Religious Identity, Safeguards, and Hold-Ups in Human Capital Transmission*

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Abstract

This paper shows that religion can substitute for contractual safeguards in human capital transmission. Using over 50,000 apprenticeship contracts from Venice (1575–1775), I find that masters with strong religious identities were less likely to demand third-party guarantors, front-load training costs, and defer payment. Exogenous variation in masters' religious identities comes from differential pre-birth exposure to earthquakes. Evidence from apparitions of the Virgin Mary, a regression discontinuity around Pentecost, and heterogeneity analyses points to three complementary mechanisms: beliefs in supernatural monitoring, religious norms, and religious parochialism. Despite greater exposure to apprentice hold-up, religious masters did not experience higher early-exit rates.

Keywords: Religion, religious identity, contracts, contractual safeguards, hold-up problems, apprenticeships
JEL codes: Z12, J24, D86

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1 Introduction

The transmission of knowledge and skills from experienced workers to apprentices is a first-order determinant of productivity and a central channel through which human capital accumulates in an economy. Making such transmission viable, however, requires solving a commitment problem. Apprentices can leave once they are productive, preventing firms from recouping their investments and undermining their incentives to train. To solve this hold-up, extant research emphasizes that training contracts must be designed to make early exit costly, whether through strategic control over knowledge transfer (Garicano and Rayo, 2017), penalties for quitting (Hoffman and Burks, 2017), or incentives conditional on completion (Cefalà et al., 2024).

This paper shows that religion can substitute for these safeguards in master-apprentice relationships. Masters with a strong religious identity were less likely to demand third-party guarantors, require apprentices to front-load the cost of training through zero-wage arrangements, and defer payment until completion. Beliefs in divine surveillance, religious norms, and religious parochialism offered masters the assurances that contractual safeguards would otherwise supply. And while this left religious masters more exposed to hold-ups, they were no more likely to see their apprentices leave early.

The empirical setting is Early Modern Venice. The data come from the *Accordi dei Garzoni*, a corpus of more than 50,000 apprenticeship contracts registered with the *Giustizia Vecchia* between 1575 and 1775 (Ehrmann, Topalov, and Kaplan, 2023). These contracts specified the terms under which apprentices were hired to learn a trade, typically in exchange for labor and for a fixed period, and defined the core rights and obligations of both parties. I complement these records with data on biblical, saint, and church patron names, earthquakes, Marian apparitions, and the historical dates of Pentecost.

This setting offers several advantages for studying masters' demand for contractual safeguards. First, the scope for opportunism was asymmetric. Guild monitoring and reputational sanctions disciplined masters to train properly, even when training quality was difficult to verify. In contrast, guilds and reputation were less effective at ensuring apprentices completed their terms (apprentices were mobile and could abscond), pushing masters to rely on contractual safeguards enforced by the *Giustizia Vecchia* (Caracausi, 2017; Wallis, 2012; Mokyr, 2020). Second, these safeguards were specified at the start of the apprenticeship, mitigating concerns about endogenous adjustment to observed performance. Third, because masters contracted individually with apprentices, this setting avoids the noise from delegated authority and collective decision-making common in organizational settings. Finally,

a shared contractual framework and single enforcement institution make contractual choices directly comparable across trades and time.

To measure masters' religious identity, I rely on a name-based index. Given names reflect the culture in which individuals are socialized (Dion, 1983; Lieberson, 2000). Parents transmit beliefs and values to their children (Bisin and Verdier, 2001; Fryer and Levitt, 2004); names are both part of, and a reflection of, that transmission (Bazzi, Fiszbein, and Gebresilasse, 2020; Fouka, 2020); and this intergenerational process leaves a measurable imprint on identity that shapes behavior in adulthood (Bengtson et al., 2009; Jurajda and Kovač, 2021; Andersen and Bentzen, 2024).[1] Thus, although names cannot fully capture the complexity of religious identity, religiously salient names provide an informative signal of stronger religious socialization. For identification, I exploit exogenous variation in religiosity induced by earthquake exposure before masters were born (Pargament, 2001; Bentzen, 2019).[2]

The 2SLS results show that a one-standard-deviation increase in master name religiosity reduces the likelihood of a guarantor by approximately 19 percentage points, the likelihood of a zero-wage arrangement by 28 percentage points, and the likelihood of deferred payment by 41 percentage points. These estimations account for transaction characteristics through trade fixed effects and remain robust after controlling for additional covariates, such as the supply and demand of apprentices, master traditionalism, previous experiences of opportunism, and apprentices' origins. Alternative explanations based on masters substituting contractual safeguards for non-economic compensation, hiring younger apprentices, or shortening contract length do not account for these patterns.

I then show that three different dimensions of religious identity served to reduce masters' demand for safeguards: beliefs in divine surveillance, religious norms, and religious parochialism. A central feature of many religions is the belief that morally concerned, omniscient deities observe human behavior and reward or punish it (Norenzayan and Shariff, 2008; Johnson and Bering, 2006). Such beliefs are associated with heightened perceptions of surveillance, which can improve expectations about how others will behave. It follows that masters who believed actions were being watched will demand fewer safeguards when hiring apprentices. Empirically, I rely on documented Marian apparitions as primes that increase the salience of supernatural watchers.[3] In these episodes, the Virgin Mary is reported to have

[1] Other studies use name-giving patterns to assess religious identity (Haan, 2005; Andersen and Bentzen, 2024), individualism (Bazzi, Fiszbein, and Gebresilasse, 2020), ethnicity (Fouka, 2020), "blackness" (Fryer and Levitt, 2004), and nationalism (Jurajda and Kovač, 2021).

[2] Religious identity may correlate with unobserved characteristics of masters that independently affect contracting decisions. For instance, religiosity has been associated with traditionalism and conformity (Saroglou, Delpierre, and Dernelle, 2004) and sensitivity to threats (Yu et al., 2022), both of which could increase the demand for contractual safeguards and bias OLS estimates toward zero.

[3] For a review and meta-analysis of religious priming effects, see Shariff et al. (2016).

appeared, offering guidance and demanding specific actions, signaling that human behavior is being observed.

Religious identity is also defined by the internalization of doctrinal commitments that usually frame honesty, fairness, promise-keeping, and trustworthiness as moral duties (Pichon, Boccato, and Saroglou, 2007; McKay et al., 2011). Because individuals tend to project their own values onto others (Krueger, 1998; Thielmann, Hilbig, and Zettler, 2020), masters who have internalized religious norms may perceive their apprentices as less likely to behave opportunistically, reducing their demand for contractual safeguards. To capture the effect of religious norms, I implement a regression discontinuity (RD) design around Pentecost. This Catholic feast represents the renewal of believers' commitments to Christ's mission and marks the end of the Easter season, increasing the salience of religious norms as the date approaches.

The last dimension of religious identity concerns its social content. By providing a shared set of beliefs and values that distinguish coreligionists from outsiders and by organizing them into tightly knit communities, religion sharpens group boundaries (Turner, Brown, and Tajfel, 1979; Dunbar, 2022). As with other salient markers (e.g., ethnicity or nationality), a shared religious identity can increase in-group prosocial dispositions and create channels of information that facilitate monitoring and sanctioning. Such informal enforcement can then substitute for contractual safeguards in disciplining apprentices' opportunistic behavior. To assess empirically the relevance of this dimension, I test whether religious masters demand even fewer safeguards when their apprentices also have a strong religious identity.

In the last part of the paper, I turn to the consequences of religious masters' choices. As masters reduce their safeguards, standard models would predict more early exit. The data, however, show that masters with a strong religious identity are not more likely to see their apprentices flee.

Three reasons may explain why these apprenticeships remained incentive-compatible despite weaker contractual safeguards. First, masters with stronger religious identity were more likely to hire religious apprentices, and shared religious identity may have raised the costs of unilaterally breaking the contract (Dunbar, 2022). Second, religious masters may have attracted less opportunistic apprentices. If trustworthy apprentices prefer masters who do not treat them as potential cheaters, religious masters' willingness to forgo guarantors and other protections could have attracted apprentices who were less likely to leave early (Sliwka, 2007; Ellingsen and Johannesson, 2008). Third, apprentices may have reciprocated the absence of safeguards. Experimental evidence documents that when principals signal distrust through monitoring or penalties, agents respond with reduced effort and cooperation

(Fehr and Rockenbach, 2003; Falk and Kosfeld, 2006). By forgoing formal protections, religious masters could have avoided these costs and shifted the relationship from deterrence toward relational enforcement (Charness, 2002).

1.1 Related literature and contributions

This paper is related to several literatures that intertwine at the intersection of human capital transactions, contracting, identity, and religion.

First, it speaks to the human capital literature on the classic hold-up problem in training. Starting with how frictions (e.g., informational asymmetries, search frictions) could allow this type of training (Becker, 1964; Acemoglu and Pischke, 1998, 1999), attention has recently focused on contract design and how contractual safeguards can make apprentices' commitment credible (Garicano and Rayo, 2017; Hoffman and Burks, 2017; Shi, 2023; Jeffers, 2024; Cefalà et al., 2024). Work by economic historians focusing on apprenticeships tells a similar story. In the training arrangements that were common across Europe since at least medieval times, safeguards such as third-party guarantors and training premiums were central to ensuring human capital transmission (Wallis, 2007; Minns and Wallis, 2013; Ogilvie, 2019; Mokyr, 2020). This contrasts with parts of Asia, such as India and China, where training remained largely within kin networks (Roy, 2013; van Zanden and Prak, 2013). The present paper complements both literatures by showing that religion could substitute contractual enforcement to make human capital transmission viable.

The paper also contributes to the broader literature on contracting. A large body of work examines how principals use contractual safeguards to secure gains from trade under hold-up and agency problems, in settings ranging from supply chains and outsourcing to consumer credit (Arruñada, 2012; Ahmadjian and Oxley, 2013; Antràs and Foley, 2015; Collier, Ellis, and Keys, 2025). This literature has focused primarily on the characteristics of the transaction to explain the choice of safeguards. I show that the principal's identity also plays a first-order role, not only through in-group channels that mitigate information and enforcement problems (Giannetti and Yafeh, 2012; Fisman, Paravisini, and Vig, 2017), but also through the beliefs and norms that identity carries with it.[4] Moreover, the finding that forgoing safeguards does not lead to greater apprentice opportunism also connects to work in which heterogeneity in social preferences shapes contract choice and matching (Cabrales, Calvó-Armengol, and Pavoni, 2008; Cabrales et al., 2010; Friebel, Kosfeld, and Thielmann, 2019), to experimental evidence on the "hidden costs of control," where monitoring and

[4]For some additional empirical evidence on how principals' values and beliefs shape contracts, see Cabrales et al. (2010) and Erat (2013). For theoretical models incorporating principals' moral preferences, see Chassang and Zehnder (2016) and Li and Schnedler (2025).

penalties signal distrust and crowd out cooperation (Fehr and Rockenbach, 2003; Falk and Kosfeld, 2006; De Chiara et al., 2025), and to the relational contracts literature, which emphasizes that sustained cooperation can rest on positive perceptions and reciprocity (Baker, Gibbons, and Murphy, 2002; Dufwenberg and Kirchsteiger, 2004; Gil and Zanarone, 2025).

Third, the paper adds to the empirical literature on how religion affects economic behavior. The strands most closely related to this paper focus on religious identity and religious practice. Religious identity has been shown to shape informal insurance (Chen, 2010), fairness and social punishment (Henrich et al., 2010), economic preferences such as risk aversion and discount rates (Benjamin, Choi, and Fisher, 2016), deception (Christie, 2019), compliance with health campaigns (Armand et al., 2024), and volunteering (Kelly, Kramer, and Shariff, 2024).[5] Religious practice, in turn, has been shown to influence economic growth and subjective well-being (Campante and Yanagizawa-Drott, 2015), political attitudes (Aksoy and Gambetta, 2022), tolerance and beliefs about equality (Clingingsmith, Khwaja, and Kremer, 2009), and educational outcomes (Hornung, Schwerdt, and Strazzeri, 2023). A prominent view in this literature is that religion primarily strengthens parochial behavior (Galen, 2012). The evidence here points in a different direction: religious masters demanded fewer safeguards even when their apprentices did not share a strong religious identity, consistent with evidence that religion's prosocial effects extend beyond the in-group (Guiso, Sapienza, and Zingales, 2003; Henrich et al., 2010; Bennett and Einolf, 2017; Valencia Caicedo, Dohmen, and Pondorfer, 2023). The paper also shows empirically that divine surveillance and religious norms can explain this broader prosociality.

Finally, the paper joins a growing stream of organizational research in the economics of religion.[6] Bloom, Sadun, and Van Reenen (2012) show that hierarchical religions reduce firm decentralization; Filistrucchi and Prüfer (2019) compare how Catholic and Protestant doctrines translate into different organizational structures; Ben-Nasr and Ghouma (2022) show that Islamic Law narrows the investment opportunity of Shariah-compliant firms, leading firms to pay higher dividends; and Qiao (2025) reveals that the historical prevalence of Protestantism in the US influences female representation in the leadership teams of modern firms. Moreover, Montero, Yang, and Yentzen (2025) show that increases in the opportunity costs of religion push churches to establish new educational and health institutions and relax doctrines. I extend this line of work from organizational design and the consequences of religion for organizations to contractual design, showing that religious identity affects the

[5]There is also a body of empirical work on identity in labor and organizational settings. See, for example, Casoria, Reuben, and Rott (2022) on group identity and hiring; Oh (2023) on social identity and labor supply; Bisin et al. (2011) on ethnic identity and labor outcomes; and Evans et al. (2024) on political identity and team performance.

[6]For a recent overview of the economics of religion, see Becker, Rubin, and Woessmann (2024).

terms under which economic relationships are formed.

2 Empirical setting and data

The following sections outline the historical background of apprenticeship contracts and describe the data used in the main analyses, concluding with a discussion about external validity.

2.1 Apprenticeship contracts in Medieval and Early Modern Europe

Apprenticeships were a central element in the organization of production in pre-industrial Europe. For masters, they offered the possibility of sourcing low-cost labor within the workshop in exchange for training (De Munck, 2007; Ogilvie, 2019). At the macro-level, they fostered the transmission of skills and knowledge across generations and beyond kinship lines, becoming a key driver of long-run human capital formation and economic development in Europe (De la Croix, Doepke, and Mokyr, 2018).

These arrangements were structured through contracts that specified reciprocal obligations: masters provided training and (sometimes) compensation, while apprentices supplied labor as they learned the craft.[7] Because access to most trades depended on completing such a contract, apprenticeship functioned as the standard entry point into an artisan career. Former apprentices typically progressed to journeymen and, after demonstrating proficiency, to masters supervising their own workshops and apprentices.

The success of these arrangements, however, depended on preventing opportunistic behavior by both parties (Mokyr, 2020). Masters could exploit apprentices by prioritizing cheap labor over training. The quality of training cannot be fully specified in a written contract, and training efforts and their outcomes are difficult to verify externally. Apprentices, on the other hand, had incentives to shirk (effort within the workshop is difficult to monitor), and the fixed and non-repeatable term of the contract made early exit especially appealing for them as training neared its end. Specifically, apprentices could quit after acquiring the trade's skills but before fully offsetting their training costs, move to another place, and practice the trade (Mokyr, 2020). Information asymmetries made these problems even worse for masters. Apprentices often came from distant locations and moved frequently, which meant

[7] Guilds and other institutions typically defined only a minimal legal framework for these arrangements, such as eligibility rules or the minimum length of the contract, leaving considerable room for contractual flexibility.

masters had limited prior knowledge about them and few ways to verify their character or reliability (Wallis, 2020; De Munck, De Kerf, and De Bie, 2020). Moreover, most masters trained only a small number of apprentices during their careers (Mokyr, 2020), which limited their opportunities to learn from past mistakes or develop effective screening and selection strategies (Mokyr, 2020).

Three complementary mechanisms addressed these problems and made apprenticeship arrangements viable (Mokyr, 2020; Ogilvie, 2019). The first was individual reputation. Reputation worked because of the repeated nature of economic interactions: masters who failed in their obligations or mistreated apprentices could suffer social and economic penalties, while apprentices who shirked in the workshop could damage their future job prospects or their chances of gaining guild membership.

The second mechanism was collective enforcement through guilds, which especially contributed to upholding masters' commitments. Guilds had explicit interests in maintaining product quality and safeguarding their collective reputation, concerns that extended to mitigating externalities arising from masters' opportunistic behavior in apprenticeship contracts (e.g., lower-quality goods, poor training).[8]

Finally, there were contractual safeguards, enforced by judicial institutions. While reputation proved useful in small, close-knit environments and guilds oversaw masters' behavior, these mechanisms were less effective at deterring apprentice early exit in large cities characterized by high geographical mobility and more complex economies. In these contexts, designing contracts and enforcing them through courts became important for addressing apprentice-side opportunism (Hamilton, 2000; Wallis, 2012; Caracausi, 2017). Over time, this reliance on formal judicial enforcement of contractual obligations became the dominant mechanism as mobility and anonymity grew, laying the groundwork for the institutional structure of modern labor markets.

2.2 Safeguards in apprenticeship contracts

Among the various forms of opportunism apprentices could engage in, early exit posed the greatest threat to masters. An apprentice who quit after acquiring valuable skills but before completing the full term left the master with unrecoverable training costs and disrupted workshop production. The contractual safeguards described below were designed primarily to raise the costs of premature departure but they also served to discipline other forms of opportunistic behavior, such as shirking or negligence, by creating financial consequences

[8]Guild concerns with quality and reputation also extended to trade and became important for the development of long-distance trade (Greif, 1993).

that extended beyond the exit decision alone.

Guarantors. The inclusion of a guarantor made a third party legally and financially responsible for the apprentice's conduct, pledging to compensate the master or even to pursue and return a runaway apprentice so that the contractual term would be completed (Caracausi, 2017; Wallis, 2012). This transformed early exit from a bilateral issue between master and apprentice into one where the costs of early exit could be shifted to the guarantor.[9]

Zero-wage contracts. Zero-wage contracts represent an extreme form of cost allocation, in which apprentices effectively paid for training by providing uncompensated labor services (Becker, 1964). From the master's perspective, this arrangement minimized exposure to early exit: even if the apprentice departed prematurely, the master had already received compensation for training through the apprentice's labor.

Deferred payment. When masters did provide a wage, they could structure payments to create self-enforcing incentives against early exit. Rather than paying wages throughout the apprenticeship, masters could defer monetary compensation until contract completion. Back-loaded wages meant that apprentices who left early forfeited accumulated earnings, making departure increasingly costly as the contract neared completion (Lazear, 1979). This was particularly important because the apprentice's incentive to leave also increased toward the end of the term, when the gap between outside wages and contract compensation was largest.

Training premiums. In many European settings, contracts required the apprentice's family to pay an upfront premium to the master at the start of the term. As Wallis (2012) shows for eighteenth-century England, premiums compensated masters for the anticipated risk of non-completion and were calibrated to reflect trade-specific training costs and likelihood of default. From the apprentice's perspective, it represented a sunk cost that raised the opportunity cost of departure, since the premium was typically non-refundable. In Venice, however, requiring premiums was not a common safeguard (Bellavitis and Sapienza, 2023).

2.3 Data description

Accordi dei Garzoni. Beginning in the sixteenth century, the Venetian Republic required masters to register apprenticeship contracts at the *Giustizia Vecchia*, a court established in 1261 to supervise guild activities (Colavizza, Cella, and Bellavitis, 2020; Stopper, 2023). This policy created a centralized archive that recorded the identities and occupations of the

[9] A descriptive comparison of frequencies in the working sample provides support for the idea that guarantors facilitated the return of apprentices. Conditional on fleeing, 25% of apprentices with a guarantor in their contract eventually returned, compared to 17% of those without.

parties, key dates, contractual obligations, and whether the relationship was completed at term for each agreement. These records do not include masters' own children, whose training remained outside formal registration. The original contracts, digitized in the *Accordi dei Garzoni* corpus (Ehrmann, Topalov, and Kaplan, 2023), constitute the main data source for this analysis.

The corpus contains 54,237 apprenticeship contracts registered between 1575 and 1775. For the analysis, I consider single-master contracts for which the year, master, and occupational group are identifiable, yielding a working sample of 52,359 contracts. The sample covers more than 170 trades, including tailoring, printing, stonemasonry, and carpentry. Most apprentices are from Venice (23%), with others coming from other Italian provinces and abroad. On average, the masters in the sample trained 1.92 apprentices. Although one cannot directly verify the religious denomination of masters and apprentices, they would almost certainly have been born Catholics, as guilds in Catholic states systematically excluded Jews, Muslims, Orthodox Christians, and Protestants (Ogilvie, 2019). Appendix A1 describes the variables used in the analysis in detail, while Table A1 presents summary statistics.

Relevant names in the Catholic tradition. Names that are relevant in Catholicism are instrumental in measuring the religious identity of masters and apprentices. Guided by prior work, I focus on biblical names, saints' names, and church patrons' names. Biblical naming correlates with the strength of Christian belief (Berkes et al., 2023), especially among Catholics (Perl and Wiggins, 2004); saints occupy a central place in Catholic devotion as intercessors and moral exemplars (Brown, 1981; Bartlett, 2013); and church patrons stand at the center of Catholic communal worship and religious life (Bossy, 1985; Duffy, 1992).

