldwebel	1,030	Fähnrich	15
Hauptfeldwebel	742	Gruppenfluglehrer	15
Hauptwachtmeister	518	Techn. Kriegsverwaltungsassistent	14
Oberschirmmeister	445	Vizewachtmeister	11
Hauptscharführer	328	Bootsmann	11
Schirmmeister	309	Wehrmachtsbeamter	9
Funkmeister	295	Oberscharfuhrer	9
Oberfunkmeister	254	Hauptwachtmeister	8
Stabswachtmeister	241	Stabsscharführer	5
RAD Obertruppführer	205	Blindflughilfslehrer	4
Oberbeschlagmeister	201	Gendarmerieobermeister	4
Sanitätsoberfeldwebel	180	Gendarmerieoberwachtmeister	3
Oberfähnrich	171	Hauptscharfuhrer	2
Oberfeuerwerker	136	Oberhauptwachtmeister	2
Zugwachtmeister	133	Truppwachtmeister	2
Beschlagmeister	131	Hauptfeldwebelanwärter	1
Kriegsverwaltungsassistent	109	Sanitätshauptfeldwebel	1
Polizeioberwachtmeister	101		
Revieroberwachtmeister	97		
Polizeiwachtmeister	82		
Feldunterarzt	77		
Standartenoberjunker	67		
RAD Unterfeldmeister	66		
Waffenwachtmeister	64		
Oberfeldwachtmeister	60		
Heereswerkmeister	56		
Feuerwerker	55		
Oberfeldwebelanwärter	50		
Nachrichtenmechaniker	43		
Obersteuermann	38		
Stabsschirmmeister	35		
Sanitätsstabsfeldwebel	35		
Kriegswerkmeister	33		
Unterarzt	31		
R. Oberwachtmeister	30		
Feldwachtmeister	29		

Table A.5: Ranks and Sub-Ranks: Leutnant / Oberleutnant, Hauptmann, Stabsoffizier.

Leutnant / Oberleutnant Sub-Rank	N	Hauptmann Sub-Rank	N	Stabsoffizier Sub-Rank	N
Leutnant	1,923	Hauptmann	719	Major	201
Oberleutnant	1,524	Hauptsturmführer	169	Oberfeldarzt	34
Untersturmführer	519	SS Untersturmführer	28	Stabsveterinär	33
Feldpolizeisekretär	324	Rittmeister	26	Oberstabsarzt	30
Kriegsverwaltungsinspektor	203	Oberveterinär	25	Sturmbannführer	22
Obersturmführer	173	Batteriechef	4	Oberführer	16
Zahlmeister	152			Obersturmbannführer	16
Oberarzt	146				
Regierungsinspektor	141				
Sonderführer	128				
Oberzahlmeister	121				
Zugführer	87				
Waffenmeister	65				
Oberstleutnant	65				
Techn. Inspektor	46				
Heeresjustizinspektor	41				
Werkmeister	36				
Sanitätsoffiziersanwärter	30				
Offiziersbewerber	28				
Sonderführer G	25				
Sanitätsreserveoffizier	17				
Abwehroffizier	16				
Wetterdienstinspektor	10				
Assistenzarzt	9				
Reservesanitätsoffiziersbewerber	5				
Sanitätsoffizier	5				
Heeresjustizoberinspektor	5				
Standartenoberjunker and Werkmeister	3				
Reservesanitätsoffiziersanwärter	1				

Table A.6: Baseline Results with Probit and Negative Binomial Regressions.

	(1) Pr(Award)	(2) Pr(Injury)	(3) Pr(Promotion)	(4) Pr(Death)	(5) Num. Awards	(6) Num. Promotions	(7) Num. Injuries
Protestant	0.074*** [0.005]	0.028*** [0.004]	0.025*** [0.007]	0.019*** [0.004]	0.162*** [0.013]	0.065*** [0.022]	0.037*** [0.006]
Observations	15,421	15,421	9,860	15,421	15,421	9,860	15,421
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.007	0.002	0.002	0.005	0.003	0.001	0.002

Notes. Average marginal effects. Probit models in Columns (1)-(4); negative binomial regressions in Columns (5)-(7). All regressions include a constant term. Standard errors clustered over level 1 sub-national districts. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

Table A.7: Accounting for Historical Cistercian Presence.