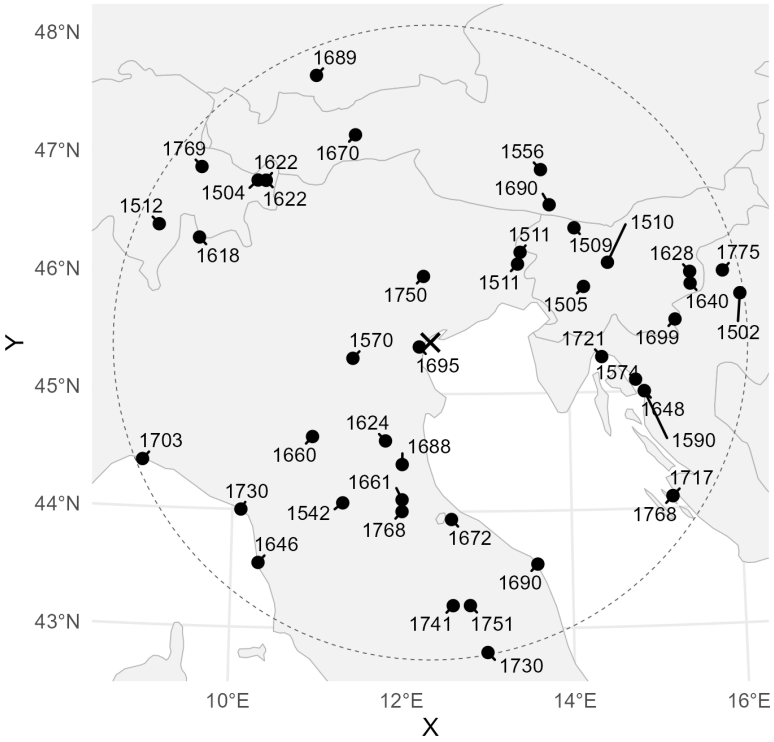
Biblical names are retrieved from *Hitchcock's Bible Names Dictionary* (Hitchcock, 1894), which contains more than 2,500 Bible and Bible-related names along with their meanings. Saint names come from the Catholic Saints database, which includes detailed biographical entries for more than 10,000 saints, as well as information on their associated iconography, prayers, and readings. Finally, data on Church patrons comes from Wikimedia, restricting the search to churches built in historically Christian European countries. All names are standardized to their etymological roots to ensure homogeneity even when cultural variations of names (e.g., Paul, Pol, Pablo) are present.

Earthquakes. Information about historical earthquakes, used as a source of exogenous variation in religious naming, is taken from the Significant Earthquake Database maintained by the National Centers for Environmental Information (NCEI). This database contains earthquakes occurring worldwide from 2150 B.C. to the present that meet at least one of

the following criteria: Moderate damage (approximately $1 million or more), 10 or more deaths, Magnitude 7.5 or greater, Modified Mercalli Intensity X or greater, or the earthquake generated a tsunami.

For the purposes of this study, I restrict the sample to earthquakes occurring within a 300-kilometer radius of Venice. This distance captures earthquakes that were likely to be salient to the Venetian population and therefore capable of influencing its level of religiosity. Between 1475 and 1775, 43 earthquakes were recorded in the region. Figure 1 displays their spatial distribution.

Figure 1: Earthquakes around Venice (1475-1775)



Notes. The figure displays the location and year of documented earthquakes between 1475 and 1775 within a 300-kilometer radius of Venice. The cross indicates the location of Venice, and the dashed circle represents the 300-kilometer buffer.

2.4 External validity

Using apprenticeship contracts in Early Modern Venice as an empirical setting raises obvious questions about external validity. Here, I discuss the extent to which the paper's findings can generalize along different dimensions.

Contractual safeguards. Third-party guarantors were widespread in pre-modern Eu-

ropean apprenticeships (Ogilvie, 2019; Wallis, 2007), and remain common in contemporary contracting through instruments such as personal guarantors on loans or collateral deposits in rental agreements. Similarly, the use of deferred compensation as a bonding device is well documented across a wide range of labor markets, both historical and modern (Lazear, 1979), while zero-wage or low-wage arrangements in exchange for training persist today in internships, residencies, and modern apprenticeship programs. More broadly, the decision of how much contractual protection to introduce in a transaction is a general problem of economic exchange, and shifting liability to third parties, front-loading returns, or back-loading compensation are common responses to hold-up and agency problems that extend well beyond early modern Venice. Note also that Venice had well-developed judicial institutions, which made these contractual provisions legally binding and credible at the time (Ruggiero, 1978).

The nature of the transaction. Beyond the relevance of apprenticeships in modern economies (Ryan, 2001; Wolter and Ryan, 2011; Garicano and Rayo, 2017), the hazards faced by Venetian masters illustrate a classic principal-agent problem in human capital transmission. When firms invest in training general skills that can be used elsewhere, apprentices' productivity rises not only within the firm but also outside it, increasing their outside options and creating incentives to exit before training costs are recovered (Acemoglu and Pischke, 1999; Shi, 2023). Recent evidence indeed emphasizes that the risk of quitting before costs are repaid is an important constraint on investment in workers with short-term contracts (Poulissen et al., 2023). More broadly, agency problems, hold-up, or adverse selection are prevalent across historical and institutional settings, and deciding how much protection to introduce in a transaction is a general problem of economic exchange. Given that the sample covers more than 170 economic activities, the findings should also apply across a wide range of industries.

The relevance of religion. Although overall religious affiliation has declined in some parts of the world, especially in Europe, religion remains central to most people's lives. Surveys across South America, Africa, the Middle East, and South Asia show that a majority still regard religion as "very important", a pattern that is not specific to developing economies (Pew Research Center, 2018). In the United States, 53% of adults say religion is very important in their lives, and recent data suggest declines in Christian adherence might have levelled off (Pew Research Center, 2025). New religious movements are also gaining traction, such as Pentecostalism in Brazil (Cheibub, 2022), new Christian prophetism in Ghana (Kaledzi, 2022), or nondenominational Christianity in the United States (Silliman, 2022), while natural disasters, political discourses, or a crisis of meaning are increasing the salience of religious beliefs even in Western secularized countries (Cavendish, 2025; Hernández and

Hernández, 2025; Johnson, 2024). Demographic trends further underscore the long-term relevance of religion: roughly 90% of all children born worldwide by 2050 (more than 2.2 billion) will be raised within a religious tradition (Pew Research Center, 2015).

Scope of the mechanisms. The mechanisms explored in the paper are also relevant for other religions. Most major religions have some concept of supernatural agents or principles, from omniscient gods to karma or ancestral spirits, that monitor behavior and punish wrongdoing (Norenzayan et al., 2016). Moreover, the doctrines of all major world religions, including the Abrahamic traditions, Hinduism, and Buddhism, embed prosocial values, grounded in some variant of the Golden Rule: "Do to others as you would have them do to you." Finally, in-group effects are universal: religious identity serves as a salient cue of group membership, and across diverse contexts, co-religionists are systematically perceived as more trustworthy, moral, and dependable partners in exchange (Norenzayan and Shariff, 2008).

Limits to generalization. While these observations suggest that the paper's setting may offer insights into the demand for contractual safeguards beyond early modern Venice, any generalization should be made with caution. Specific characteristics of religions, the broader organizational or cultural context, or the way religion interacts with formal institutions could shape the relationship between religious identity and the demand for contractual safeguards. For instance, the marginal effect of religion could be limited in high-trust environments, in organizational settings where individuals have little discretion to shape decisions, or where alternative moral frameworks prevail. Perhaps the most important limitation is that the analysis takes place in a religiously homogeneous setting: although masters and apprentices differed in how religious they were, this variation occurred entirely within Catholicism, as Catholic guilds excluded individuals from other confessions. As a result, this paper cannot speak to how principals and agents might behave when transacting across religious boundaries.

3 Religious identity and the demand for guarantors

3.1 How much room is there for religious identity in safeguard demand?

Standard models of contracting predict that the demand for safeguards is largely determined by the technology of the transaction (e.g., the nature of the assets involved, the production process, the structure of returns on investment) as these define the scope for opportunistic behavior (Williamson, 1985; Hart and Moore, 1990; Holmström and Milgrom, 1991). In

the context of apprenticeships, the trade defines much of this technology. In trades such as weaving, tailoring, or shoemaking, tools were inexpensive, workshops abundant, and productivity increased relatively quickly, making it feasible for a trained apprentice to leave and set up independently. By contrast, trades such as metalworking or shipbuilding involved longer training periods and costly equipment, raising the cost of early exit. If the technology of the trade fully determined safeguard choices, there would be little room for master-level characteristics such as religiosity to matter.

To assess how much variation in safeguard use occurs across trades versus across masters within the same trade, I estimate a three-level mixed-effects model with year and day-of-year fixed effects and random intercepts for trades and for masters nested within trades:[10]

$$Safeguard_{ijgtd} = \alpha + \gamma_t + \delta_d + \mu_g + \nu_{jg} + \varepsilon_{ijgtd}, \tag{1}$$

where $Safeguard_{ijgtd}$ is an indicator for the presence of a given contractual safeguard in contract i signed by master j in trade g, on day d of year t. I estimate (1) separately for each safeguard outcome: (i) the presence of a third-party guarantor, (ii) the absence of wages, and (iii) deferred payments. γ_t and δ_d denote year and day-of-year fixed effects, respectively. μ_g is the trade-level random intercept and ν_{jg} is the master-level random intercept nested within trade g. ε_{ijgtd} is the contract-level error term.

By construction, the random components are mean-zero deviations around the fixed part:

$$\mu_g \sim \mathcal{N}(0, \psi), \qquad \nu_{jg} \sim \mathcal{N}(0, \omega), \qquad \varepsilon_{ijgtd} \sim \mathcal{N}(0, \theta).$$

which, after conditioning on the time fixed effects, explain the remaining variance σ^2:

$$\psi + \omega + \theta \equiv \sigma^2$$

Intuitively, ψ captures persistent differences across trades in the use of safeguards, ω captures the influence of master-specific characteristics that are relatively stable across contracts but differ within trades (e.g., risk preferences, certainty-seeking, socio-economic background, reputation), and θ reflects the idiosyncratic characteristics of each contract signed by the same master. Expressing each component as a share of σ^2,

$$\text{Trade share} = \frac{\psi}{\sigma^2}, \qquad \text{Master share} = \frac{\omega}{\sigma^2}, \qquad \text{Contract share} = \frac{\theta}{\sigma^2},$$

[10] Day-of-year fixed effects absorb seasonal patterns in contracting activity.

a higher share indicating a larger fraction of the residual variance attributable to that level.

Conditional on year and day-of-year fixed effects, the variance decomposition for the guarantor variable shows about 11% of the remaining variance to the trade level, 16% to the master level (within trades), and 73% to within-master contract variation. For deferred payments, 12% lies at the trade level, 29% at the master level, and 59% at the contract level. For zero-wage contracts, the corresponding shares are 27% (trade), 25% (master), and 48% (contract). Across outcomes, the master component is comparable in magnitude to the trade component, indicating that *who the master is* matters roughly as much as *what trade he is in* for explaining safeguard choices.[11]

Figures 2A, 2B, and 2C report, for each trade and outcome variable, the standard deviation of residuals after partialing out the time fixed effects and the trade random intercept. Most trades display substantial residual dispersion, confirming that average trade differences leave much of the variation unexplained. Figures 2D, 2E, and 2F repeat the exercise after adding the master random intercept. Roughly half of masters exhibit low residual dispersion, meaning that time effects and trade and master components account for most of their safeguard choices. The remaining masters show considerable contract-level variation.

Overall, these results indicate that transaction characteristics, as captured by trade membership, explain only a fraction of the variation in safeguard use. The substantial master-level component suggests that individual attributes play a meaningful role in contracting decisions. The analyses that follow exploit this variation.

[11] These estimates use only the subsample of masters with more than one contract. A two-level specification with only the trade random effect estimated on the full sample attributes a very similar share to the trade component, indicating that the results are not driven by sample selection.

Figure 2: Residual dispersion of contractual safeguards by trade and master.

2A: Guarantor 2B: Zero wage 2C: Deferred payment

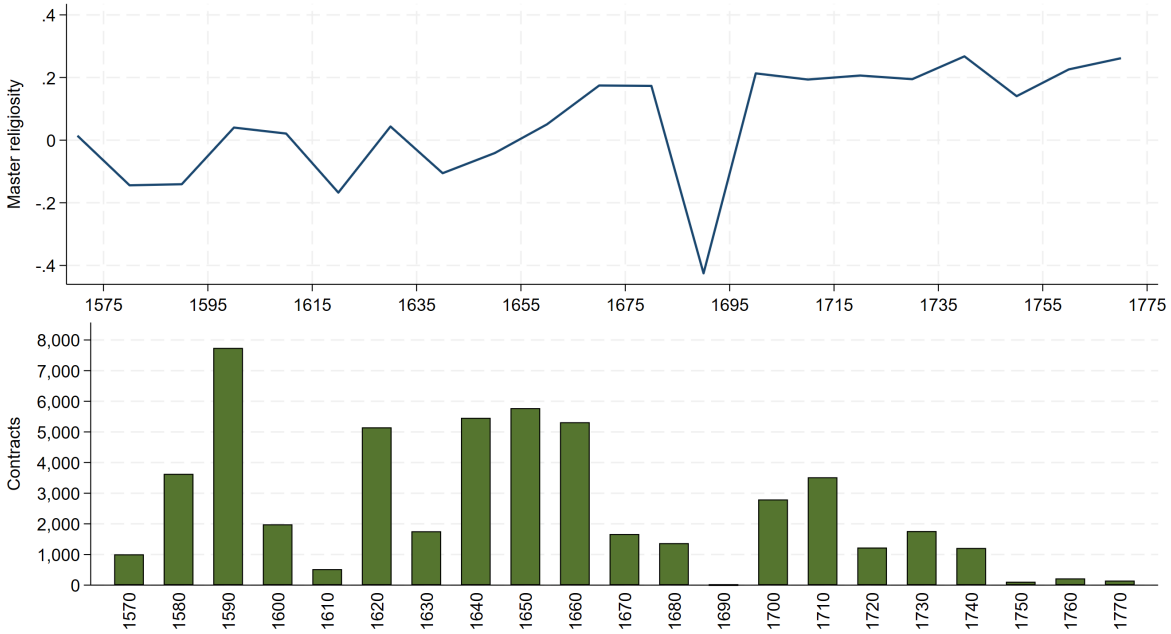
2D: Guarantor 2E: Zero wage 2F: Deferred payment

Notes. Panels A–C plot within-trade residual dispersion after removing time and trade effects. Each point is a trade, and the vertical axis is the within-trade standard deviation of residuals across its contracts. Panels D–F plot within-master residual dispersion after removing time, trade, and master effects. Each point is a master, and the vertical axis is the within-master standard deviation of residuals across contracts.

3.2 Religious identity: measurement and identification strategy

Measurement. I measure masters' religious identity using a name-based index that captures how Catholic a given name is. Specifically, the index is the standardized first principal component of three counts: 1) how many times the given name appears as a biblical character; 2) how many Catholic saints bear that name; and 3) how often churches are dedicated to that name as a patron. The eigenvalue of the first component is 2.30, with the second and third being 0.55 and 0.14, indicating a strong one-dimensional structure. Relative to survey-based measures, the main appeal of using given names is that it allows measuring the intensive margin of religious identity historically at a large scale and avoids issues arising from non-response, sampling, and social desirability bias, which are prevalent in religion research (Brenner, 2014; Hadaway, Marler, and Chaves, 1998). Figure 3 plots the average master name religiosity for the period 1575-1775 and Table A2 shows the religious relevance of the most and least common master names.

Figure 3: Average master name religiosity, Venice (1575-1775)



Notes. Average master name religiosity in Venice over the 1575-1775 period. Master name religiosity is the first principal component of three variables: 1) the number of times the master's name appears in the bible; 2) the number of times the name is shared with a saint; and 3) the number of times the name was used to name a church.

Identification strategy. Religious identity may correlate with unobserved determinants of contractual choices. Religiosity has been previously associated with traditionalism (Saroglou, Delpierre, and Dernelle, 2004; Gelfand et al., 2011), threat sensitivity (Yu et al., 2022), and higher socioeconomic status (Iannaccone, 1998), any of which could independently shape the demand for safeguards.

To recover the causal effect of religious identity, I exploit variation in earthquake exposure in the master's parental generation. Past research shows that natural disasters tend to elicit feelings of vulnerability and existential anxiety, leading individuals to seek comfort and meaning in religion (Pargament, 2001; Bentzen, 2019). From a cultural transmission perspective, such an increase in religious salience makes religion more likely to enter the bundle of beliefs, values, and norms that parents transmit to their children, allowing changes in religiosity to persist across generations (Boyd and Richerson, 1985; Bengtson et al., 2009). Because names are part of that transmission, children's names will then tend to reflect the increases in religiosity experienced by previous generations (Lieberson, 2000; Andersen and Bentzen, 2024).[12]

[12]Earthquakes have been widely interpreted as acts of God. In 383 CE, Philaster, Bishop of Brescia,

Implementing this strategy requires identifying the period during which parental earthquake exposure could have influenced naming decisions, that is, the window before the master's birth. Because birth dates are unobserved, I approximate this window using the year m in which master i first appears in the contract corpus. Apprentices began training around age 14, spent 5-7 years as trainees, and then required additional years as journeymen to demonstrate proficiency (Bellavitis et al., 2023; Ogilvie, 2019). Masters thus typically attained mastership in their late 20s or early 30s, though with substantial cross-trade variation: surgeons in the Netherlands reached mastership at an average age of 27.3, carpenters in Madrid at 30.05, while locksmiths sometimes qualified as early as 20 and hatters averaged 37.3 (Sánchez and Llorente, 2016; Groot, 2020). Taking the upper end of this range and allowing for the possibility that some masters appear in the corpus several years after attaining mastership, most masters were likely born in the window $[m - 40, m]$. Earthquakes occurring before $m - 40$ should have therefore shaped naming patterns through their effect on parental religiosity, whereas earthquakes after $m - 40$ postdate birth and cannot have influenced naming decisions.

Figure 4 provides direct empirical support for this timing. The figure reports coefficients from regressing master name religiosity on earthquake exposure measured in successive decades between m and $m - 80$. Earthquakes occurring well before the birth window ($m - 40$ and earlier) are positively and significantly associated with more religious names, with each additional earthquake increasing the religious name index by approximately 0.04 standard deviations. By contrast, exposure after $m - 40$ shows no systematic association. Guided by both the historical evidence and this empirical pattern, I define the instrument as the total number of earthquakes in the window $[m - 70, m - 40]$.[13]

Despite this relevance, for parental earthquake exposure to serve as a valid instrument, it must affect contractual outcomes only through their impact on masters' religious identity.

considered it heresy not to attribute earthquakes to God's will (Philastrius, 1898), and after the 1755 Lisbon earthquake it was a widespread opinion among Catholic priests and Protestant ministers that Lisbon had been punished for its immorality (Poirier, 2005). Such interpretations generally strengthened religious devotion and, more specifically, the cult of protective figures, as with Emygdius after the 1703 Italian earthquake or Filippo Neri after the 1688 Benevento earthquake (Azzolini, 2017; Viceconte, Schiano, and Cecere, 2023). Giving a child the name of a saint or biblical figure at baptism was then a consequent expression of faith, whether as an act of penance before a punishing God or as a means of securing a religious figure's protection (Smith-Bannister, 1997; Klapisch-Zuber, 2017; Berkes et al., 2023). This custom of encoding religious devotion in names can be traced back at least to Hannah's vow in 1 Samuel 1:11, in which she promises that if God grants her a son, she will dedicate the child to His service, calling him Samuel ("asked of God").

[13] Because m is an imperfect proxy for birth year and parental age at childbirth varies, this window only approximates true pre-birth exposure and may include some irrelevant earthquakes. This measurement error would attenuate the first-stage relationship, so the estimated effect should be interpreted as a lower bound. Despite this, the instrument satisfies the relevance condition.

I discuss this identifying assumption in greater detail in the next section.[14]

Equations. I estimate several 2SLS specifications with different sets of controls and fixed effects. The baseline first- and second-stage equations are:

$$\text{Master name religiosity}_i = \pi_0 + \pi_1 \,\text{Parental earthquake exposure}_i + \sum_k \pi_k X_{ik} + \gamma_{g(i)} + \delta_{t(i)} + \epsilon_i \tag{2}$$

$$\text{Safeguard}_i = \beta_0 + \beta_1 \,\text{Master } \widehat{\text{name religiosity}}_i + \sum_k \beta_k X_{ik} + \gamma_{g(i)} + \delta_{t(i)} + \epsilon_i, \tag{3}$$

where *Master name religiosity*$_i$ is master i's name-based religiosity index; *Safeguard*$_i$ is the contractual outcome of interest; *Parental earthquake exposure*$_i$ is the total number of earthquakes in masters' parental generation; $\mathbf{X}_{ik}$ is a vector of covariates; and $\gamma_{g(i)}$ and $\delta_{t(i)}$ denote trade and period fixed effects, respectively. Standard errors are clustered at the master level.