	(1) Pr(Award)	(2) Pr(Injury)	(3) Pr(Promotion)	(4) Pr(Death)	(5) ln(Awards)	(6) ln(Promotions)	(7) ln(Injuries)
Protestant	0.076*** [0.006]	0.029*** [0.004]	0.026*** [0.007]	0.017*** [0.003]	0.082*** [0.006]	0.031*** [0.010]	0.024*** [0.003]
Cistercian share	-66.930 [68.690]	5.941 [47.860]	-25.626 [53.140]	77.709 [84.253]	-47.235 [88.234]	-76.815 [65.106]	-17.596 [41.633]
Observations	15,421	15,421	9,860	15,421	15,421	9,860	15,421
R-squared	0.007	0.001	0.001	0.001	0.007	0.001	0.001
State FE	No	No	No	No	No	No	No

Notes. Linear probability models in Columns (1)-(4). All regressions include a constant term. Standard errors clustered over states. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

Table A.8: Survey Questions: Locus of Control.

Question	Statistic	Protestant	Catholic	Mean Difference
People shape their fate themselves World Values Survey	Mean SE N	0.609 [0.011] 673	0.615 [0.013] 418	-0.006
I have little control over my life GSOEP (youth sample)	Mean SE N	0.278 [0.012] 405	0.299 [0.012] 399	-0.021
Others have often controlled my life GSOEP (youth sample)	Mean SE N	0.314 [0.012] 404	0.345 [0.014] 398	-0.031*
I have control over my own destiny GSOEP (youth sample)	Mean SE N	0.706 [0.016] 404	0.718 [0.015] 398	-0.012
I have little control over my life GSOEP (adult sample)	Mean SE N	0.290 [0.003] 6,894	0.284 [0.003] 6,034	0.006
What you achieve depends on luck GSOEP (adult sample)	Mean SE N	0.437 [0.003] 6,882	0.447 [0.004] 6,026	-0.010**

Note. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10% levels respectively. GSOEP: German Socio-Economic Panel.

## Propensity Score Matching estimates

We implement propensity score matching estimators as (i) a safety check on the estimation of linear probability models through OLS, and (ii) a method to address potential outliers in our data. The problems with linear probability models are discussed extensively in [Lewbel et al. \(2012\)](#). LPMs can produce fitted values that are not bounded by the  $(0, 1)$  interval, despite the fact that the dependent variable is binary, and LPMs are also prone to producing too many extreme predicted values, that are close to 0 or 1, even if they do not cross below 0 or above 1. Even assuming these problems do not hold, outliers in our data could be skewing the results. This is because OLS is a unit-weighted least squares error minimization problem. If, say, some Protestant soldiers have very large positive errors, the parameter estimates of *Protestant* will be biased upward, since OLS will ‘tilt’ the linear prediction upward in an effort to accommodate large positive errors, resulting in larger slope estimates.

To address these issues, we match soldiers on the propensity score and compare the effect of our treatment variable, Protestantism, between Protestant and Catholic soldiers that have similar likelihoods of treatment. Mirroring our approach in the main text, we estimate the likelihood of treatment conditional on either location fixed effects or the distance to Wittenberg. Additionally, we restrict our algorithm to perform caliper matching with a radius of 0.01, meaning that matched treatment and control units have estimated probabilities of treatment that are within 0.01 of each other.<sup>15</sup> The propensity score  $\mathbf{p}$  is the vector of fitted values from the following probit specification:

$$\Pr(\text{Protestant}_i = 1) = \varphi(\alpha_0 + X_i \gamma + \epsilon_i) \quad (\text{A.1})$$

where  $\varphi$  is the standard normal cdf and  $X$  is distance to Wittenberg or the vector of location fixed effects. Letting  $Y$  denote effort-related outcomes, the average treatment effect on the treated is calculated as:

$$\text{ATT} = E(Y_{1i} | \text{Protestant}_i = 1, \mathbf{p}) - E(Y_{0i} | \text{Protestant}_i = 0, \mathbf{p}) \quad (\text{A.2})$$

The results are shown in [Table A.9](#). The estimates are consistent with those we report throughout the paper.

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<sup>15</sup>Alternate results with a caliper of 0.05 are similar.