Trade fixed effects absorb time-invariant differences across occupations, ruling out explanations based on transaction attributes or the selection of masters across trades, such as the possibility that more religious masters sort into trades where tasks allow better monitoring or demand different skill levels. Period fixed effects control for aggregate temporal shocks common to all trades.[15]

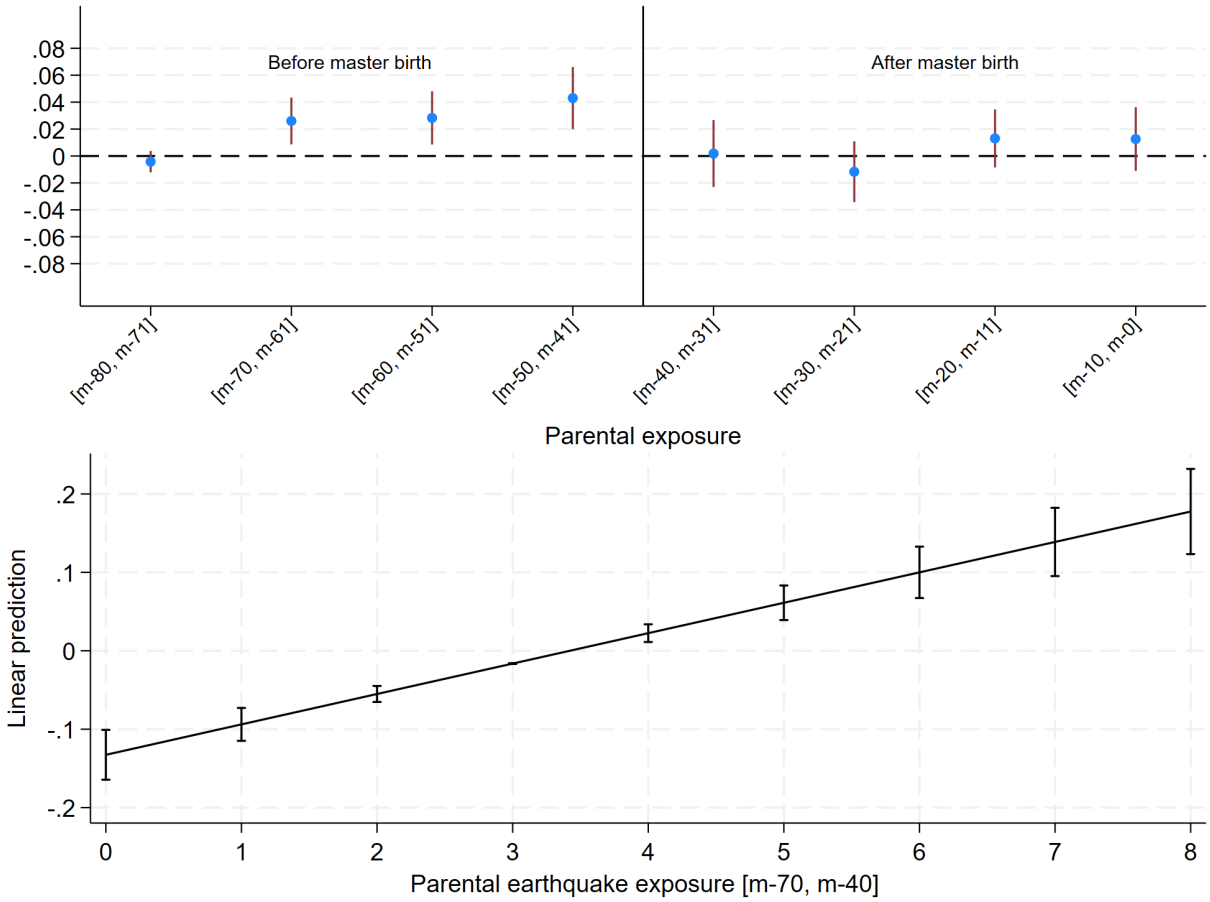
3.3 Main results

Table 1 reports 2SLS estimates of the effect of master name religiosity on three contractual safeguards: the inclusion of a third-party guarantor, zero-wage provisions, and deferred

[14] This identification strategy assumes that most masters were drawn from families established in Venice or its vicinity, so that earthquakes around Venice are informative about the shocks experienced by their parental generation. This assumption is plausible, as mastership was often inherited: likely anticipating both the advantages and the individual interest of training offspring (e.g., reduced opportunism, direct inheritance of workshops), numerous guilds explicitly granted access privileges to mastership for masters' sons, and some explicitly incorporated hereditary provisions into their statutes (De Munck, De Kerf, and De Bie, 2020; Stopper, 2023). In Appendix A3, I complement these historical accounts by providing quantitative evidence on the persistence of family ties within trades using a surname analysis.

[15] In these analyses, the period fixed effects correspond to 10 historically relevant periods of Venetian history, as using coarser time windows would cancel out most of the variation in parental earthquake exposure. Details for each of these periods, along with a historical overview of Early Modern Venice, can be found in Appendix A2. Results remain similar in the most demanding specifications that include *trade* × *period* fixed effects, which account for technology and organizational changes within each trade over time.

Figure 4: Parental exposure to earthquakes and master name religiosity



Notes. The figure documents the first-stage association between parental earthquake exposure and master name religiosity. The top panel plots coefficients from regressing master name religiosity on earthquake exposure calculated at different windows, where m is the year in which master i appears in the corpus of contracts. The vertical line separates bins before and after masters' birth according to historical records on the structure of guild labor relations. Exposure in the parental window, namely $[m-70,\ m-40]$, is positively associated with receiving a more religious name. Exposure after birth shows no systematic association. The flat post-birth estimates work as a placebo, indicating that the relevant variation stems from shocks to the parental generation and that earthquakes do not alter name religiosity once names are set. The bottom panel shows the linear relationship between parental earthquake exposure—the total number of earthquakes in $[m-70,\ m-40]$—and master name religiosity. Each additional earthquake is associated with an increase of about 0.04 standard deviations. The vertical lines represent the 95% CIs.

payments. In the baseline specification with only trade and time fixed effects (Columns 1, 4, and 7), a one-standard-deviation increase in master name religiosity reduces the probability of including a guarantor by 24 percentage points, the probability of a zero-wage contract by 30 percentage points, and the probability of deferred payment by 42 percentage points. Kleibergen-Paap F-statistics are well above conventional thresholds across all specifications, confirming instrument relevance.

Adding covariates that capture conditions in the apprentice market and the master's cultural profile leaves the estimates virtually unchanged (Columns 2, 5, and 8). Specifically, the number of apprenticeships in the trade over the preceding five years controls for trade-specific demand fluctuations that could simultaneously affect both the pool of available apprentices and the type of masters active in the market. Common name, a normalized rank index of the master's given name popularity, proxies for the master's cultural traditionalism, ensuring that the religiosity index does not simply capture adherence to naming conventions more broadly.

Columns 3, 6, and 9 add additional contract characteristics, namely, non-economic compensation, apprentice age, and contract duration. Though potentially "bad controls" because they are jointly determined with safeguards, they provide a stringent sensitivity test that precludes alternative explanations: the results are not explained by masters trading off guarantors against non-monetary compensation; hiring younger apprentices, which might be riskier; or shortening contract length.

Tables A3–A5 show that the coefficients are virtually unchanged when additional covariates are included, including the master's hiring experience and past apprentice early exits. The results are also robust to conditioning on the religiosity of the apprentice (Section 3.4.3) using each individual component of the name-based index as the independent variable (Table A6) and to measuring parental earthquake exposure with larger radii (Tables A7–A12), though as one would expect, the estimates attenuate with distance, consistent with local exposure driving the first-stage relationship.

Across all specifications, the 2SLS estimates are markedly larger (and of opposite sign) than the near-zero OLS coefficients. One explanation is the presence of omitted-variable bias. If religious masters also display strong traditionalist or conformity values (Saroglou, Delpierre, and Dernelle, 2004), heightened sensitivity to threats (Yu et al., 2022), and cultural tightness (Gelfand et al., 2011). These traits would arguably make religious masters more concerned about opportunism and increase their demand for safeguards, generating a positive bias that offsets and masks the negative effect of religious identity that the 2SLS estimates recover.

Table 1: Master name religiosity and the demand for contractual safeguards

	Guarantor			Zero wage			Deferred payment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: OLS									
Master name religiosity	0.003	0.002	0.002	-0.001	0.003	0.004	-0.001	-0.003	-0.003
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Panel B: Reduced Form									
Earthquake parental exposure	-0.006***	-0.006***	-0.005***	-0.007***	-0.007***	-0.007***	-0.010***	-0.010***	-0.010***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Panel C: 2SLS									
Master name religiosity	-0.24**	-0.22***	-0.19**	-0.30***	-0.28***	-0.26***	-0.42***	-0.42***	-0.41***
	[0.09]	[0.08]	[0.08]	[0.10]	[0.08]	[0.08]	[0.11]	[0.10]	[0.10]
N	52,360	52,359	52,106	52,360	52,359	52,106	37,232	37,231	37,056
Mean dep. var.	0.73	0.73	0.73	0.29	0.29	0.29	0.79	0.79	0.79
Kleibergen-Paap F-stat.	19.20	31.64	31.55	19.20	31.64	31.55	17.73	24.23	24.10
Contracts in trade		✓	✓		✓	✓		✓	✓
Common name		✓	✓		✓	✓		✓	✓
Non-mon. compensation			✓			✓			✓
Apprentice age			✓			✓			✓
Appr. duration			✓			✓			✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes. The table reports estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Another explanation is that parental earthquake exposure may shift cultural traits other than religious identity, violating the exclusion restriction. Existential threats could push individuals not only toward religion but also toward more traditionalist values as coping mechanisms (Pyszczynski, Greenberg, and Solomon, 1999). I assess this possibility using the master's name commonality as a proxy for traditionalism. Historically prevalent names signal social conformity and attachment to tradition, whereas less common names indicate greater individualism and openness to cultural change (e.g., Bazzi, Fiszbein, and Gebresilasse, 2020). Figure A5 shows no evidence that parental earthquake exposure predicts such a broad cultural shift.

To address remaining concerns about other dimensions of masters' identity affected by earthquakes, I assess the sensitivity of the IV estimates using the Conley, Hansen, and Rossi (2012) plausibly exogenous approach. Figure A6 reports the identification region (the union of 95% confidence intervals for β_1) when allowing the instrument to have a nonzero direct effect γ on each outcome through pathways other than religious identity. Overturning the IV estimate would require the direct effect γ to be negative and large: specifically, $\gamma < -0.003$ for third-party guarantors, $\gamma < -0.006$ for zero wage, and $\gamma < -0.014$ for deferred payments. To put these magnitudes in context, they correspond to 33%, 46%, and 71% of the respective

standardized reduced-form coefficients, implying that the direct effect of earthquakes through non-religious channels would need to be at least one-third to two-thirds as large as the total reduced-form effect, but operating in the same direction. Such a large negative direct impact appears unlikely. Evidence that natural disasters and adverse shocks tend to increase risk aversion and precautionary behavior (e.g., Barro, 2006; Callen et al., 2014; Cameron and Shah, 2015) suggests that any direct effect would be positive ($\gamma > 0$), which would shift the identified set downward and strengthen the main result. Full details on these analyses are provided in Section A5.1.2.

3.4 Channels

The previous section showed that masters with more religious names are less likely to introduce contractual safeguards in their apprenticeships. Below, I discuss and present empirical evidence on three dimensions of religious identity that may help explain this pattern: beliefs in supernatural monitoring, adherence to religious norms, and in-group identification.

3.4.1 Beliefs in supernatural watchers

A central feature of Catholicism and most major religions is the belief in a morally concerned, omniscient deity who monitors human behavior and enforces moral standards through supernatural punishment and reward (Norenzayan and Shariff, 2008; Henrich, 2020). For believers, the presence of such a deity introduces monitoring even when no human observer is present, inducing a psychological state of increased surveillance that should improve expectations about others' behavior. This follows a broader principle in social cognition: perceptions of fairness and trustworthiness are higher when an entity capable of monitoring and sanctioning is believed to be present (Kelley and Michela, 1980; Miller, Visser, and Staub, 2005). Applied to the apprenticeship context, if a master believes that a supernatural watcher monitors his apprentice's conduct, the perceived need for contractual safeguards should diminish.[16]

To test the behavioral consequences of supernatural monitoring, I use documented apparitions of the Virgin Mary as events that plausibly heightened perceptions of divine surveillance among masters. Because these episodes are concentrated in time and space and carry strong psychological salience, they provide a natural setting for examining how perceived supernatural presence shapes contracting decisions. This strategy builds on experimental evidence showing that religious priming (e.g., making references to God salient) increases

[16]If religious individuals infer others' behavior under a rational-actor model, that is, if they expect divine punishment to constrain only those who genuinely believe in a supernatural entity, these effects should apply primarily when cooperating with co-religionists (e.g., Gervais, Shariff, and Norenzayan, 2011). In this vein, Table A21 shows that Venetian masters did not apply this principle consistently.

prosocial behavior and perceptions of being monitored (Norenzayan, Shariff, and Gervais, 2009; Shariff et al., 2016), as well as on historical work documenting the spiritual and behavioral impact of Marian miracles (Brading, 2001; Benet, 2001).[17]

Some examples of the religious responses triggered by Marian apparitions are illustrative of their relevance. Following the reports of apparitions and miraculous healings at Lourdes in 1858, for instance, the site rapidly became a major pilgrimage destination and remains one of the most prominent centers of Marian devotion today, receiving over three million visitors annually (François, Sternberg, and Fee, 2012; Taylor, 1995). In Fátima, the "Miracle of the Sun" in 1917 reinvigorated Portuguese Catholicism and reshaped public discourse about the role of religion in national identity (Benet, 2001). Closer to the empirical setting, on June 5, 1606, the Virgin Mary reportedly appeared to Sigismonde Conti in Argenta, Italy, triggering a wave of religious fervor. Cardinal Aldobrandini undertook a pilgrimage to the site later that year, the Archbishop of Ravenna appointed a dedicated chaplain, and by 1619 approximately 150,000 ex-votos of gold and silver had accumulated at the apparition site. Appendix A4 details other examples of Marian miracles in the dataset, describing how the Virgin Mary provided help or relief, prompting widespread religious fervor.

For the analysis, I construct a binary variable equal to one if a Marian apparition occurred within 300km of Venice in the two years preceding the signature of the apprenticeship contract. Between 1575 and 1775, 18,412 contracts were preceded by at least one apparition within this window (Figure A4). Using this indicator as the main explanatory variable, I estimate different specifications of the following baseline equation:

$$\text{Safeguard}_i = \beta_0 + \beta_1 \,\text{Marian apparition}_i + \sum_k \beta_k X_{ik} + \gamma_{g(i)} + \delta_{t(i)} + \varepsilon_i, \tag{4}$$

where Safeguard_i is an indicator for each contractual safeguard in contract i; $\text{Marian apparition}_i$ equals one if an apparition took place in the two years preceding the contract; $\mathbf{X}_{ik}$ is a vector of covariates; and $\gamma_{g(i)}$ and $\delta_{t(i)}$ denote trade and triennial fixed effects, respectively. Standard errors are clustered at the master level. All specifications also control for master name religiosity, ensuring that the apparition effect is not confounded with the master's baseline religious identity.

Table 2 reports the results. Across all three safeguards, exposure to a recent Marian apparition is associated with a significant reduction in safeguard use. For guarantors, the

[17] Data on Marian apparitions come from the Miracle Hunter database, which records the date, location, identity of visionaries, messages conveyed, and ecclesiastical responses for each event. For the analysis, I retain all Marian apparitions taking place within a radius of 300km around Venice. Additional details on Marian apparitions can be found in Appendix A4.

effect ranges from 1.4 to 1.6 percentage points depending on the specification (Columns 1–2). For zero-wage contracts, the reduction is 1.6 to 1.7 percentage points (Columns 3–4), and for deferred payments, 2.4 to 2.7 percentage points (Columns 5–6). Odd columns include baseline controls — contracts in trade, common name, and master religiosity — while even columns add contract characteristics.[18] The pattern is consistent with the supernatural monitoring channel: following an event that heightens the perceived presence of divine surveillance, masters reduce their demand for human-made contractual protections.

Several additional tests support the robustness of these findings. Tables A13–A18 show that the results remain robust to the inclusion of additional covariates and fixed effects, as well as to alternative constructions of the independent variable using different exposure windows and radii. These alternative specifications also reveal geographic attenuation: apparitions closer to Venice produce larger effects, while those farther away yield weaker coefficients that often lose statistical significance, consistent with nearby events being more salient and more widely known. Moreover, Table A19 shows that the effect is concentrated among masters with strong religious identities. For masters with name religiosity below the 25th percentile, apparitions have little impact on contracting behavior. This heterogeneity reinforces the interpretation that apparitions operate through religious beliefs rather than through some unrelated channel.

Table A20 and Tables A16–A18 further introduce master fixed effects, absorbing all time-invariant master characteristics, such as socioeconomic background or deep personality traits, that might jointly determine both responsiveness to apparitions and contracting decisions. Identification then relies on comparing the safeguard choices of the same master when signing contracts before and after a Marian apparition. This is a demanding test, as it restricts the sample to masters who sign multiple contracts and requires that the timing of apparitions relative to their contracting activity generates sufficient variation. Despite these restrictions, most estimates remain statistically significant at conventional levels, suggesting that the results are not driven by unobserved differences across masters.

A remaining concern is that Marian apparitions may not be fully exogenous to contracting decisions. Precisely because apparitions are strong signals of religiosity, they may be more frequent following adverse shocks such as epidemics, poor harvests, or conflict, when individuals are more prone to seek comfort in religion (Pargament, 2001). If such a relationship exists, however, the same uncertainty that triggers Marian apparitions would also raise masters' demand for contractual protection, attenuating the estimated negative relationship. The OLS estimates in Table 2 would then understate the true effect of apparitions

[18] As in the main estimations, these additional covariates may be "bad controls" in a strict causal sense, but their inclusion helps rule out plausible alternative explanations.

on safeguard demand.

Table 2: Marian apparitions

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition	-0.016***	-0.014**	-0.017***	-0.016***	-0.027***	-0.024***
	[0.006]	[0.006]	[0.006]	[0.006]	[0.005]	[0.005]
N	52,357	52,103	52,357	52,103	37,225	37,051
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓		✓		✓
Apprentice age		✓		✓		✓
Appr. duration		✓		✓		✓
Master religiosity	✓	✓	✓	✓	✓	✓
Triennial FE	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. Master religiosity is a standardized index of the religious salience of the master's given name. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

3.4.2 Religious norms

Religious identity can also operate through norms. In many religious traditions, prescriptions about honesty, fairness, and promise-keeping are embedded in doctrine and framed as moral duties (Pichon, Boccato, and Saroglou, 2007; McKay et al., 2011). Once internalized, these prosocial values shape expectations about others' conduct, as people tend to project their own values when assessing how others will behave (Krueger, 1998; Bushong and Gagnon-Bartsch, 2024). In the context of apprenticeships, this projection implies that more religious masters, having internalized the prosocial content of Catholicism, will hold more favorable expectations about apprentice conduct, reducing the perceived risk of opportunism and lowering the demand for contractual safeguards.

If religious norms matter for contracting, their effect should be strongest when those norms are most salient. Psychologically, rituals activate and reinforce a given set of norms through repeated action and reflection, increasing individuals' tendency to behave consistently with them (Campante and Yanagizawa-Drott, 2015; Hobson et al., 2018). I exploit this role of rituals to provide evidence on the consequences of religious norms, examining whether contracts signed shortly before a major Catholic ritual reflect lower demand for safeguards.

Specifically, I focus on Pentecost, which is particularly suitable for three reasons. First, together with Easter, Pentecost is one of the two most important observances of the Catholic liturgical year. It closes the Easter season and marks the deadline for fulfilling the annual duty of communion (Canon Law Society of America, 1999, can. 920), a central sacrament that requires spiritual preparation, including introspection and confession, therefore prompting individuals to revisit the moral tenets of Christianity. Second, unlike Easter, economic activity around Pentecost remains more continuous, which reduces concerns that any observed effect reflects disruptions to contracting rather than changes in masters' attitudes. Third, Pentecost is a movable feast whose date shifts between late May and June across years. This annual rotation breaks alignment with the civil calendar, allowing the inclusion of day-of-year fixed effects that absorb date-specific secular factors unrelated to the ritual.

I explore how the demand for safeguards changes around Pentecost using a regression discontinuity (RD) design that implements the local-polynomial approach with triangular kernels and bias correction of Calonico, Cattaneo, and Titiunik (2014). To date Pentecost, I compute Easter Sunday using the algorithm of Meeus (1998) and add 49 days.[19]

Using all contracts within a window of 30 days before and after Pentecost, I estimate the following local-linear RD:[20]

$$\text{Safeguard}_i = \alpha_\ell + \tau D_i + \beta_\ell r_{\text{Pentecost},i} + (\beta_r - \beta_\ell) D_i r_{\text{Pentecost},i} + \sum_k \beta_k Z_{ik} + \gamma_{g(i)} + \delta_{t(i)} + \lambda_{d(i)} + \varepsilon_i \tag{5}$$

where Safeguard_i is an indicator for the presence of a given contractual safeguard in contract i; D_i signals contracts signed after Pentecost; $r_{\text{Pentecost},i}$ is the running variable measuring days to Pentecost; τ captures the discontinuity at the cutoff; β_ℓ is the local slope to the left and $\beta_r - \beta_\ell$ the change in slope at the cutoff; Z_{ik} represents the baseline covariates; and $\gamma_{g(i)}$, $\delta_{t(i)}$, and $\lambda_{d(i)}$ denote trade, year, and day-of-year fixed effects, respectively.[21] Bias-corrected standard errors are clustered at the day-of-year level, and optimal bandwidths follow Calonico, Cattaneo, and Farrell (2020), though I also report estimates at nearby bandwidth choices for robustness.

Figure 5 displays the discontinuity graphically, plotting binned means by day within

[19] For years up to 1582, I apply the Julian computus and convert the result to the civil Gregorian calendar.

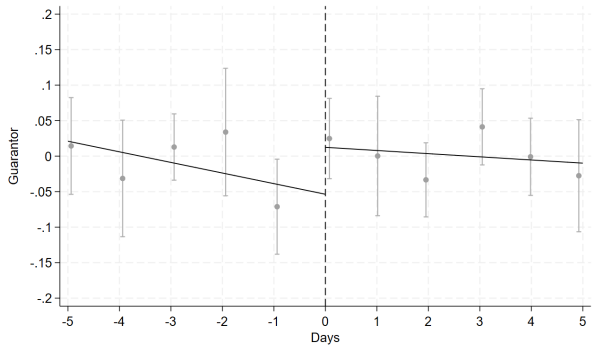
[20] The 60-day window is conservative. Any ritual effect is likely to be concentrated near Pentecost, and the optimal bandwidths calculated below are substantially smaller. Results are similar with narrower or wider windows.

[21] Although RD designs do not require conditioning on covariates, including them can reduce sampling variability and improve precision (Lee and Lemieux, 2010). In addition to the fixed effects, I include master name religiosity and master name commonality, both predetermined at the time of signing.

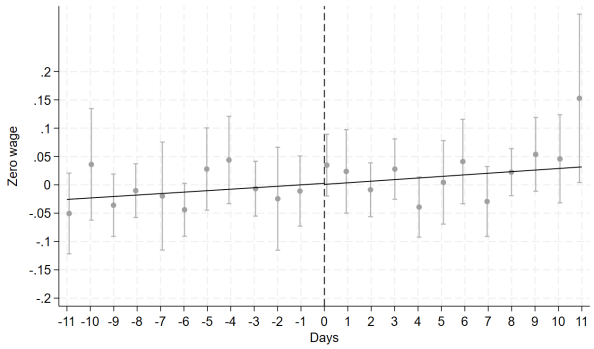
the optimal bandwidth together with the local-linear fit. Panel A shows that guarantor demand reduces in the days leading up to Pentecost and jumps upward after crossing the cutoff. This pattern is consistent with an anticipatory activation of religious norms: in the days preceding the feast, the dense exposure to moral cues, examination of conscience, and sacramental confession heightens the salience of prosocial norms, reducing masters' perceived need for third-party enforcement. Once the feast passes, these cues attenuate and safeguard demand reverts to its baseline level. I find, however, no discontinuities in the demand for zero-wage provisions (Panel B) or deferred payments (Panel C).

Focusing on third-party guarantors, the estimated discontinuity is 11 percentage points ($p < 0.05$; Table 3, Specification 1), with the predicted probability of including a guarantor rising from -0.09 just before Pentecost to 0.01 just after. The discontinuity is robust across specifications, with estimates ranging from 10 to 13 percentage points for the linear polynomial and from 12 to 29 percentage points for higher-order polynomials (Table 3).

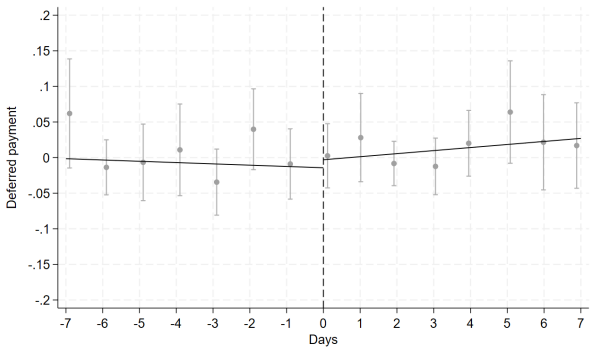
Figure 5: Pentecost and contractual safeguards



Panel A: Guarantor demand



Panel B: Zero wage



Panel C: Deferred payment

Notes. The figure displays local–linear RD estimates at Pentecost for the demand for three contractual safeguards: third-party guarantors, zero wage provisions, and deferred payments. The horizontal axis is days relative to Pentecost. Grey dots are binned daily means of the dependent variable, residualized on covariates (name religiosity and master name commonality) and fixed effects (trade, year, and day-of-year), and vertical grey bars show the 95% confidence intervals. The red line segments plot separate local–linear fits on each side of the cutoff, estimated with a triangular kernel and the robust bias–corrected approach of Calonico, Cattaneo, and Titiunik (2014). The calculation of the optimal bandwidths follows Calonico, Cattaneo, and Farrell (2020).

Two conditions underpin the validity of the RD design. First, absent Pentecost, the conditional expectation of potential outcomes is continuous at the cutoff. Practically, this means that contracts just to the left and right of the threshold must be comparable. Figure A7 plots local linear RD estimates for master name religiosity, name commonality, apprentice name religiosity, apprentice age, compensation, and apprenticeship duration. In all cases, I cannot reject the null that the discontinuity at the cutoff is zero, indicating no evidence of predetermined or co-determined observables changing at the cutoff. For unobservables to threaten identification, they would have to shift within the same narrow window for reasons unrelated to the ritual and not captured by the fixed effects. This is unlikely, as most plau-

Table 3: Pentecost RD estimates across polynomial orders and bandwidth choices

Spec.	p	Bandwidth choice	Left est.	Right est.	RD est.	Std. err.	Left BW	Right BW
(1)	1	Optimal	-0.09	0.01	0.11	0.05	5.31	5.31
(2)	1	Optimal ± 1.5	-0.11	0.02	0.13	0.05	6.81	6.81
(3)	1	Optimal ± 3.0	-0.10	0.02	0.12	0.05	8.31	8.31
(4)	2	Optimal	-0.14	0.02	0.16	0.07	9.18	9.18
(5)	2	Optimal ± 1.5	-0.12	0.02	0.15	0.06	10.68	10.68
(6)	2	Optimal ± 3.0	-0.11	0.02	0.13	0.05	12.18	12.18
(7)	3	Optimal	-0.26	0.02	0.29	0.12	9.58	9.58
(8)	3	Optimal ± 1.5	-0.19	0.02	0.21	0.09	11.08	11.08
(9)	3	Optimal ± 3.0	-0.16	0.02	0.18	0.08	12.58	12.58

Notes. The table presents RD estimates of the demand for third-party guarantors at Pentecost. "Optimal" denotes the data-driven bandwidth from the main specification on each side of the cutoff following Calonico, Cattaneo, and Farrell (2020). Alternative specifications use *Optimal* ± 1.5 and *Optimal* ± 3.0 bandwidths on each side, which are shown in the last two columns. "Left/Right est." are predicted values at the cutoff, while "RD est." is the estimated discontinuity. "Left BW" and "Right BW" indicate the bandwidths employed in each specification. Standard errors are robust corrected.

sible drivers of contracting decisions, such as tax deadlines or wage payments, are anchored to the civil calendar and therefore absorbed by day-of-year fixed effects.

The second condition for the RD design's validity is the absence of self-selection or manipulation near the cutoff. This is plausible for two reasons. First, because the contracting environment is similar just before and after Pentecost, there is no material incentive for masters to bunch around this date. Second, manipulation of the cutoff is not possible because Pentecostal timing is set by liturgical rules. More formally, a density test fails to reject continuity of the running variable at the Pentecost cutoff at the 5% level (Figure A8).

A further concern is that the discontinuity in the demand for guarantors reflects changes on the apprentice side rather than in masters' expectations, since the ritual affects the entire Catholic community. This could operate through two channels, namely, compositional shifts in the apprentice pool, or changes in apprentice behavior that masters anticipate. On the first, as noted above, apprentice religiosity does not change discontinuously around the cutoff, ruling out systematic sorting of religious apprentices into contracts near Pentecost. On the second, the discontinuity persists and even grows slightly when restricting the sample to apprentices with name religiosity below the 25th percentile (Figure A9). The fact that masters reduce safeguards even when contracting with apprentices with a weak religious identity suggests that the discontinuity is driven by shifts in masters' own expectations rather than by changes in apprentice conduct. If the discontinuity was driven by apprentices becoming more prosocial around Pentecost, the effect should, instead, be weakest for those least likely to have internalized religious norms.

I perform two final robustness checks. First, Table A22 places the cutoff at alternative days around Pentecost and finds no discontinuities at these placebo dates. Second, I examine Quinquagesima, the Sunday before Lent begins (50 days before Easter). While less

prominent than Pentecost, Quinquagesima marks the transition to the penitential season of Lent, involving heightened introspection and spiritual preparation that, like the period before Pentecost, is likely to activate religious norms. Quinquagesima is also a movable feast, allowing for the same identification strategy. The results, shown in Figure A10, reveal a similar discontinuity in guarantor demand and, additionally, a discontinuity in deferred payment.

3.4.3 Religious parochialism

A third channel that may contribute to the negative effect of religious identity on the demand for contractual safeguards is in-group dynamics. As religious identity strengthens, individuals are more likely to perceive themselves as members of a distinct group and to categorize others accordingly. This activates psychological tendencies that raise expectations of trustworthiness and fairness toward those who share the same religious identity (Turner, Brown, and Tajfel, 1979; Dunbar, 2022). Some scholars indeed argue that the effects attributed to moralizing beliefs and norms may instead reflect such in-group favoritism (Galen, 2012), a view consistent with evidence that religious individuals are fairer, more trusting, and more cooperative primarily when a common religious identity exists (Bulbulia and Mahoney, 2008; Ben-Ner et al., 2009), and comparatively more distrustful toward those whose values conflict with their religion's moral framework (Hall, Matz, and Wood, 2010; Koopmans, 2015).

These psychological tendencies are reinforced by the social structure of religious communities. Individuals with a strong religious identity tend to be deeply embedded in congregational life, where repeated interaction creates dense informal channels of information and reputation (Iannaccone, 1992; Greif, 1993). Within such communities, information about past behavior is more accurate, the reputational costs of opportunism are higher, and the value of maintaining a prosocial reputation is greater.[22]

In practice, religious parochialism implies that masters with a strong religious identity should reduce the demand for safeguards when apprentices also have a strong religious identity. To explore this heterogeneity, I include an interaction between master name religiosity and apprentice name religiosity in the main 2SLS specification.[23]

[22] A related question is what information people use to determine whether someone shares their religious identity. Research suggests that individuals mainly rely on two aspects, namely, the perceived level of religiosity and the specific religious denomination (e.g., Welch et al., 2004; Tan and Vogel, 2008). To make such assessments, individuals may use explicit visual cues (McClendon, 2016) or, alternatively, infer others' religious characteristics from names (Grundmann, Rockenbach, and Werner, 2025) or behavioral signals and the broader social context (Weeks and Vincent, 2007). Indeed, individuals seem to categorize others along religious lines even when no explicit indications of religiosity or denomination are given and when other salient markers such as sex and race are readily available.

[23] To measure apprentice religiosity, I use the same strategy as for masters, discussed in Section 2.3,

Table 4 examines how the effect of master name religiosity on safeguard demand varies with apprentice name religiosity. Column (1) includes only master and name religiosity, and Columns (2) and (3) add the interaction term. Column (3) also includes non-monetary compensation, apprentice age, and apprenticeship duration. All specifications include period and trade fixed effects and standard errors are clustered at the master level.

Across all three panels, the main coefficient on master name religiosity remains negative and statistically significant, in line with the baseline estimates. Even when accounting for the religious identity of the apprentice, therefore, the religious identity of the master shapes safeguard demand. The interaction between master and apprentice name religiosity is also negative and significant across all outcomes: -0.15 ($p < 0.01$) for guarantors, -0.14 ($p < 0.01$) for zero-wage provisions, and -0.19 ($p < 0.01$) for deferred payments. Religious masters' demand for safeguards is thus even lower when the apprentice also has a strong religious identity. The magnitude of the interaction ranges from about 33% of the direct master effect for deferred payments to 47% for guarantors, suggesting that religious parochialism plays a relatively substantive role.

First-stage F-statistics for the master instrument remain well above conventional thresholds in Column (1), but decline once the interaction term is included, falling to around 10 in Panels A and B and just below 10 in Panel C. The F-statistics for the apprentice interaction instrument are weaker still, dropping to approximately 7 in Panel C.[24] The AR test, however, rejects the null at the 1% level across all panels and columns, suggesting that the results are not driven by weak-instrument bias.

A back-of-the-envelope calculation illustrates the relative importance of the two components. Even among contracts with the least-religious apprentices (taking name religiosity at its sample minimum of -1.23, so that the interaction works against the main effect), a one-standard-deviation increase in master name religiosity still reduces the probability of a guarantor by 13 percentage points, a zero-wage provision by 21 percentage points, and a deferred payment by 34 percentage points. These magnitudes are close to the baseline estimates, suggesting that in-group dynamics primarily work by amplifying the effect of master religiosity documented in Section 3.

Table A23 shows that the interaction coefficient remains negative and significant when controlling for whether the contract is the master's first, for the master's exposure to prior

building the instrument for the interaction *Master name religiosity* $\times$ *Apprentice name religiosity*$_i$ as *Parental earthquake exposure* $\times$ *Apprentice name religiosity*$_i$. Figure A1 shows the average apprentice name religiosity for the 1575–1775 period.

[24] In Table A24 and Table A25, where alternative specifications are considered, the first-stage F-statistics are considerably larger and the results remain similar.

apprentice opportunism, for years since the master's first apprentice, for day-of-year fixed effects, for apprentice country and province of origin fixed effects, and for period × trade fixed effects. The results are also similar when constructing the parental exposure variable using larger radii of 400 and 500 kilometers (Table A24), and when replacing the composite religiosity index with its individual components for both masters and apprentices (Table A25).

Table 4: Master name religiosity and parochial behavior

	Panel A: Third-party guarantor		
	(1)	(2)	(3)
Master name religiosity	-0.242***	-0.363**	-0.320**
	[0.089]	[0.154]	[0.142]
Apprentice name religiosity	0.015***	0.028**	0.025**
	[0.005]	[0.011]	[0.010]
Master name religiosity x apprentice name religiosity		-0.165**	-0.151**
		[0.073]	[0.067]
N	52,357	52,357	52,106
Mean dep. var.	0.73	0.73	0.73
F-stat. Rel. master	27.78	12.81	13.02
F-stat. Rel. appr		9.89	10.08
AR F-test (p-value)		0.00	0.00
	Panel B: Zero wage		
	(1)	(2)	(3)
Master name religiosity	-0.297***	-0.407***	-0.377**
	[0.092]	[0.156]	[0.149]
Apprentice name religiosity	0.014***	0.026**	0.024**
	[0.005]	[0.011]	[0.010]
Master religiosity name x apprentice name religiosity		-0.150**	-0.140**
		[0.073]	[0.069]
N	52,357	52,357	52,106
Mean dep. var.	0.29	0.29	0.29
F-stat. Rel. master	27.78	12.81	13.02
F-stat. Rel. appr		9.89	10.08
AR F-test (p-value)		0.00	0.00
	Panel C: Deferred payment		
	(1)	(2)	(3)
Master name religiosity	-0.457***	-0.589***	-0.572***
	[0.117]	[0.213]	[0.209]
Apprentice name religiosity	0.024***	0.038**	0.038**
	[0.007]	[0.015]	[0.015]
Master name religiosity x apprentice name religiosity		-0.190*	-0.190*
		[0.105]	[0.103]
N	37,230	37,230	37,056
Mean dep. var.	0.79	0.79	0.79
F-stat. Rel. master	20.71	10.00	9.97
F-stat. Rel. appr		7.34	7.32
AR F-test (p-value)		0.00	0.00
Contracts in trade	✓	✓	✓
Common name	✓	✓	✓
Non-mon. compensation			✓
Apprentice age			✓
Appr. duration			✓
Period FE	✓	✓	✓
Trade FE	✓	✓	✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors (Panel A), zero-wage provisions (Panel B), and deferred payments (Panel C). Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

4 Apprentice hold-up

The preceding sections have shown that masters with a strong religious identity demand fewer contractual safeguards. A natural question is whether this comes at a cost. Under standard contracting logic, third-party guarantors, zero-wage provisions, or deferred payments raise the expected cost of breach for apprentices, so masters who forgo them should be more exposed to apprentice early exit. If, in addition, apprentices perceive religious masters as more trusting or lenient, opportunistic apprentices could disproportionately select into apprenticeships with them, making this problem more salient. This section examines whether religious masters' lower reliance on safeguards comes at a cost in terms of higher rates of apprentice early exit.

4.1 Religious masters and early exit

To obtain the effect of master name religiosity on the probability of apprentice early exit, I estimate the following equations:

$$\text{Master name religiosity}_i = \pi_0 + \pi_1 \,\text{Parental earthquake exposure}_i + \sum_k \pi_k X_{ik} + \gamma_{g(i)} + \delta_{t(i)} + \epsilon_i \tag{6}$$

$$\text{Early exit}_i = \beta_0 + \beta_1 \,\text{Master } \widehat{\text{name}} \text{ religiosity}_i + \sum_k \beta_k X_{ik} + \gamma_{g(i)} + \delta_{t(i)} + \epsilon_i, \tag{7}$$

where *Master name religiosity*$_i$ is master i's name-based religiosity index; *Early exit*$_i$ is a binary variable equal to one if the apprentice left the workshop before the agreed termination date; *Parental earthquake exposure*$_i$ is the number of earthquakes in masters' parental generation; $\mathbf{X}_{ik}$ is a vector of covariates; and $\gamma_{g(i)}$ and $\delta_{t(i)}$ denote trade and period fixed effects, respectively. Standard errors are clustered at the master level.

Table 5 shows the results. Contrary to the prediction that religious masters' lower reliance on safeguards should leave them more exposed to hold-ups, there is no evidence that more religious masters experience higher rates of early exit. The point estimates are negative and stable, ranging from 0.057 to 0.068, across specifications that control for apprentice age, apprenticeship duration, and non-monetary compensation (Column 3), apprentices' name religiosity (Column 4), masters' contracting experience, masters' exposure to prior apprentice opportunism, and years since the master's first apprentice (Column 5), day-of-year

fixed effects (Column 6), apprentice country-of-origin fixed effects (Column 7), apprentice province-of-origin fixed effects (Column 8), and period × trade fixed effects (Column 9). The coefficients are imprecisely estimated in most columns, however, and only Column (7), which includes country fixed effects, yields a statistically significant coefficient of -0.061 ($p < 0.01$). These results may instead suggest that religious masters experience less apprentice opportunism.

Table 5: Master name religiosity and early exit

	Early exit								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Master name religiosity	-0.067	-0.062	-0.057	-0.062	-0.068	-0.066	-0.061***	-0.062	-0.063
	[0.050]	[0.046]	[0.045]	[0.048]	[0.042]	[0.046]	[0.015]	[0.040]	[0.043]
N	52,360	52,359	52,106	52,106	51,847	52,357	39,576	34,917	52,223
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kleibergen-Paap F-stat.	19.20	31.64	31.55	27.72	37.67	31.40	91.65	22.16	36.43
Contracts in trade		✓	✓	✓	✓	✓	✓	✓	✓
Common name		✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation			✓	✓					
Apprentice age			✓	✓					
Appr. duration			✓	✓					
Appr. name religiosity				✓					
1st contract					✓				
Exp. opportunism					✓				
Yrs. since 1st appr.					✓				
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE						✓			
Country FE							✓		
Appr. province FE								✓	
Period × Trade FE									✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on apprentice early exit. Master name religiosity is a standardized index of the religious salience of the master's given name. The instrument is parental earthquake exposure, defined as the total number of earthquakes experienced by the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE and apprentice province FE, correspond to day-of-year and apprentice province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(6) and (9). In column (7), standard errors are clustered at the master and apprentice country-of-origin level. In column (8), standard errors are clustered at the master and apprentice province-of-origin level. *p ≤ 0.1; **p ≤ 0.05; ***p ≤ 0.01.

In Section A5.5, Table A26 re-estimates the specifications using parental earthquake exposure within a 400 km radius as the instrument. The coefficients are larger in magnitude and statistically significant across most columns, consistent with the baseline findings. When the radius is expanded to 500 km (Table A27), however, the coefficients shrink toward zero. Table A28 decomposes the religious name index into its individual components, providing similar results than in the main estimations. Finally, Table A29 redefines early exit more strictly as cases in which the apprentice left and never returned. The results closely mirror the baseline, with negative and stable coefficients across specifications.

4.2 Why do religious masters experience less early exit?

Three non-mutually exclusive explanations can plausibly account for the effect of master name religiosity on apprentice early exit.

Apprentice religiosity and in-group dynamics. A first explanation is that the negative association between master religiosity and early exit partly reflects religious parochial tendencies. First, shared identity and the social structure of religious communities would lead religious masters to prefer hiring religious apprentices. Consistent with this, Table A30 shows that a one-standard-deviation increase in master name religiosity is associated with an increase of approximately 1.3 standard deviations in apprentice name religiosity, suggesting a strong assortative matching along religious lines.[25] Then, if higher expectations of supernatural punishment, the moral weight of promises, or reputational concerns raise the perceived cost of breaking a commitment with a religious master, more religious apprentices may be less inclined toward opportunistic exit (Arruñada, 2009; Dunbar, 2022), explaining the above results.