Table A.9: Propensity Score Matching Estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pr(Award)	Pr(Injury)	Pr(Promotion)	Pr(Death)	ln(Awards)	ln(Promotions)	ln(Injuries)
ATT: propensity score conditioned on location fixed effects							
Estimate	0.075***	0.027***	0.022***	0.019***	0.080***	0.027***	0.022***
SE	[0.008]	[0.006]	[0.009]	[0.006]	[0.008]	[0.010]	[0.006]
N	15,421	15,421	9,860	15,421	15,421	9,860	15,421
ATT: propensity score conditioned on distance to Wittenberg							
Estimate	0.049***	0.020***	0.023**	0.016***	0.053***	0.018	0.016***
SE	[0.009]	[0.007]	[0.011]	[0.007]	[0.010]	[0.012]	[0.006]
N	15,411	15,411	9,853	15,411	15,411	9,853	15,411

Notes. Propensity score matching estimates. Propensity score estimated via probit in the first stage. Standard errors in brackets, clustered over states. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

Table A.10: Full Estimates from Table 7 in the Main Text.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pr(Award)	Pr(Injury)	Pr(Promotion)	Pr(Death)	ln(Awards)	ln(Promotions)	ln(Injuries)
Protestant	0.044*** [0.005]	0.014*** [0.004]	0.029** [0.010]	0.004 [0.003]	0.048*** [0.006]	0.027*** [0.009]	0.013** [0.005]
Education (Ref. = University)							
Elementary School	-0.013 [0.031]	0.007 [0.047]	-0.070* [0.038]	-0.009 [0.031]	0.056** [0.022]	-0.017 [0.079]	0.023 [0.033]
Secondary School	0.038 [0.041]	0.004 [0.040]	-0.010 [0.023]	0.016 [0.031]	0.097** [0.038]	0.029 [0.032]	0.008 [0.029]
High School	0.000 [0.038]	-0.009 [0.051]	0.022 [0.046]	0.001 [0.037]	0.064* [0.033]	0.089 [0.081]	0.007 [0.037]
Trade School	-0.047* [0.023]	0.019 [0.051]	-0.021 [0.029]	-0.026 [0.032]	0.027* [0.013]	0.006 [0.072]	0.039 [0.036]
Occupation (Ref. = Scientist)							
Manager	0.101** [0.041]	-0.011 [0.037]	-0.128** [0.058]	0.044* [0.025]	0.110** [0.040]	-0.049 [0.059]	-0.017 [0.027]
Cleric	0.069*** [0.021]	0.019 [0.017]	-0.054* [0.027]	0.015 [0.018]	0.077*** [0.017]	-0.047 [0.029]	0.015 [0.013]
Craftsman	0.094*** [0.018]	0.041** [0.016]	-0.144*** [0.028]	0.030* [0.017]	0.096*** [0.013]	-0.127*** [0.036]	0.036*** [0.011]
Farmer	0.092*** [0.021]	0.051** [0.018]	-0.064 [0.039]	0.028 [0.019]	0.090*** [0.016]	-0.070** [0.031]	0.034** [0.015]
Labourer	0.154*** [0.020]	0.074*** [0.016]	-0.146*** [0.044]	0.033** [0.015]	0.148*** [0.020]	-0.122** [0.057]	0.071*** [0.012]
Unemployed	0.012 [0.014]	-0.008 [0.023]	-0.083*** [0.024]	0.014 [0.019]	0.028 [0.019]	-0.020 [0.036]	0.004 [0.020]
Father's Occupation (Ref. = Scientist)							
Father: Manager	-0.005 [0.031]	-0.043** [0.017]	-0.101*** [0.026]	0.035** [0.016]	0.004 [0.038]	-0.144*** [0.036]	-0.020 [0.015]
Father: Cleric	0.018 [0.026]	-0.029 [0.022]	0.019 [0.022]	-0.010 [0.019]	0.014 [0.036]	-0.030 [0.032]	-0.022 [0.019]
Father: Craftsman	-0.045 [0.029]	-0.069** [0.024]	-0.007 [0.023]	0.006 [0.017]	-0.042 [0.037]	-0.047 [0.034]	-0.048** [0.019]
Father: Farmer	-0.067* [0.033]	-0.115*** [0.019]	-0.040* [0.021]	-0.008 [0.024]	-0.073* [0.039]	-0.083** [0.031]	-0.084*** [0.015]
Father: Labourer	-0.044** [0.020]	-0.055*** [0.018]	-0.060* [0.028]	0.048** [0.018]	-0.031 [0.027]	-0.092** [0.039]	-0.027** [0.011]
Father: Unemployed	0.023 [0.021]	-0.041 [0.025]	0.024 [0.023]	0.063*** [0.021]	0.046 [0.038]	0.029 [0.031]	-0.030 [0.020]
Ethnicity (Ref. = Alsace-Lorraine)							
German	0.175*** [0.027]	0.109*** [0.015]	0.056 [0.326]	0.073*** [0.024]	0.164*** [0.027]	0.144 [0.231]	0.084*** [0.011]
Ostbelgier	0.066 [0.038]	0.168*** [0.057]	0.307 [0.356]	0.080 [0.061]	0.063 [0.053]	0.341 [0.266]	0.122** [0.045]
Luxembourger	0.039 [0.027]	0.056* [0.027]		-0.034 [0.022]	0.043* [0.024]		0.036 [0.021]
Health: Height	-0.073 [0.052]	-0.043 [0.043]	0.255** [0.104]	0.040 [0.047]	-0.164*** [0.055]	0.276** [0.102]	-0.084* [0.041]
Nazi organization membership							
SA Member	0.137*** [0.022]	0.085*** [0.017]	0.092*** [0.020]	0.024** [0.010]	0.148*** [0.032]	0.075** [0.028]	0.073*** [0.016]
SS Member	0.142*** [0.022]	0.119*** [0.024]	0.113 [0.075]	-0.006 [0.029]	0.140*** [0.025]	0.134* [0.074]	0.099*** [0.017]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pr(Award)	Pr(Injury)	Pr(Promotion)	Pr(Death)	ln(Awards)	ln(Promotions)	ln(Injuries)
HJ Member	0.080*** [0.016]	0.061*** [0.010]	-0.044** [0.020]	0.025** [0.009]	0.101*** [0.018]	-0.038** [0.015]	0.055*** [0.008]
NSDAP Member	0.026 [0.019]	0.013 [0.011]	0.001 [0.015]	-0.035*** [0.006]	0.044* [0.021]	0.025 [0.020]	0.018* [0.010]
Observations	4,578	4,578	2,489	4,578	4,578	2,489	4,578
R-squared	0.029	0.016	0.042	0.013	0.028	0.041	0.016
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Linear probability models in Columns (1)-(4). All regressions include a constant term. Standard errors clustered over states; omitted to preserve space. \*\*\*, \*\* and \* denote significance at the 1, 5 and 10% level respectively.