Table A31 explores this hypothesis by including the interaction between master and apprentice name religiosity in the early-exit specifications. The interaction is negative across all specifications, suggesting that early exit tends to be lower when both master and apprentice have strong religious identities. However, the estimates are not statistically significant under conventional thresholds in most columns, which might speak about the strength of this channel. On the other hand, apprentice name religiosity is not associated with a reduced probability of early exit, suggesting that religious identity on its own does not make apprentices less likely to exit early in this context. These apprentice-side estimates should be interpreted with caution, as the relationship is purely correlational.

Screening and self-selection. Beyond attracting more religious apprentices, religious masters may systematically attract apprentices who are less willing to behave opportunistically because of the contractual bundle they offer. Two complementary forces can drive this selection. First, by forgoing contractual safeguards, religious masters signal trust and prosociality. This signal is credible precisely because it exposes the master to apprentice opportunism: only a master who genuinely intends to sustain a cooperative relationship would accept such a level of exposure to early exit. This costly signal can serve as a screening device, attracting apprentices who value fairness and reciprocity into relationships where trust is both offered and expected (Sliwka, 2007; Ellingsen and Johannesson, 2008).

[25] Details of these estimations are provided in Section A5.5.

Second, apprentices who are more willing to behave opportunistically may be deterred from entering these relationships in the first place. Research has shown that religious individuals are more willing to punish norm-transgressors (Laurin et al., 2012) and that even non-religious individuals exhibit heightened reputational concerns when interacting with religious counterparts, adjusting their behavior to avoid being perceived as immoral (Cowgill, Rios, and Simpson, 2017). If an opportunistic apprentice anticipates that defection will be met with unusually harsh punishment or reputational damage, his expected payoff from entering the relationship falls, reducing the likelihood that he selects into it. Religious masters would thus simultaneously attract commitment-oriented apprentices and deter opportunistic ones, an explanation consistent with previous work showing that social preferences lead agents to sort into different contracts, sustaining arrangements that would not be stable under purely self-interested behavior (Cabrales, Calvó-Armengol, and Pavoni, 2008; Cabrales et al., 2010; Friebel, Kosfeld, and Thielmann, 2019).

Relational enforcement and the hidden costs of control. A reduced rate of early exit could also be a reciprocal response from apprentices who might otherwise have been indifferent or opportunistic. Experimental evidence shows that formal mechanisms intended to ensure compliance can crowd out intrinsic motivation and provoke the very opportunism they are designed to prevent. Agents reduce effort when principals increase authority or monitoring, because control is interpreted as a signal of distrust (Falk and Kosfeld, 2006; Fehr, Herz, and Wilkening, 2013). More broadly, decisions that reveal selfish intentions or signal a lack of morality can undermine cooperative behavior (Fehr and Rockenbach, 2003).

By forgoing formal protections, religious masters may have avoided these hidden costs of control. The absence of a guarantor, in particular, could signal trust and transform the nature of the relationship from one governed by contractual safeguards to one sustained by positive perceptions and reciprocity (Charness, 2002; Dufwenberg and Kirchsteiger, 2004). [26] This channel seems especially relevant to explain the Pentecost results: when a master signs during a period of heightened religious salience and demands fewer safeguards, the reduction in early exit cannot reflect stable selection on apprentice type (since the apprentice pool does not change discontinuously around the cutoff), pointing instead toward a direct effect of the contractual environment on apprentice behavior.

[26] More generally, it is possible that religious masters treated their apprentices better along dimensions not captured by the contract (e.g., by providing fairer working conditions, greater patience in training, or more equitable treatment), creating additional incentives for apprentices to remain.

5 Concluding remarks

This paper shows that religious identity, measured through a name-based index, shapes the demand for contractual safeguards in apprenticeship relationships. Using more than 50,000 apprenticeship contracts from Early Modern Venice and leveraging exogenous variation in masters' parental earthquake exposure, I find that more religious masters are significantly less likely to require third-party guarantors, front-load the costs of training, and defer payment.

Additional analyses show that this effect operates through three complementary channels. Evidence from Marian apparitions highlights the role of beliefs in "supernatural watchers"; a regression discontinuity at Pentecost points to the importance of religious norms; and heterogeneity analyses underscore the relevance of religious parochialism.

The paper also shows that religious masters, despite introducing fewer safeguards in their contracts, do not experience higher apprentice opportunism in the form of early exit. This finding could be explained by more religious masters hiring religious apprentices; less opportunistic apprentices self-selecting into contracts with more religious masters; and changes in the nature of the relationship away from contractual enforcement and toward relational contracting.

Taken together, these results suggest that religion can replace contractual enforcement in human capital transactions, complement standard accounts of contracting that explain safeguard demand through transaction characteristics, extend empirical work on identity and economic behavior and on organizational research in the economics of religion, and speak to ongoing debates on the scope and mechanisms of religious prosociality.

Extending this analysis to other historical and contemporary settings, across different religious traditions and contractual environments, could help clarify the scope and limits of religious identity in shaping economic exchange. More generally, exploring how different dimensions of principals' identities influence the contracts they design appears to be a promising avenue for future research on contracts, organizations, and markets.

References

Acemoglu, Daron and Jörn-Steffen Pischke. 1999. "Beyond Becker: Training in Imperfect Labour Markets." *The Economic Journal* 109 (453):F112–F142.

Acemoglu, Daron and Jörn-Steffen Pischke. 1998. "Why Do Firms Train? Theory and Evidence." *Quarterly Journal of Economics* 113 (1):79–119.

Ahmadjian, Christina L. and Joanne E. Oxley. 2013. "Vertical Relationships, Hostages, and Supplier Performance: Evidence from the Japanese Automotive Industry." *Journal of Law, Economics, and Organization* 29 (3):485–512.

Aksoy, Ozan and Diego Gambetta. 2022. "Commitment through sacrifice: How Longer Ramadan fasting strengthens religiosity and political Islam." *American Sociological Review* 87 (4):555–583.

Andersen, Lars Harhoff and Jeanet Bentzen. 2024. "In the Name of God! Religiosity and the Transition to Modern Growth." *CEPR Discussion Paper No. DP16938* .

Antràs, Pol and C. Fritz Foley. 2015. "Poultry in Motion: A Study of International Trade Finance Practices." *Journal of Political Economy* 123 (4):809–852.

Armand, Alex, Britta Augsburg, Antonella Bancalari, and Kalyan Kumar Kameshwara. 2024. "Religious proximity and misinformation: Experimental evidence from a mobile phone-based campaign in India." *Journal of Health Economics* 96:102883.

Arruñada, Benito. 2009. "Specialization and Rent-Seeking in Moral Enforcement: The Case of Confession." *Journal for the Scientific Study of Religion* 48 (3):443–461.

———. 2012. *Institutional Foundations of Impersonal Exchange: Theory and Policy of Contractual Registries*. Chicago & London: University of Chicago Press.

Azzolini, Monica. 2017. "Coping with Catastrophe: St Filippo Neri as Patron Saint of Earthquakes." *Quaderni Storici* 52 (3):727–750.

Baker, George, Robert Gibbons, and Kevin J. Murphy. 2002. "Relational Contracts and the Theory of the Firm." *Quarterly Journal of Economics* 117 (1):39–84.

Barro, Robert J. 2006. "Rare Disasters and Asset Markets in the Twentieth Century." *The Quarterly Journal of Economics* 121 (3):823–866.

Bartlett, Robert. 2013. *Why Can the Dead Do Such Great Things? Saints and Worshippers from the Martyrs to the Reformation*. Princeton, NJ: Princeton University Press.

Bazzi, Samuel, Martin Fiszbein, and Mesay Gebresilasse. 2020. "Frontier Culture: The Roots and Persistence of "Rugged Individualism" in the United States." *Econometrica* 88 (6):2329–2368.

Becker, Gary S. 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago: University of Chicago Press.

Becker, Sascha O., Jared Rubin, and Ludger Woessmann. 2024. "Religion and Growth." *Journal of Economic Literature* 62 (3):1094–1142.

Bellavitis, Anna and Valentina Sapienza. 2023. "A data set for historians." In *Apprenticeship, Work,*

Society in Early Modern Venice, edited by Anna Bellavitis and Valentina Sapienza. Routledge, 101–120.

Bellavitis, Anna, Valentina Sapienza, Antoine Gremaux, and Olivier Raveux. 2023. "Patterns of Workshop Inheritance in Early Modern Venice." In *Apprenticeship, Work, and Society in Early Modern Venice*, edited by Anna Bellavitis and Valentina Sapienza, chap. 5. New York, NY: Routledge.

Ben-Nasr, Hamdi and Hatem H. Ghouma. 2022. "Dividend policy and religion: International evidence from firms with Islamic Label." *Emerging Markets Review* 50:100840.

Ben-Ner, Avner, Brian P. McCall, Massoud Stephane, and Hua Wang. 2009. "Identity and in-group/out-group differentiation in work and giving behaviors: Experimental evidence." *Journal of Economic Behavior & Organization* 72 (1):153–170.

Benet, José. 2001. "Fátima and the Portuguese Political Crisis of the First Republic." In *The Appearances of the Virgin Mary in Twentieth-Century Catholicism*, edited by Christian Sorrel and Pierre Létourneau. Presses Universitaires de Lyon, 93–110.

Bengtson, Vern L., Casey E. Copen, Norella M. Putney, and Merril Silverstein. 2009. "A Longitudinal Study of the Intergenerational Transmission of Religion." *International Sociology* 24 (3):325–345.

Benjamin, Daniel J., James J. Choi, and Geoffrey Fisher. 2016. "Religious Identity and Economic Behavior." *The Review of Economics and Statistics* 98 (4):617–637.

Bennett, Mark R. and Christopher J. Einolf. 2017. "Religion, altruism, and helping strangers: A multilevel analysis of 126 countries." *Journal for the Scientific Study of Religion* 56 (2):323–341.

Bentzen, Jeanet. 2019. "Acts of God? Religiosity and Natural Disasters Across Subnational World Districts." *The Economic Journal* 129 (622):2295–2321.

Berkes, Enrico, Davide Maria Coluccia, Gaia Dossi, and Mara Squicciarini. 2023. "Dealing With Adversity: Religiosity or Science? Evidence From the Great Influenza Pandemic." CEPR Discussion Paper 18008, Centre for Economic Policy Research.

Bisin, Alberto, Eleonora Patacchini, Thierry Verdier, and Yves Zenou. 2011. "Ethnic identity and labour market outcomes of immigrants in Europe." *Economic Policy* 26 (65):57–92.

Bisin, Alberto and Thierry Verdier. 2001. "The Economics of Cultural Transmission and the Dynamics of Preferences." *Journal of Economic Theory* 97 (2):298–319.

Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. 2012. "The Organization of Firms Across Countries." *The Quarterly Journal of Economics* 127 (4):1663–1705.

Bossy, John. 1985. *Christianity in the West, 1400–1700*. Oxford: Oxford University Press.

Boyd, R. and P. J. Richerson. 1985. *Culture and the evolutionary process*. University of Chicago Press.

Brading, D. A. 2001. *Mexican Phoenix: Our Lady of Guadalupe: Image and Tradition across Five Centuries*. Cambridge: Cambridge University Press.

Brenner, Philip S. 2014. "Testing the Veracity of Self-Reported Religious Practice in the Muslim World." *Social Forces* 92 (3):1009–1037.

Brown, Peter. 1981. *The Cult of the Saints: Its Rise and Function in Latin Christianity*. Chicago: University of Chicago Press.

Bulbulia, Joseph and Andrew Mahoney. 2008. "Religious solidarity: The hand grenade experiment." *Journal of Cognition and Culture* 8 (3-4):295–320.

Bushong, Benjamin and Tristan Gagnon-Bartsch. 2024. "Failures in Forecasting: An Experiment on Interpersonal Projection Bias." *Management Science* 70 (12):8735–8752.

Cabrales, Antonio, Antoni Calvó-Armengol, and Nicola Pavoni. 2008. "Social Preferences, Skill Segregation, and Wage Dynamics." *Review of Economic Studies* 75 (1):65–98.

Cabrales, Antonio, Raffaele Miniaci, Marco Piovesan, and Giovanni Ponti. 2010. "Social Preferences and Strategic Uncertainty: An Experiment on Markets and Contracts." *American Economic Review* 100 (5):2261–2278.

Callen, Michael, Mohammad Isaqzadeh, James D. Long, and Charles Sprenger. 2014. "Violence and Risk Preference: Experimental Evidence from Afghanistan." *American Economic Review* 104 (1):123–148.

Calonico, Sebastian, Matias D. Cattaneo, and Max H. Farrell. 2020. "Optimal Bandwidth Choice for Robust Bias-Corrected Inference in Regression Discontinuity Designs." *The Econometrics Journal* 23 (2):192–210.

Calonico, Sebastian, Matias D. Cattaneo, and Rocío Titiunik. 2014. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica* 82 (6):2295–2326.

Cameron, Lisa and Manisha Shah. 2015. "Risk-Taking Behavior in the Wake of Natural Disasters." *Journal of Human Resources* 50 (2):484–515.

Campante, Filipe and David Yanagizawa-Drott. 2015. "Does religion affect economic growth and happiness? Evidence from Ramadan." *The Quarterly Journal of Economics* 130 (2):615–658.

Canon Law Society of America. 1999. *Code of Canon Law: Latin–English Edition, New English Translation*. Washington, DC: Canon Law Society of America.

Caponetto, Salvatore. 1998. *The Protestant Reformation in Sixteenth-Century Italy*. Kirksville: Truman State University Press.

Caracausi, Andrea. 2017. "A reassessment of the role of guild courts in disputes over apprenticeship contracts: A case study from early modern Italy." *Continuity and Change* 32 (1):85–114.

Casoria, Fortuna, Ernesto Reuben, and Christina Rott. 2022. "The Effect of Group Identity on Hiring Decisions with Incomplete Information." *Management Science* .

Cattaneo, Matias D., Michael Jansson, and Xinwei Ma. 2020. "Simple Local Polynomial Density Estimators." *Journal of the American Statistical Association* 115 (531):1449–1455.

Cavendish, Camila. 2025. "Secularists must remember that religion is on the rise." Online; accessed

11 April 2025. https://www.ft.com/content/a942ca43-d8c9-408b-861b-c2b7d3b5d2b1. Financial Times.

Cefalà, Luisa, Pedro Naso, Michel Ndayikeza, and Nicholas Swanson. 2024. "Under-Training by Employers in Informal Labor Markets: Evidence from Burundi." Working Paper 2070, Stanford King Center on Global Development.

Charness, Gary. 2002. "Attribution and Reciprocity in an Experimental Labor Market." *Journal of Labor Economics* 20 (3):665–688.

Chassang, Sylvain and Christian Zehnder. 2016. "Rewards and punishments: Informal contracting through social preferences." *Theoretical Economics* 11 (3):1145–1179.

Cheibub, Ian. 2022. "How Pentecostal Churches Are Changing Brazil." Online; accessed 11 April 2025. https://www.dw.com/en/how-pentecostal-churches-are-changing-brazil/a-63283164. Deutsche Welle.

Chen, Daniel L. 2010. "Club Goods and Group Identity: Evidence from Islamic Resurgence during the Indonesian Financial Crisis." *Journal of Political Economy* 118 (2):300–354.

Christie, Angelina N. 2019. "On religion, lying, and social preferences." *Economics Letters* 174:161–164.

Clingingsmith, David, Asim Ijaz Khwaja, and Michael Kremer. 2009. "Estimating the impact of the Hajj: religion and tolerance in Islam's global gathering." *The Quarterly Journal of Economics* 124 (3):1133–1170.

Colavizza, Giovanni, Riccardo Cella, and Anna Bellavitis. 2020. "Apprenticeship in Early Modern Venice." In *Apprenticeship in Early Modern Europe*, edited by Maarten Prak and Patrick Wallis. Cambridge University Press, 106–137.

Collier, Benjamin L., Cameron M. Ellis, and Benjamin J. Keys. 2025. "The Cost of Consumer Collateral: Evidence from Bunching." *Econometrica* 93 (3):779–819.

Conley, Timothy G., Christian B. Hansen, and Peter E. Rossi. 2012. "Plausibly Exogenous." *Review of Economics and Statistics* 94 (1):260–272.

Cowgill, Colleen M., Kimberly Rios, and Ain Simpson. 2017. "Generous heathens? Reputational concerns and atheists' behavior toward Christians in economic games." *Journal of Experimental Social Psychology* 73:169–179.

Cristellon, Cecilia and Seidel Menchi. 2013. "Religious Life." In *A Companion to Venetian History, 1400-1797*, edited by Eric Dursteler. Leiden, Netherlands: Brill.

De Chiara, Alessandro, Florian Engl, Holger Herz, and Ester Manna. 2025. "Control aversion in hierarchies." *The Journal of Law, Economics, and Organization* Advance Article.

De la Croix, David, Matthias Doepke, and Joel Mokyr. 2018. "Clans, Guilds, and Markets: Apprenticeship Institutions and Growth in the Preindustrial Economy." *The Quarterly Journal of Economics* 133 (1):1–70.

De Munck, Bert. 2007. *Technologies of Learning: Apprenticeship in Antwerp from the 15th Century*

to the End of the Ancien Régime. Turnhout: Brepols Publishers.

De Munck, Bert, Raoul De Kerf, and Annelies De Bie. 2020. "Apprenticeship in the Southern Netherlands, c. 1400–c. 1800." In *Apprenticeship in Early Modern Europe*, edited by Maarten Prak and Patrick Wallis. Cambridge: Cambridge University Press, 217–246.

Dion, Kenneth L. 1983. "Names, Identity, and Self." *Names* 31 (4):245–257.

Duffy, Eamon. 1992. *The Stripping of the Altars: Traditional Religion in England, c. 1400–c. 1580*. New Haven, CT: Yale University Press.

Dufwenberg, Martin and Georg Kirchsteiger. 2004. "A theory of sequential reciprocity." *Games and Economic Behavior* 47 (2):268–298.

Dunbar, R. 2022. *How Religion Evolved: And Why It Endures*. London: Penguin Random House.

Ehrmann, Maud, Orlin Topalov, and Frédéric Kaplan. 2023. "From Archival Sources to Structured Historical Information: Annotating and Exploring the 'Accordi Dei Garzoni'." In *Apprenticeship, Work, Society in Early Modern Venice*, edited by Anna Bellavitis and Valentina Sapienza. London: Routledge, 304.

Ellingsen, Tore and Magnus Johannesson. 2008. "Pride and Prejudice: The Human Side of Incentive Theory." *American Economic Review* 98 (3):990–1008.

Erat, Sanjiv. 2013. "Avoiding lying: The case of delegated deception." *Journal of Economic Behavior & Organization* 93:273–278.

Evans, Richard B., Melissa Porras Prado, A. Emanuele Rizzo, and Rafael Zambrana. 2024. "Identity, Diversity, and Team Performance: Evidence from U.S. Mutual Funds." *Management Science* .

Falk, Armin and Michael Kosfeld. 2006. "The Hidden Costs of Control." *American Economic Review* 96 (5):1611–1630.

Fehr, Ernst, Holger Herz, and Tom Wilkening. 2013. "The Lure of Authority: Motivation and Incentive Effects of Power." *American Economic Review* 103 (4):1325–1359.

Fehr, Ernst and Bettina Rockenbach. 2003. "Detrimental Effects of Sanctions on Human Altruism." *Nature* 422 (6928):137–140.

Filistrucchi, Lapo and Jens Prüfer. 2019. "Faithful Strategies: How Religion Shapes Nonprofit Management." *Management Science* 65 (1):188–208.

Fisman, Raymond, Daniel Paravisini, and Vikrant Vig. 2017. "Cultural Proximity and Loan Outcomes." *American Economic Review* 107 (2):457–492.

Fouka, Vasiliki. 2020. "Backlash: The Unintended Effects of Language Prohibition in U.S. Schools after World War I." *The Review of Economic Studies* 87 (1):204–239.

François, Bruno, Esther M. Sternberg, and Elizabeth Fee. 2012. "The Lourdes Medical Cures Revisited." *Journal of the History of Medicine and Allied Sciences* 69 (1):135–162.

Friebel, Guido, Michael Kosfeld, and Gerd Thielmann. 2019. "Trust the Police? Self-Selection of

Motivated Agents into the German Police Force." *American Economic Journal: Microeconomics* 11 (4):59–78.

Fryer, Roland G., Jr. and Steven D. Levitt. 2004. "The Causes and Consequences of Distinctively Black Names." *The Quarterly Journal of Economics* 119 (3):767–805.

Galen, L.W. 2012. "Does Religious Belief Promote Prosociality? A Critical Examination." *Psychological Bulletin* 138 (5):876.

Garicano, Luis and Luis Rayo. 2017. "Relational Knowledge Transfers." *American Economic Review* 107 (9):2695–2730.