## The Sociology and Psychology Literatures

Several studies find no association between Protestantism and effort-related outcomes (Chusmir and Koberg, 1988; Ray, 1982; Kleiber and Crandall, 1981), while others find effects consistent with the Protestant work ethic. Studies have linked Protestantism to socio-economic status, suggesting both a level effect, where Protestants are of higher socio-economic status than Catholics (Mayer and Sharp, 1962; Lenski, 1961; Homola et al., 1987), and a growth effect, with Protestants being more upwardly mobile and achieving higher socio-economic status after controlling for parental income and other family characteristics (Lenski, 1961; Homola et al., 1987). Thus, there is evidence suggesting that Protestants outperform Catholics in terms of lifetime socio-economic achievement. Attitudes towards work, effort and achievement are seen to be the main root of these differences in achievement. Vecchio (1980) documents overall lower job satisfaction for Protestants relative to Catholics, and also finds that Protestants are more concerned with occupational prestige than Catholics. This suggests that striving for achievement is a distinctly Protestant quality. Hrebiniak and Alutto (1972) find that Protestants show more commitment to their employers than Catholics. Protestant managers in Britain also report greater work ethic than Catholic managers in Ireland (Arslan, 2001). Greenberg (1977) studies the effect of negative performance feedback in laboratory experiments with a simple effort task: when given negative feedback, participants with Protestant values performed significantly better than others, suggesting a correlation between Protestant values and aversion to poor performance. Stake (1983) shows that holders of Protestant ethics in the laboratory were more likely to allocate rewards for performance based on actual performance.