Gelfand, Michele J., Jana L. Raver, Lisa Nishii, Lisa M. Leslie, Janetta Lun, Beng Chang Lim, Lai Duan, Alon Almaliach, Swee Hoon Ang, Jonas Arnadottir, Zeynep Aycan, Klaus Boehnke, Pawel Boski, Rosa Cabecinhas, Doris K.-S. Chan, Jagdeep Chhokar, Alessia D'Amato, Mireia Ferrer, Iris Fischlmayr, Ronald Fischer, Mária Fülöp, James Georgas, Emiko S. Kashima, Yoshihisa Kashima, Kwang Koo Kim, Alain Lempereur, Patricia Marquez, Naresh Othman, Bert Overlaet, Paraskevi Panagiotopoulou, Karl Peltzer, Lourdes R. Perez-Florizno, Lidiia Ponomarenko, Anu Realo, Vidar Schei, Manfred Schmitt, Peter B. Smith, Nazar Soomro, Erna Szabo, Nalinee Taveesin, Midori Toyama, Evert Van de Vliert, Niharika Vohra, Colleen Ward, and Susumu Yamaguchi. 2011. "Differences between tight and loose cultures: A 33-nation study." *Science* 332 (6033):1100–1104.

Gervais, Will M., Azim F. Shariff, and Ara Norenzayan. 2011. "Do you believe in atheists? Distrust is central to anti-atheist prejudice." *Journal of Personality and Social Psychology* 101 (6):1189–1206.

Giannetti, Mariassunta and Yishay Yafeh. 2012. "Do Cultural Differences Between Contracting Parties Matter? Evidence from Syndicated Bank Loans." *Management Science* 58 (2):365–383.

Gil, Ricard and Giorgio Zanarone. 2025. "Governing Relationships: Theory, Evidence, and Opportunities." In *Handbook of New Institutional Economics*, edited by Claude Ménard and Mary M. Shirley, Springer Books, chap. 25. Springer, 2nd ed., 621–649.

Greif, Avner. 1993. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition." *American Economic Review* 83 (3):525–548.

Groot, Piet Joannes. 2020. "Newcomers, Migrants, Surgeons: Making Career in the Amsterdam Surgeons' Guild of the Eighteenth Century." *TSEG - The Low Countries Journal of Social and Economic History* 17 (3):7–36.

Grundmann, Susanna, Bettina Rockenbach, and Katharina Werner. 2025. "First Names and Ascribed Characteristics." *Journal of Economic Behavior & Organization* 234:107005.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2003. "People's opium? Religion and economic attitudes." *Journal of Monetary Economics* 50 (1):225–282.

Haan, Michael D. 2005. "Studying the Impact of Religion on Fertility in Nineteenth-Century Canada: The Use of Direct Measures and Proxy Variables." *Social Science History* 29 (3):373–

411.

Hadaway, C. Kirk, Penny Long Marler, and Mark Chaves. 1998. "Overreporting church attendance in America: Evidence that demands the same verdict." *American Sociological Review* 63 (1):122–130.

Hall, Deborah L., David C. Matz, and Wendy Wood. 2010. "Why Don't We Practice What We Preach? A Meta-Analytic Review of Religious Racism." *Personality and Social Psychology Review* 14 (1):126–139.

Hamilton, Gillian. 2000. "The Decline of Apprenticeship in North America: Evidence from Montreal." *The Journal of Economic History* 60 (3):627–664.

Hart, Oliver and John Moore. 1990. "Property Rights and the Nature of the Firm." *Journal of Political Economy* 98 (6):1119–1158.

Henrich, Joseph. 2020. *The WEIRDest People in the World: How the West Became Psychologically Peculiar and Particularly Prosperous*. New York: Farrar, Straus, and Giroux.

Henrich, Joseph, Jean Ensminger, Richard McElreath, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, Natalie Henrich, Carolyn Lesorogol, Frank Marlowe, David Tracer, and John Ziker. 2010. "Markets, Religion, Community Size, and the Evolution of Fairness and Punishment." *Science* 327 (5972):1480–1484.

Hernández, María Teresa and Cristian Hernández. 2025. "How Evangelical Pastors Provide Spiritual Comfort in Crisis-Hit Venezuela." Online; accessed 16 May 2025. https://apnews.com/article/venezuela-evangelical-churches-pastors-crisis-77337a0d4aeabf931b7db01ed3ea4a0d. AP News.

Hitchcock, Roswell D. 1894. *Hitchcock's Bible Names Dictionary*. New York: A.J. Johnson.

Hobson, Nicholas M., Juliana Schroeder, Jane L. Risen, Dimitris Xygalatas, and Michael Inzlicht. 2018. "The Psychology of Rituals: An Integrative Review and Process-Based Framework." *Perspectives on Psychological Science* 22 (3):260–284.

Hoffman, Mitchell and Stephen V. Burks. 2017. "Training Contracts, Employee Turnover, and the Returns from Firm-Sponsored General Training." Working Paper 23247, National Bureau of Economic Research.

Holmström, Bengt and Paul Milgrom. 1991. "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design." *Journal of Law, Economics, Organization* 7 (Special Issue):24–52.

Hornung, Erik, Guido Schwerdt, and Maurizio Strazzeri. 2023. "Religious practice and student performance: Evidence from Ramadan fasting." *Journal of Economic Behavior & Organization* 205:100–119.

Iannaccone, Laurence R. 1992. "Sacrifice and Stigma: Reducing Free-riding in Cults, Communes, and Other Collectives." *Journal of Political Economy* 100 (2):271–291.

———. 1998. "Introduction to the Economics of Religion." *Journal of Economic Literature* 36 (3):1465–1495.

Jeffers, Jessica S. 2024. "The impact of restricting labor mobility on corporate investment and entrepreneurship." *The Review of Financial Studies* 37 (1):1–44.

Johnson, D. and J. Bering. 2006. "Hand of God, mind of man: Punishment and cognition in the evolution of cooperation." *Evolutionary Psychology* 4:219–233.

Johnson, Matt. 2024. "Liberalism and the West's 'Crisis of Meaning'." Online; accessed 13 Jan 2025. https://quillette.com/2024/07/04/liberalism-and-the-wests-crisis-of-meaning-ayaan-hirsi-ali-tom-holland-new-theism/. Quillette.

Jurajda, Štěpán and Dejan Kovač. 2021. "Names and behavior in a war." *Journal of Population Economics* 34 (1):1–33.

Kaledzi, Isaac. 2022. "Ghana warns against alarmist New Year prophecies." Online; accessed 13 Jan 2025. https://www.dw.com/en/ghana-warns-against-alarmist-new-year-prophecies/a-64247116. Deutsche Welle.

Kelley, Harold H. and John L. Michela. 1980. "Attribution Theory and Research." *Annual Review of Psychology* 31 (Volume 31, 1980):457–501.

Kelly, John Michael, Stephanie R. Kramer, and Azim F. Shariff. 2024. "Religiosity predicts prosociality, especially when measured by self-report: A meta-analysis of almost 60 years of research." *Psychological Bulletin* 150 (3):284–318.

Klapisch-Zuber, Christiane. 2017. "The Heavenly Patrons of Girls and Boys at the Florence Baptistery (Fourteenth and Fifteenth Centuries)." *Clio. Women, Gender, History* 45 (1):61–83.

Koopmans, Ruud. 2015. "Religious Fundamentalism and Hostility against Out-groups: A Comparison of Muslims and Christians in Western Europe." *Journal of Ethnic and Migration Studies* 41 (1):33–57.

Krueger, Joachim I. 1998. "On the Perception of Social Consensus." In *Advances in Experimental Social Psychology*, vol. 30, edited by Mark P. Zanna. San Diego, CA: Academic Press, 163–240.

Lane, Frederic Chapin. 1973. *Venice: A Maritime Republic*. Baltimore: Johns Hopkins University Press.

Laurin, Kristin, Azim F. Shariff, Joseph Henrich, and Aaron C. Kay. 2012. "Outsourcing punishment to God: beliefs in divine control reduce earthly punishment." *Proceedings of the Royal Society B: Biological Sciences* 279 (1741):3272–3281.

Lazear, Edward P. 1979. "Why Is There Mandatory Retirement?" *Journal of Political Economy* 87 (6):1261–1284.

Lee, David S. and Thomas Lemieux. 2010. "Regression Discontinuity Designs in Economics." *Journal of Economic Literature* 48 (2):281–355.

Li, Xinyu and Wendelin Schnedler. 2025. "Sharing the Fame but Taking the Blame: When Declaring

a Single Person Responsible Solves a Free Rider Problem." *Management Science* Forthcoming.

Lieberson, Stanley. 2000. *A matter of taste : how names, fashions, and culture change*. New Haven: Yale University Press.

McClendon, David. 2016. "Religion, Marriage Markets, and Assortative Mating in the United States." *Journal of marriage and the family* 78 (5):1399–1421.

McKay, Ryan, Charles Efferson, Harvey Whitehouse, and Ernst Fehr. 2011. "Wrath of God: Religious Primes and Punishment." *Proceedings of the Royal Society B: Biological Sciences* 278 (1713):1858–1863.

Meeus, Jean. 1998. *Astronomical Algorithms*. Richmond, VA: Willmann–Bell, 2nd ed.

Miller, Dale T., Penny S. Visser, and Brian D. Staub. 2005. "How Surveillance Begets Perceptions of Dishonesty: The Case of the Counterfactual Sinner." *Journal of Personality and Social Psychology* 89 (2):117–128.

Minns, Chris and Patrick H. J. Wallis. 2013. "The price of human capital in a pre-industrial economy: premiums and apprenticeship contracts in 18th century England." *Explorations in Economic History* 50 (3):335–350.

Mokyr, Joel. 2020. "The Economics of Apprenticeship." In *Apprenticeship in Early Modern Europe*, edited by Maarten Prak and Patrick Wallis. Cambridge: Cambridge University Press, 20–43.

Montero, Eduardo, Dean Yang, and Triana Yentzen. 2025. "The Price of Faith: Economic Costs and Religious Adaptation in Sub-Saharan Africa." *University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2025-33* .

Norenzayan, Ara and Azim F. Shariff. 2008. "The Origin and Evolution of Religious Prosociality." *Science* 322 (5898):58–62.

Norenzayan, Ara, Azim F. Shariff, and Will M. Gervais. 2009. "The evolution of religious misbelief." *Behavioral and Brain Sciences* 32 (6):531–532.

Norenzayan, Ara, Azim F. Shariff, Will M. Gervais, Aiyana K. Willard, Rita A. McNamara, Edward Slingerland, and Joseph Henrich. 2016. "The cultural evolution of prosocial religions." *Behavioral and Brain Sciences* 39:e1.

Norwich, John Julius. 1982. *A History of Venice*. New York: Alfred A. Knopf.

Ogilvie, Sheilagh. 2019. *The European Guilds: An Economic Analysis*. Princeton, NJ: Princeton University Press.

Oh, Suanna. 2023. "Does Identity Affect Labor Supply?" *American Economic Review* 113 (8):2055–2083.

Pargament, Kenneth I. 2001. *The Psychology of Religion and Coping: Theory, Research, Practice*. New York, NY: Guilford Press.

Perl, Paul and Jonathon L. Wiggins. 2004. "Don't Call Me Ishmael: Religious Naming Among Protestants and Catholics in the United States." *Journal for the Scientific Study of Religion*

43 (2):209–228.

Pew Research Center. 2015. "The Future of World Religions: Population Growth Projections, 2010–2050." Pew Research Center Report. https://www.pewresearch.org/religion/2015/04/02/the-future-of-world-religions/. Accessed 13 October 2024.

———. 2018. "The Age Gap in Religion Around the World." Pew Research Center Report. https://www.pewresearch.org/religion/2018/06/13/the-age-gap-in-religion-around-the-world/. Accessed 13 October 2024.

———. 2025. "Decline of Christianity in the U.S. Has Slowed, May Have Leveled Off: Findings from the 2023–24 Religious Landscape Study." Pew Research Center Report. https://www.pewresearch.org/religion/2025/02/26/decline-of-christianity-in-the-u-s-has-slowed-may-have-leveled-off/. Accessed 29 March 2025.

Pezzolo, Luciano. 2013. "The Venetian Economy." In *A Companion to Venetian History, 1400-1797*, edited by Eric Dursteler. Leiden, Netherlands: Brill.

Philastrius. 1898. *Diversarum Hereseon Liber*, *Corpus Scriptorum Ecclesiasticorum Latinorum*, vol. 38. Vienna / Leipzig: Tempsky / Freytag.

Pichon, Isabelle, Giulio Boccato, and Vassilis Saroglou. 2007. "Nonconscious influences of religion on prosociality: A priming study." *European Journal of Social Psychology* 37 (5):1032–1045.

Poirier, Jean-Paul. 2005. *Le tremblement de terre de Lisbonne (1755)*. Paris: Odile Jacob.

Poulissen, Davey, Andries de Grip, Didier Fouarge, and Annemarie Künn– Nelen. 2023. "Employers' Willingness to Invest in the Training of Temporary versus Permanent Workers: A Discrete Choice Experiment." *Labour Economics* 84:102430.

Pyszczynski, Tom, Jeff Greenberg, and Sheldon Solomon. 1999. "A dual-process model of defense against conscious and unconscious death-related thoughts: An extension of terror management theory." *Psychological Review* 106 (4):835–845.

Qiao, Kunyuan. 2025. "From Church Leadership to Firm Leadership: Religion of Early State Residents, State Institutions, and Present-Day Corporate Female Executives." *Strategy Science* Forthcoming.

Roy, Tirthankar. 2013. "Apprenticeship and Industrialization in India, 1600–1930." In *Technology, Skills and the Pre-Modern Economy in the East and the West*, edited by Jan Luiten Van Zanden and Maarten Prak, chap. 2. Boston: Brill.

Ruggiero, Guido. 1978. "Law and Punishment in Early Renaissance Venice." *Journal of Criminal Law and Criminology* 69 (1):89–104.

Ryan, Paul. 2001. "The School-to-Work Transition: A Cross-National Perspective." *Journal of Economic Literature* 39 (1):34–92.

Sánchez, José Antolín Nieto and Juan Carlos Zofío Llorente. 2016. "The Return of the Guilds: A View from Early Modern Madrid." *Journal of Social History* 50 (2):247–272.

Saroglou, Vassilis, Vanessa Delpierre, and Rebecca Dernelle. 2004. "Values and Religiosity: A Meta-Analysis of Studies Using Schwartz's Model." *Personality and Individual Differences* 37 (4):721–734.

Shariff, Azim F., Aiyana K. Willard, Teresa Andersen, and Ara Norenzayan. 2016. "Religious Priming: A Meta-Analysis With a Focus on Prosociality." *Personality and Social Psychology Review* 20 (1):27–48.

Shi, Liyan. 2023. "Optimal Regulation of Noncompete Contracts." *Econometrica* 91 (2):425–463.

Silliman, Daniel. 2022. "'Nondenominational' Is Now the Largest Segment of American Protestants." Online; accessed 11 April 2025. https://www.christianitytoday.com/2022/11/religion-census-nondenominational-church-growth-nons/. Christianity Today.

Sliwka, Dirk. 2007. "Trust as a Signal of a Social Norm and the Hidden Costs of Incentive Schemes." *American Economic Review* 97 (3):999–1012.

Smith-Bannister, Scott. 1997. *Names and Naming Patterns in England, 1538–1700*. Oxford: Oxford University Press.

Stopper, Francesca. 2023. "Fathers, Sons and Apprentices in the Goldsmiths' and Jewellers' Guild (16th–18th Centuries)." In *Apprenticeship, Work, Society in Early Modern Venice*, edited by Anna Bellavitis and Valentina Sapienza. New York, NY: Routledge, 248–269.

Tan, Jonathan H.W. and Claudia Vogel. 2008. "Religion and trust: An experimental study." *Journal of Economic Psychology* 29 (6):832–848.

Taylor, Thomas. 1995. ""So Many Extraordinary Things to Tell": Letters from Lourdes, 1858." *The Journal of Ecclesiastical History* 46 (3):457–481.

Thielmann, Isabel, Benjamin E. Hilbig, and Ingo Zettler. 2020. "Seeing Me, Seeing You: Testing Competing Accounts of Assumed Similarity in Personality Judgments." *Journal of Personality and Social Psychology* 118 (1):172–198.

Turner, J. C., R. J. Brown, and H. Tajfel. 1979. "Social comparison and group interest in ingroup favouritism." *European Journal of Social Psychology* 9 (2):187–204.

Valencia Caicedo, Felipe, Thomas Dohmen, and Andreas Pondorfer. 2023. "Religion and cooperation across the globe." *Journal of Economic Behavior & Organization* 215:479–489.

van Zanden, Jan Luiten and Maarten Prak. 2013. "Technology and Human Capital Formation in the East and West Before the Industrial Revolution." In *Technology, Skills and the Pre-Modern Economy in the East and the West*, edited by Jan Luiten van Zanden and Maarten Prak, chap. 1. Boston: Brill, 1–35.

Viceconte, Maria, Giulio Schiano, and Domenico Cecere. 2023. "Introduction." In *Heroes in Dark Times: Saints and Officials Tackling Disaster (16th–17th Centuries)*, edited by Maria Viceconte, Giulio Schiano, and Domenico Cecere. Rome: Viella, 1–18.

Wallis, Patrick. 2007. "Apprenticeship and Training in Premodern England." *The Journal of Economic History* 67 (3):832–861.

———. 2012. "Labor, Law, and Training in Early Modern London: Apprenticeship and the City's Institutions." *Journal of British Studies* 51 (4):791–819.

———. 2020. "Apprenticeship in England." In *Apprenticeship in Early Modern Europe*, edited by Maarten Prak and Patrick Wallis. Cambridge: Cambridge University Press, 247–281.

Weeks, Matthew and Mark A. Vincent. 2007. "Using Religious Affiliation to Spontaneously Categorize Others." *The International Journal for the Psychology of Religion* 17 (4):317–331.

Welch, Michael R., David Sikkink, Eric Sartain, and Carolyn Bond. 2004. "Trust in God and Trust in Man: The Ambivalent Role of Religion in Shaping Dimensions of Social Trust." *Journal for the Scientific Study of Religion* 43 (3):317–343.

Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism.* New York: The Free Press.

Wolter, Stefan C. and Paul Ryan. 2011. "Apprenticeship." In *Handbook of the Economics of Education*, vol. 3, edited by Eric A. Hanushek, Stephen Machin, and Ludger Woessmann, chap. 11. Amsterdam: Elsevier, 521–576.

Yu, Zhaoliang, Persefoni Bali, Myron Tsikandilakis, and Eddie M. W. Tong. 2022. ""Look not at what is contrary to propriety": A meta-analytic exploration of the association between religiosity and sensitivity to disgust." *British Journal of Social Psychology* 61 (3):1066–1095.

Supplementary Appendix for "Religious Identity, Safeguards, and Hold-Ups in Human Capital Transmission"

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February 2026

This Supplementary Appendix provides additional details for the paper "Religious Identity, Safeguards, and Hold-Ups in Human Capital Transmission." It includes additional information, alternative analyses, robustness checks, and data sources, generally following the same order as in the manuscript.

Contents

A1 Extended data description

This section defines all variables and documents their construction and sources.

A1.1 Outcomes

Third-party guarantor. Binary variable equal to one if the contract includes a third-party guarantor clause, and zero otherwise. The guarantor is a third party who assumes legal and financial responsibility for the apprentice's conduct (e.g., compensating the master or helping secure the apprentice's return in case of flight). Source: *Accordi dei Garzoni* corpus.

Zero-wage arrangement. Binary variable equal to one if the contract specifies no monetary wage for the apprentice, and zero otherwise. This outcome captures the front-loading of training costs onto apprentices through uncompensated labor. Source: *Accordi dei Garzoni* corpus.

Deferred payment. Binary variable equal to one if the contract specifies that monetary compensation is deferred until the end of the apprenticeship term, and zero otherwise. This measure is defined for the subset of contracts in which monetary compensation is provided. Therefore, contracts without wage are treated as missing for this outcome. Source: *Accordi dei Garzoni* corpus.

Apprentice early exit. Binary indicator that equals one when the apprentice fled before the agreed contractual term ended. This information is available because the master reported these events to the *Giustizia Vecchia*. Data come from the *Accordi dei Garzoni* corpus.

A1.2 Independent variables

Master name religiosity. Standardized index capturing the religious salience of the master's given name. Constructed as the first principal component of: 1) the count of biblical figures sharing the name; 2) the count of Catholic saints bearing the name; and 3) the count of churches naming that patron. All names are standardized to their etymological roots using the Variant Names Project, which documents alternative spellings, linguistic variants, and historical forms for names. This information predominantly comes from genealogical databases such as Ancestry and WeRelate, supplemented by linguistic resources and contributions from linguistic communities. The construction of the index, as well as the underlying data sources, is detailed in Section 2.3 and Section 3.2. Figure 3 shows the average master name religiosity for the 1575-1775 period.

Log. N of biblical mentions. Natural logarithm of the number of biblical figures

sharing the master's given name. The construction of this measure, as well as the underlying data sources, is detailed in Section 2.3 and Section 3.2.

Log. N of saints mentions. Natural logarithm of the number of saints sharing the master's given name. The construction of this measure, as well as the underlying data sources, is detailed in Section 2.3 and Section 3.2.

Log. N of church patron mentions. Natural logarithm of the number of church patrons sharing the master's given name. The construction of this measure, as well as the underlying data sources, is detailed in Section 2.3 and Section 3.2.

Marian apparition. Binary variable that takes one if a Marian apparition took place within a 300 km radius of Venice in the two years preceding the contract's signature. Data come from the Miracle Hunter database (accessible at `https://www.miraclehunter.com/miracles/`. Figure A3 displays the spatial distribution of the 38 miracles that took place around Venice in the period of analysis.

Parental earthquake exposure. Total number of earthquakes within a 300-kilometer radius around Venice in the time window $[m-70, m-40]$, where m is the year in which master i first appears in the corpus of contracts. Information about historical earthquakes is taken from the Significant Earthquake Database maintained by the National Centers for Environmental Information (NCEI). This database contains earthquakes occurring worldwide from 2150 B.C. to the present that meet at least one of the following criteria: Moderate damage (approximately $1 million or more), 10 or more deaths, Magnitude 7.5 or greater, Modified Mercalli Intensity X or greater, or the earthquake generated a tsunami. Figure 1 displays the spatial distribution of the 43 earthquakes that took place around Venice between 1475 and 1575.

Apprentice name religiosity. Standardized index capturing the religious salience of the apprentice's given name. The methodology and underlying databases are the same as those used to measure master name religiosity (see Section 2.3 and Section 3.2). Figure A1 shows the average apprentice name religiosity for the 1575-1775 period.

A1.3 Covariates

Contracts in trade. Natural logarithm of the total number of apprenticeship contracts registered in the master's trade during the current and previous five years. Data come from the *Accordi dei Garzoni* corpus.

Common name. Normalized rank-based index of the master's given-name popularity in the sample (including apprentices and guarantors), scaled to $(0, 1]$. For each 30-year cohort

c, I order distinct names by their frequency and assign a rank $\text{Rank}_{ic} = 1, 2, \ldots, N_c$ (1 for the most common name, N_c for the rarest). I then rescale this rank to the unit interval, $\text{Normalized rank}_{ic} = (\text{Rank}_{ic} - 1)/(N_c - 1)$, and invert the scale so that larger values denote greater popularity: $\text{Common name}_{ic} = 1 - \text{Normalized rank}_{ic}$. The underlying data come from the *Accordi dei Garzoni* corpus.

Non-monetary compensation. First principal component of the in-kind components of compensation paid by masters to apprentices. The underlying information for the index is four binary variables: whether the master pays accommodation; whether the master is committed to take care of the apprentice when ill; whether the master pays the apprentice's general expenses; and whether the master pays for clothes. Higher values indicate more in-kind payments. Data come from the *Accordi dei Garzoni* corpus.

Apprentice age. Discrete variable encoding the apprentice's age at signing. The variable has 7 categories: <10 years, 10–<12, 12–<14, 14–<16, 16–<18, 18–<20, ≥21 (including all instances labeled "*maggiore età*"). Data come from the *Accordi dei Garzoni* corpus.

Apprenticeship duration. Contract length in years. Data come from the *Accordi dei Garzoni* corpus.

First contract. Binary variable that equals one if the contract is the first one signed by a given master. The underlying data come from the *Accordi dei Garzoni* corpus.

Experienced opportunism. Binary variable that equals one if the master has previously experienced apprentice opportunism in the form of early exit. The underlying data come from the *Accordi dei Garzoni* corpus.

Years since first apprentice. Number of years elapsed between the signature of the contract and the signature of the first contract by the same master. If the master had no previous contracts, it takes zero. The underlying data come from the *Accordi dei Garzoni* corpus.

Table A1: Summary statistics

	Mean	Std. Dev.	Min	Max
Outcomes				
Third-party guarantor	0.73	0.45	0	1
Zero-wage contract	0.29	0.45	0	1
Deferred payment	0.79	0.41	0	1
Apprentice early exit	0.08	0.28	0	1
Master religious identity				
Master name religiosity (standardized index)	0.00	1.00	-1.24	2.10
Master: # biblical-name matches	1.45	2.04	0	6
Master: # saint-name matches	5.22	4.74	0	15
Master: # church-patron matches	5.57	3.80	0	13
Marian apparitions				
Marian apparition within 300 km (2-year window)	0.35	0.48	0	1
Marian apparition within 300 km (1-year window)	0.14	0.35	0	1
Marian apparition within 200 km (2-year window)	0.16	0.37	0	1
Marian apparition within 400 km (2-year window)	0.57	0.50	0	1
Parental earthquake exposure				
# earthquakes within 300 km	3.02	1.84	1	8
# earthquakes within 400 km	4.31	2.12	1	11
# earthquakes within 500 km	6.21	3.05	1	12
Apprentice religious identity				
Apprentice name religiosity (standardized index)	0.00	1.00	-1.23	3.87
Apprentice: # biblical-name matches	1.47	2.06	0	9
Apprentice: # saint-name matches	5.25	4.79	0	24
Apprentice: # church-patron matches	5.57	3.80	0	21
Contracting environment				
Contracts in trade	118.71	120.87	1	693
Common name (rank index)	0.98	0.04	0.70	1.00
Non-monetary compensation (composite index)	0.00	1.61	-3.08	1.41
Apprentice age category (1–7)	4.01	1.38	1	7
Apprenticeship duration (years)	4.85	1.34	0	10
Master prior apprenticeship experience (indicator)	0.23	0.42	0	1
Master prior experience of early exit (indicator)	0.03	0.17	0	1
Years since master's first observed contract (years)	1.75	4.79	0	30

Notes. The table reports summary statistics for the variables used in the main analyses. For variables that are log-transformed in the regressions, the reported summary statistics are based on their original (untransformed) values.

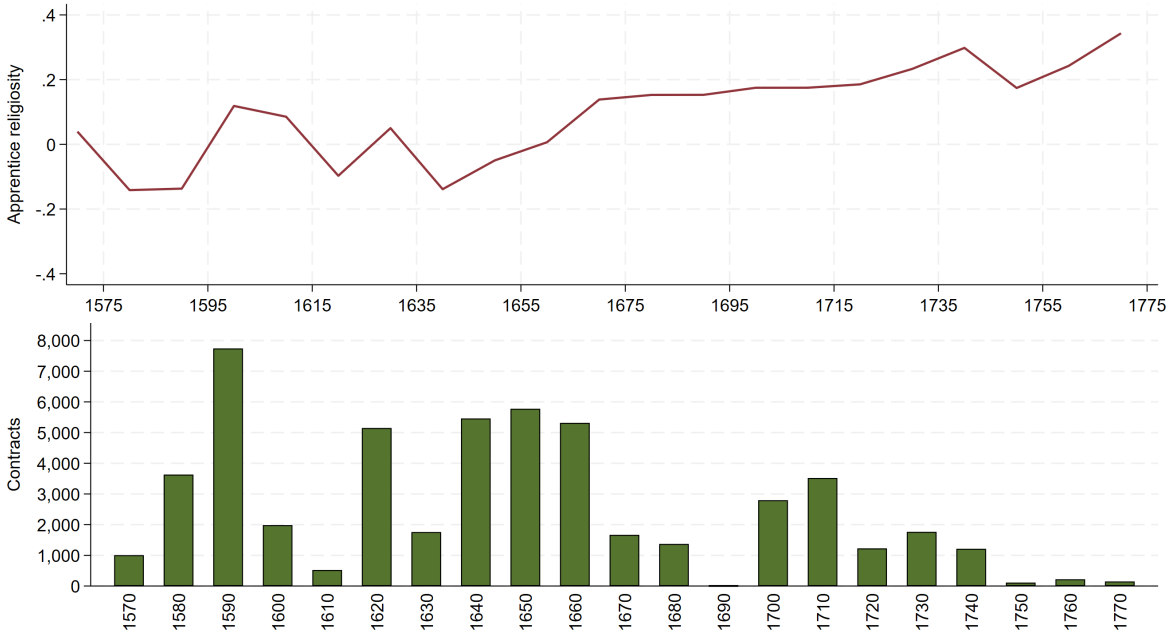
A1.4 Descriptive statistics

Table A2: Religious intensity among the most and least common master names

Name	Name frequency	Biblical figures	Saints	Church patrons
Panel A: Most common master names				
Giovanni	7,077	6	15	10
Antonio	3,689	0	9	11
Francesco	3,547	0	8	8
Giacomo	3,032	3	6	4
Pietro	2,651	1	4	9
Panel B: Least common (representative) master names				
Valentino	274	0	2	2
Agostino	265	1	8	3
Martino	237	0	4	9
Bortolo	233	0	0	1
Gerolamo	229	0	2	3

Notes. The table reports the number of biblical, saint, and church-patron associations for masters' names among the most and least common names (restricted to those occurring more than 200 times). Frequencies refer to the number of masters bearing each name.

Figure A1: Average apprentice name religiosity, Venice (1575-1775)



Notes. Average apprentice name religiosity in Venice over the 1575-1775 period. Apprentice name religiosity is the first principal component of three variables: 1) the number of times the apprentice's name appears in the bible; 2) the number of times the name is shared with a saint; and 3) the number of times the name was used to name a church.

A2 Venice 1575-1775

This section reviews the main historical developments in Venice over the study period, beginning with a broad overview and then detailing the specific sub-periods that correspond to the time-period fixed effects used in the analyses. The discussion draws on the works of Lane (1973), Norwich (1982), Caponetto (1998), Cristellon and Menchi (2013), and Pezzolo (2013).

A2.1 Overview

Once a preeminent maritime republic, Venice faced a progressive decline over the period 1575-1775. Its commercial dominance started to erode after the great voyages of Columbus (1492) and Vasco da Gama (1498) opened new routes that redirected European trade toward the Atlantic. Moreover, the rise of centralized modern states, particularly France and Spain, along with the territorial ambitions of the Papal States in Italy, gradually reduced Venice's political leverage in Southern Europe. Throughout this period, Venice also engaged in several conflicts with the Ottoman Empire, its main rival in the Eastern Mediterranean. Key episodes included the battle of Lepanto (1571), the War of Candia (1645–1669), the loss of Cyprus in 1573, and the Morean War (1684–1699). The final Ottoman-Venetian war (1714–1718) stripped Venice of much of its maritime empire, leaving only some scattered possessions in the Mediterranean.

Religious matters were also an important source of conflict throughout the period. The state had traditionally claimed the right to examine papal bulls before promulgation, over church appointments, and on subjecting clerics to the secular courts, which conflicted with post-Tridentine efforts to establish papal authority across Europe. The dispute peaked in 1606, when pope Paul V placed Venice under interdict after the Venetian state refused to drop laws that limited the Church's influence. The interdict was lifted in 1607 through a settlement that preserved papal authority in theory but, in practice, upheld Venice's secular sovereignty.[27]

These events took place in the broader context of the Counter-Reformation. Venice's extensive trade connections with the Islamic world had traditionally fostered a pragmatic openness toward religious outsiders, a tolerance that would later facilitate the spread of Protestant ideas within its borders. Although Venice ultimately embraced the Catholic Ref-

[27]There was another excommunication in 1509, in the context of the War of the League of Cambrai (1508–1516), where Pope Julius II joined forces with European powers to curb Venetian territorial expansion. This episode was part of a broader series of religious and political conflicts that involved Venice and the Papal States during the Italian Wars (1494–1559).

ormation, it consistently did so on its own terms. The clearest example is how it managed the imposition of the Roman Inquisition. Established in Venice during the 1540s, the Inquisition operated under state supervision, limiting papal influence over internal religious affairs. This relative autonomy, however, did not translate into the entrenchment of Protestantism. By the early seventeenth century, Protestant communities in Venice and, more broadly, in Italy had virtually disappeared.

Even with these events, Venice largely maintained internal stability under the rule of the patriciate. Only the arrival of the French Revolutionary armies in May 1797 definitively ended Venetian independence. Initially ceded to Austria in 1797, Venice became part of Napoleon's Kingdom of Italy in 1805. After Napoleon's defeat, the Congress of Vienna (1815) reattached it to the Habsburg Empire, where it remained until its annexation by the Kingdom of Italy in October 1866.

A2.2 Historical periods

1575–1599 (Post-Plague). The 1575–77 plague killed about one third of Venice's population. The mortality shock tightened labor markets, cut fiscal capacity, and raised perceived risk.

1600–1607 (Interdict). After Venice restricted clerical privileges, Pope Paul V imposed an interdict in 1606. The episode was brief and had modest economic effects, but it changed church–state relations and may have shifted the salience of religion.

1608–1617 (Uskok War). Habsburg-backed Uskok piracy escalated to war (1615–17). Naval protection and blockades raised expenditures financed by new taxes and loans, and disrupted some trade routes.

1618–1631 (War and Plague). The Thirty Years' War (indirectly) and the War of the Mantuan Succession (1628–31) increased military spending. The 1630–31 plague then caused over 40,000 deaths, intermittent port closures, and wage pressure from labor scarcity.

1632–1644 (Pre-Cretan Peace). With the plague receding, trade to the Levant and northern Europe gradually recovered, and workshops refilled. High imposts on salt, tobacco, and guilds persisted to service debt.

1645–1669 (Cretan War). This period encompassed the Fifth Ottoman–Venetian War over Crete. Venice borrowed continuously, raised taxes, and pledged public debt. However, Candia fell in 1669.

1670–1683 (Retrenchment). After 1669, Venice paused its grand wars and entered a period of fiscal retrenchment. Naval expenditures were cut back, and the government

focused on repaying debt and reforming administration. Trade routes stabilized, and the surviving merchant fleet gradually resumed regular voyages to the Levant, North Africa, and Europe. Agriculture on the mainland (particularly grain exports from the Terraferma) became relatively more important for revenue.

1684–1718 (Morean and Seventh Ottoman Wars). Peace ended in 1684 when Venice again joined a Christian alliance against the Ottomans. Venice gained the Morea in 1684–99 but lost it in 1714–18. Venetian trade saw temporary uplifts from privateering in Ottoman waters but suffered when peace treaties reopened Ottoman markets to rivals.

1719–1772 (Peace and Reorientation). Following 1718, Venice enjoyed several decades of peace, though already as a minor economic power. Portuguese and English traders dominated the spice and silk routes, and Ottoman markets were largely closed to Venice. Venice invested in high-quality textiles for export to Europe and encouraged its glass and printing industries, while the government secured revenue by strengthening state monopolies (salt, tobacco, lottery) and simplifying taxes. Tourism and cultural patronage also rose in this age of Enlightenment.

1773–1775 (Jesuit Suppression). The papal dissolution of the Society of Jesus restructured the religious and educational institutions of Venice. Jesuit pastoral duties were reassigned, bringing about new religious emphases in Catholic doctrine, while their schools and colleges were transferred to ecclesiastical bodies or secular authorities.

A3 Surname Concentration within Trades

To assess the extent to which occupations were transmitted from parents to children in Venetian guilds, I examine whether masters' surnames are disproportionately concentrated within trades. In this setting, masters' children typically worked in their parents' workshops, but they are not directly observed in the *Accordi dei Garzoni* corpus, so surnames provide an indirect way to detect intergenerational continuity in mastership. The long time span of the data makes a surname–based approach particularly informative, as it captures multiple generations of masters.

Specifically, I calculate a relative concentration index, α, that measures the relative prevalence of each surname in each trade:

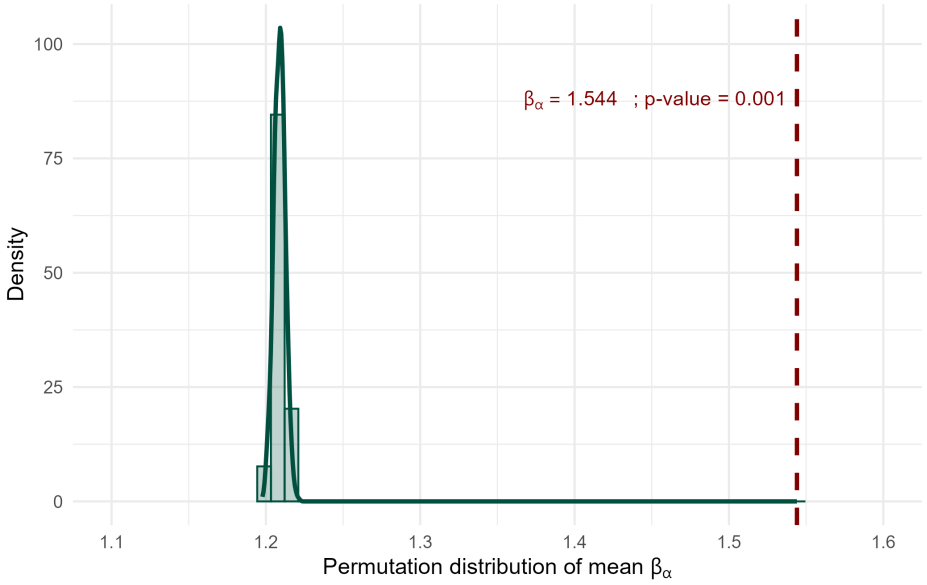
$$\alpha_{gs} = \frac{n_{gs}/n_g}{n_s/N},$$

where n_{gs} is the number of masters with surname s in trade g; n_g is the number of masters in trade g; n_s is the total number of masters with surname s; and N is the total number of masters. A value of $\alpha_{gs} > 1$ would indicate that the surname is overrepresented in trade t relative to the population.

The average α for the masters in the sample is 7.60, with a median of 5.27, implying that, on average, a master's surname is around 7 times more likely to appear in his own trade than in the general population of masters.[28] Moreover, a permutation test shows that surname concentration within trades is well above what random assignment would produce (Figure A2). In line with existing historical work, these results would suggest that mastership indeed tended to be inherited (De Munck, De Kerf, and De Bie, 2020; Stopper, 2023).

[28] This calculation includes trades with at least 500 contracts between 1575 and 1775 to avoid noise.

Figure A2: Concentration of masters' surnames in trades



Notes. The figure shows the permutation distribution of the mean log α_{gs} obtained by randomly reassigning surnames across masters within trades (1,000 draws). The vertical dashed line marks the observed mean log α_{gs}. Its position in the far right tail indicates substantially stronger within-trade surname concentration than random assignment would generate.

A4 Marian miracles

Information on Marian apparitions comes from the Miracle Hunter database. This database compiles reported apparitions over roughly two millennia and, for each case, provides details on approval status, short and long summaries of the events, biographical notes on the visionaries, transcriptions of messages, official Church statements, and, where available, visual material (e.g., photographs of shrines and devotional images).

Apparitions are classified according to their ecclesiastical approval status, with the main categories being the following. "Traditionally approved" apparitions are early events that were never subjected to a formal canonical investigation but gradually came to be recognized by the Church because of local devotion. In these cases, the clearest signs of approval are typically found in the construction of a church or sanctuary at the site of the apparition or in the continued promotion of pilgrimages and worship there. Over time, visits and statements by bishops and popes have often reinforced this de facto recognition. "Bishop approved" apparitions are those that have been formally recognized as worthy of belief by the local ordinary but have not received an explicit, separate confirmation by the Holy See. "Vatican approved" apparitions are those that were first approved by the local bishop and subsequently confirmed by the Holy See. "Approved for faith expression" refers to cases where the Church has not reached a definitive judgment on the authenticity of the apparition but explicitly permits public devotion. By contrast, "unapproved" apparitions are those for which ecclesiastical authorities have either withheld approval or actively discouraged public devotion.

For the empirical analyses, I focus on traditionally approved apparitions, which are the most numerous. Figure A3 plots the location and year of documented Marian apparitions between 1575 and 1775 within a 300 km radius of Venice. Figure A4 shows the number of contracts signed "under the influence" of one of these miracles, defined as contracts concluded within two years after an apparition. Below, I provide a few illustrative examples of Marian apparitions, taken directly from the Miracle Hunter database and lightly edited for clarity and readability.

Bopfingen, Germany, 1582. Holy Mary appeared to a very sick ten-year-old boy, William Wintzerer. He had gone in despair to the edge of a field one night and had prayed with great fervor to the Blessed Virgin to kill him if he had to continue to suffer in that way. After some hours of this intense prayer, prostrate in the chill of the night, the Mother of God appeared in a luminous glow and said: "My son, get up! You will be helped. You'll never be plagued by this disease. Dedicate yourself to the devout life. Call upon God, attend Mass regularly, go diligently to church, and make pilgrimages."

The Holy Virgin said this and disappeared, and the boy recovered and returned often in prayer to the edge of the cornfield where she had first appeared. William made a pilgrimage to Unterkochen, near the town of Aalen. The apparition received by the boy was believed by the people, and in the middle of the eighteenth century a shrine was erected in this place.

Aljubarrota, Portugal 1601. Catarina Anes, an old and poor lady, went to look for kindling wood on the mountain to get warm. In a place called the Valley of God, a Lady appeared to her and said: "Catarina, do you want me to help you with your work?"

She didn't believe what she had heard and kept on gathering wood. But then the Lady appeared to her again, this time accompanied by Santa Marta, whose chapel is nearby, and said: "Catarina, follow me."

But the old woman still did not pay attention. She didn't think all that was possible. However, the Lady appeared to her a third time and declared: "Come here, Catarina, and I will give you the key that you lost." Catarina answered: "But I lost the key in the woods. How could you find it to give to me?"

But the Lady had the key and she gave it to her. Catarina decided to believe in the strange Lady and she followed her. They walked and arrived at the foot of the mountain. Our Lady ordered her to open a hole and helped her with her own hands. From this hole sprang a beautiful and abundant spring of crystalline water.

This time Our Lady did not ask for a chapel, but said to the shepherdess: "Now go tell the people of this land that here they will find the cure for all their ills."

Ardesio, Italy 1607. On June 23, 1607, an ominous storm was gathering over the countryside. The two daughters of Mark and Salera Magdalene, Mary and Catherine, aged 11 and 7 years, had been sent by their mother to pray in the room of sacred images to avert the impending storm. While the two girls were kneeling in prayer, they saw the image of the Crucified and His Mother, painted on the wall of the room, lit up with a bright light, which emanated from the wound around the nail that pierced Christ's feet. Soon after, Mary appeared, seated on a golden chair, with Jesus Christ in her arms. She calmed the storm and peace returned.

At this sight the two girls ran screaming to their family. They were also accompanied by some neighbors, who went into the room and saw, at least partially, the miraculous apparition. For many days unexplained phenomena appeared on the fresco: points and rays of light that radiated into the room. Three days later Madeleine saw a wreath of stars shining on the face of Christ.

Naples, Italy 1631. Mt. Vesuvius erupted and Naples came under a rain of ashes. Many people in danger turned in prayer to Our Lady to be rescued. As the desperate people

prayed, invoking her name, she appeared and, with a silent message, saved them from certain death. The Blessed Virgin had already appeared at an earlier time in the area of Naples, in a cornfield, where she had predicted these events to some Jesuit fathers.

Trun, Switzerland 1660. Domenica Targa of Guardia, thirty years old, was busy supervising the cattle grazing when they suddenly, for no apparent reason, started running in all directions as if they were crazy.

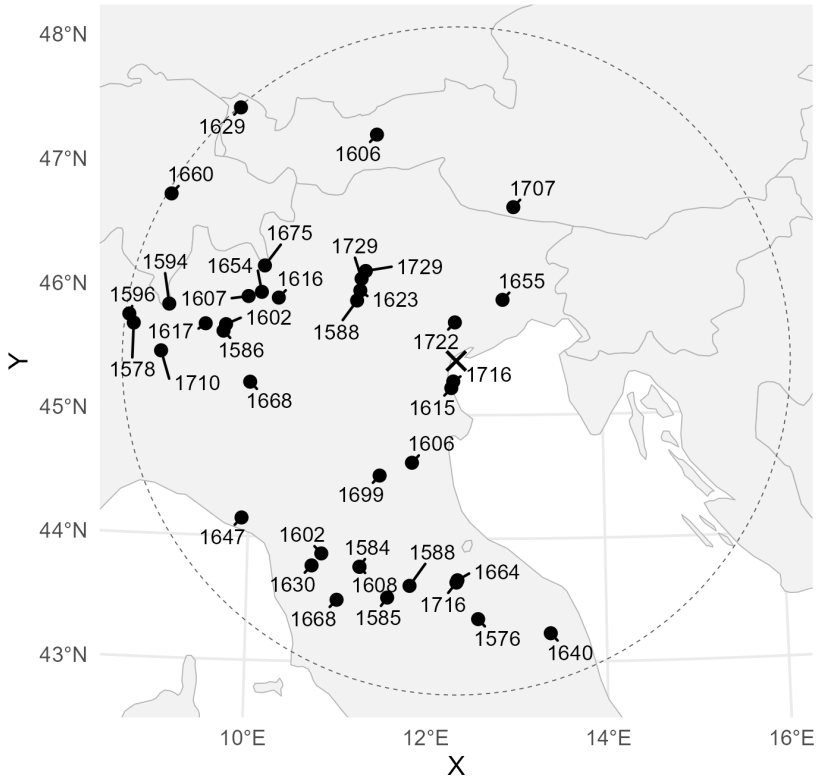
The shepherdess then began to cry out: "Mary, Jesus, help me." As soon as she uttered these words, the Virgin Mary appeared before her with a white veil on her head, and thus addressed her: "You called Jesus and Mary for help and they will help you... You promised once again to visit Our Lady of Caravaggio. But do not go to Caravaggio! Go rather to the Feast of the Ascension of Christ in the chapel of St. Anne in Montagnaga. There you will find a portrait of the Blessed Virgin by Caravaggio. Kneel down and address your prayers with a sincere heart to Jesus and Mary; then you will see miraculous things."

She went to the chapel of St. Anne in Montagnaga and, while praying fervently, she again had an apparition of Mary. The robe of the Blessed Virgin radiated a shining golden light; she was crowned with a diadem on her head that gave off rays of clear light. Even the Child Jesus, who was in her arms, was dressed all in gold.

With a crown in her right hand, the Madonna said: "I am Mary, the Mother of the Lord. Please tell this apparition to the local priest. Do not be afraid! Nothing bad will happen to you. I will be with you. In my name, you must announce that every year on this day a feast is to be held." Only a few believed the story, and especially the priest showed himself very skeptical. In another appearance, the Virgin said on Sunday: "I chose this place as the throne of my Mercy. Those who care to pray there with living faith and grace will not return home empty-handed. Take care that a church be built for the large numbers of my devotees."

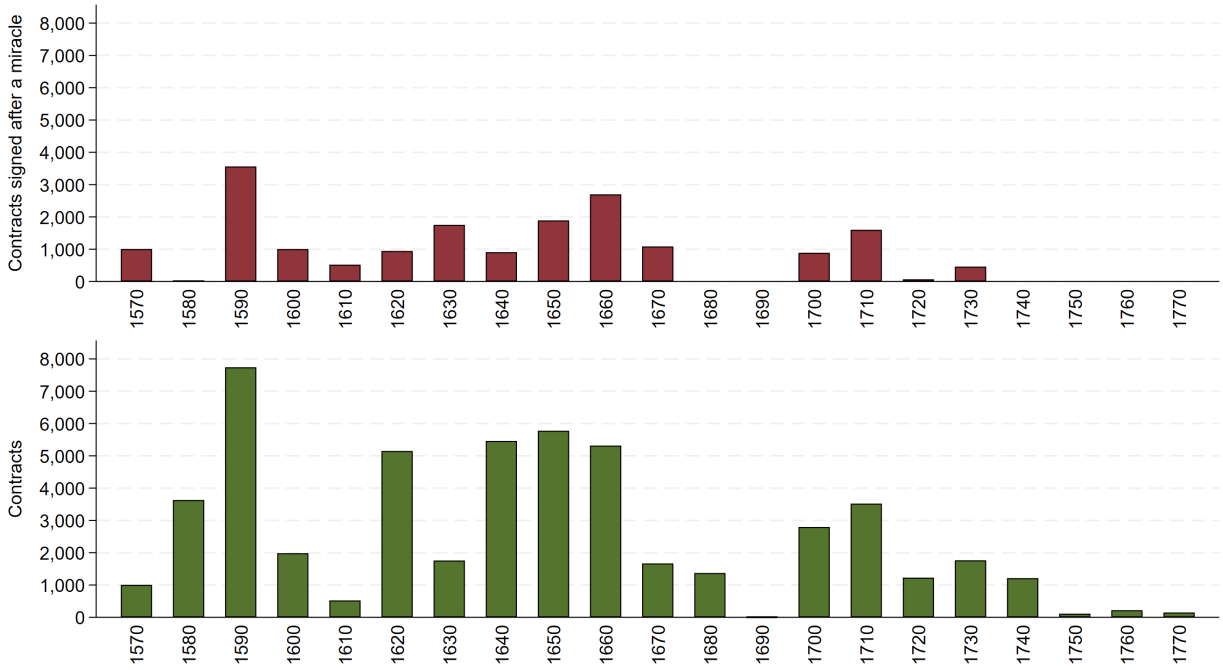
After other vicissitudes, in 1730 an ecclesiastical investigation was ordered into the case, which resulted in a positive opinion. A sanctuary was built and consecrated in 1750. She led a life of deep Christian devotion and died in 1764.

Figure A3: Marian apparitions around Venice (1575-1775)



Notes. The figure displays the location and year of documented Marian apparitions between 1575 and 1775 within a 300-kilometer radius of Venice. The cross indicates the location of Venice, and the dashed circle represents the 300-kilometer buffer.

Figure A4: Number of contracts signed under the influence of a Marian apparition, Venice (1575-1775)



Notes. The Figure on top shows the number of contracts signed under the influence of a Marian miracle in Venice over the 1575-1775 period. The Figure at the bottom shows the total number of contracts signed in the same period.

A5 Robustness checks and additional specifications

A5.1 Master name religiosity

A5.1.1 Additional covariates, alternative independent variables, and alternative instruments

This section extends the main IV results along three dimensions: 1) richer covariate sets, 2) alternative operationalizations of master name religiosity, and 3) alternative instrument definitions. The goal is to stress-test the sensitivity of the main results, validate the construct's measurement, and show that conclusions do not hinge on the spatial bandwidth used to build the instrument.

Tables A3, A4, and A5 present model specifications with additional covariates—first-contract indicator, years since first apprentice, prior experience with opportunism, average demand of guarantors in the master's trade during the previous years—and complementary fixed effects—apprentice province of origin, apprentice country of origin, day of year, and period $\times$ trade.

The first–contract indicator and years since first apprentice capture where a given contract falls in the master's career. If less experienced masters are systematically more cautious—or conversely less aware of the risks—they may demand different levels of safeguards. Controlling for these variables ensures that the effect associated with religious identity is not simply picking up life–cycle or learning–by–doing patterns in safeguard demand. Prior experience with opportunism (in the form of earlier early exits) absorbs updating based on direct shocks to beliefs about apprentice behavior: masters who have already "been burned" may rationally demand more sfaeguards, irrespective of their underlying values.

Apprentice province– and country–of–origin fixed effects absorb systematic differences in screening and contracting practices toward apprentices from different places, which could otherwise confound the relationship between master name religiosity and safeguard demand. Finally, day–of–year and period $\times$ trade fixed effects control for seasonal and slow–moving sectoral factors, such as technological changes or trade–specific crises, that might simultaneously affect contracting choices and the composition of masters in the data.

Table A6 replaces the master name religiosity index with its three underlying components: counts of biblical figures, saints, and church patrons sharing the master's given name. These counts are log-transformed prior to estimation. Tables A7-A12 then redefine the instrument by expanding the radius used to construct parental earthquake exposure from 300 km to 400 km and 500 km, respectively. All these estimations keep the same covariates and fixed effects as in the main IV specification.

Table A3: Robustness checks, Guarantor: Additional covariates

	Guarantor						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: OLS						
Master name religiosity	0.002	0.002	0.002	0.002	0.003	0.003	0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]
	Panel B: Reduced Form						
Earthquake parental exposure	-0.006***	-0.006***	-0.005***	-0.006***	-0.008***	-0.009***	-0.005***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
	Panel C: 2SLS						
Master name religiosity	-0.22***	-0.22***	-0.18**	-0.23***	-0.30***	-0.32***	-0.19**
	[0.08]	[0.08]	[0.07]	[0.08]	[0.10]	[0.09]	[0.07]
N	52,359	52,359	51,847	52,357	34,917	39,576	52,223
Mean dep. var.	0.73	0.73	0.73	0.73	0.75	0.73	0.73
Kleibergen-Paap F-stat.	32.91	32.22	37.74	31.40	25.09	31.11	36.43
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Period FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. province FE					✓		
Appr. country FE						✓	
Period × Trade FE							✓

Notes. The table reports estimates of the effect of master name religiosity on Guarantor. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A4: Robustness checks, Zero wage: Additional covariates

	Zero wage						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: OLS						
Master name religiosity	0.003	0.003	0.003	0.003	0.004	0.004	0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]
	Panel B: Reduced Form						
Earthquake parental exposure	-0.007***	-0.007***	-0.007***	-0.007***	-0.005**	-0.006***	-0.005***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
	Panel C: 2SLS						
Master name religiosity	-0.26***	-0.27***	-0.27***	-0.28***	-0.20**	-0.22***	-0.17***
	[0.08]	[0.08]	[0.08]	[0.08]	[0.09]	[0.08]	[0.06]
N	52,359	52,359	51,847	52,357	34,917	39,576	52,223
Mean dep. var.	0.29	0.29	0.29	0.29	0.30	0.29	0.29
Kleibergen-Paap F-stat.	32.91	32.22	37.74	31.40	25.09	31.11	36.43
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Period FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. province FE					✓		
Appr. country FE						✓	
Period × Trade FE							✓

Notes. The table reports estimates of the effect of master name religiosity on Zero wage. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A5: Robustness checks, Deferred payment: Additional covariates

	Deferred payment						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: OLS						
Master name religiosity	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
	Panel B: Reduced Form						
Earthquake parental exposure	-0.010***	-0.010***	-0.011***	-0.010***	-0.013***	-0.012***	-0.012***
	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]	[0.002]	[0.001]
	Panel C: 2SLS						
Master name religiosity	-0.41***	-0.42***	-0.39***	-0.41***	-0.46***	-0.41***	-0.44***
	[0.10]	[0.10]	[0.09]	[0.10]	[0.12]	[0.10]	[0.10]
N	37,231	37,231	36,878	37,230	24,299	28,127	37,102
Mean dep. var.	0.79	0.79	0.79	0.79	0.76	0.77	0.79
Kleibergen-Paap F-stat.	25.54	25.01	29.07	23.57	22.56	27.52	27.60
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Period FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. province FE					✓		
Appr. country FE						✓	
Period × Trade FE							✓

Notes. The table reports estimates of the effect of master name religiosity on Deferred payment. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A6: Robustness checks: Individual measures of the religious name index

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Biblical names					
Log. N of biblical mentions	-0.341***	-0.292**	-0.427***	-0.392***	-0.641***	-0.612***
	[0.132]	[0.122]	[0.140]	[0.135]	[0.177]	[0.170]
N	52,359	52,106	52,359	52,106	37,231	37,056
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
Kleibergen-Paap F-stat.	21.35	21.84	21.35	21.84	16.94	17.17
	Panel B: Saint names					
Log. N of saint mentions	-0.195***	-0.170***	-0.243***	-0.228***	-0.355***	-0.344***
	[0.067]	[0.065]	[0.067]	[0.067]	[0.070]	[0.070]
N	52,359	52,106	52,359	52,106	37,231	37,056
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
Kleibergen-Paap F-stat.	63.05	61.86	63.05	61.86	52.23	51.31
	Panel C: Church patron names					
Log. N of church patron mentions	-0.218***	-0.191***	-0.273***	-0.256***	-0.364***	-0.353***
	[0.076]	[0.074]	[0.077]	[0.077]	[0.072]	[0.072]
N	52,359	52,106	52,359	52,106	37,231	37,056
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
Kleibergen-Paap F-stat.	50.64	49.64	50.64	49.64	49.52	48.63
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓		✓		✓
Apprentice age		✓		✓		✓
Appr. duration		✓		✓		✓
Period FE	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓

Notes. The table reports estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Log. N of biblical mentions is the natural logarithm of the number of biblical figures sharing the master's given name, log. N of saints mentions is the natural logarithm of the number of saints sharing the master's given name, and log. N of church patron mentions is the natural logarithm of the number of church patrons sharing the master's given name. The instrument for the three independent variables is parental earthquake exposure, calculated as the total number of earthquakes in the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A7: Robustness checks, Guarantor: Earthquake exposure of 400km

	Guarantor									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: OLS										
Master name religiosity	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]
Panel B: Reduced Form										
Earthquake parental exposure (400km)	-0.006***	-0.005***	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***	-0.008***	-0.008***	-0.005***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Panel C: 2SLS										
Master name religiosity	-0.26***	-0.22***	-0.26***	-0.26***	-0.26***	-0.23***	-0.28***	-0.38***	-0.37***	-0.20**
	[0.09]	[0.08]	[0.09]	[0.09]	[0.09]	[0.08]	[0.09]	[0.14]	[0.12]	[0.08]
N	52,359	52,357	52,108	52,359	52,359	51,847	52,357	34,917	39,576	52,223
Mean dep. var.	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.75	0.73	0.73
Kleibergen-Paap F-stat.	29.07	29.03	29.37	30.27	29.90	36.24	28.49	16.26	20.80	31.91
Contracts in trade	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓									
Apprentice age		✓								
Appr. duration			✓							
1st contract				✓						
Exp. opportunism					✓					
Yrs. since 1st appr.						✓				
Period FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE							✓			
Appr. province FE								✓		
Appr. country FE									✓	
Period x Trade FE										✓

Notes. The table reports estimates of the effect of master name religiosity on Guarantor. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. In these estimations, parental earthquake exposure is defined as the total number of earthquakes that occurred during the master's parental generation within a 400 km radius of Venice. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A8: Robustness checks, Zero wage: Earthquake exposure of 400km

	Zero Wage									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: OLS										
Master name religiosity	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]
Panel B: Reduced Form										
Earthquake parental exposure (400km)	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.012***	-0.011***	-0.010***	-0.010***	-0.009***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]
Panel C: 2SLS										
Master name religiosity	-0.46***	-0.47***	-0.47***	-0.46***	-0.47***	-0.44***	-0.48***	-0.48***	-0.45***	-0.36***
	[0.11]	[0.11]	[0.11]	[0.11]	[0.11]	[0.10]	[0.11]	[0.15]	[0.13]	[0.09]
N	52,359	52,357	52,108	52,359	52,359	51,847	52,357	34,917	39,576	52,223
Mean dep. var.	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.30	0.29	0.29
Kleibergen-Paap F-stat.	29.07	29.03	29.37	30.27	29.90	36.24	28.49	16.26	20.80	31.91
Contracts in trade	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓									
Apprentice age		✓								
Appr. duration			✓							
1st contract				✓						
Exp. opportunism					✓					
Yrs. since 1st appr.						✓				
Period FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE							✓			
Appr. province FE								✓		
Appr. country FE									✓	
Period x Trade FE										✓

Notes. The table reports estimates of the effect of master name religiosity on Zero wage. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. In these estimations, parental earthquake exposure is defined as the total number of earthquakes that occurred during the master's parental generation within a 400 km radius of Venice. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A9: Robustness checks, Deferred payment: Earthquake exposure of 400km

	Deferred payment									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: OLS										
Master name religiosity	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
Panel B: Reduced Form										
Earthquake parental exposure (400km)	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.009***	-0.008***	-0.008***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]
Panel C: 2SLS										
Master name religiosity	-0.31***	-0.33***	-0.33***	-0.32***	-0.32***	-0.29***	-0.33***	-0.44***	-0.37***	-0.35***
	[0.09]	[0.09]	[0.09]	[0.09]	[0.09]	[0.07]	[0.09]	[0.14]	[0.11]	[0.09]
N	37,231	37,230	37,057	37,231	37,231	36,878	37,230	24,299	28,127	37,102
Mean dep. var.	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.76	0.77	0.79
Kleibergen-Paap F-stat.	21.46	21.71	22.17	23.30	23.12	27.36	20.81	14.35	17.55	24.98
Contracts in trade	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓									
Apprentice age		✓								
Appr. duration			✓							
1st contract				✓						
Exp. opportunism					✓					
Yrs. since 1st appr.						✓				
Period FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE							✓			
Appr. province FE								✓		
Appr. country FE									✓	
Period x Trade FE										✓

Notes. The table reports estimates of the effect of master name religiosity on Deferred payment. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. In these estimations, parental earthquake exposure is defined as the total number of earthquakes that occurred during the master's parental generation within a 400 km radius of Venice. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A10: Robustness checks, Guarantor: Earthquake exposure of 500km

	Guarantor									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: OLS										
Master name religiosity	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]
Panel B: Reduced Form										
Earthquake parental exposure (500km)	-0.003**	-0.003**	-0.003**	-0.003**	-0.003**	-0.004**	-0.004**	-0.005***	-0.005***	-0.002
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]	[0.002]	[0.001]
Panel C: 2SLS										
Master name religiosity	-0.19**	-0.16*	-0.17**	-0.18**	-0.18**	-0.19**	-0.21**	-0.32**	-0.31**	-0.12
	[0.09]	[0.09]	[0.09]	[0.09]	[0.09]	[0.08]	[0.09]	[0.15]	[0.13]	[0.08]
N	52,359	52,357	52,108	52,359	52,359	51,847	52,357	34,917	39,576	52,223
Mean dep. var.	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.75	0.73	0.73
Kleibergen-Paap F-stat.	25.40	25.23	25.03	25.51	25.51	30.84	23.45	12.04	16.50	26.69
Contracts in trade	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓									
Apprentice age		✓								
Appr. duration			✓							
1st contract				✓						
Exp. opportunism					✓					
Yrs. since 1st appr.						✓				
Period FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE							✓			
Appr. province FE								✓		
Appr. country FE									✓	
Period x Trade FE										✓

Notes. The table reports estimates of the effect of master name religiosity on Guarantor. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. In these estimations, parental earthquake exposure is defined as the total number of earthquakes that occurred during the master's parental generation within a 500 km radius of Venice. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A11: Robustness checks, Zero wage: Earthquake exposure of 500km

	Zero Wage									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: OLS										
Master name religiosity	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]
Panel B: Reduced Form										
Earthquake parental exposure (500km)	-0.008***	-0.007***	-0.007***	-0.007***	-0.007***	-0.008***	-0.007***	-0.006***	-0.006***	-0.005***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]
Panel C: 2SLS										
Master name religiosity	-0.41***	-0.40***	-0.40***	-0.39***	-0.40***	-0.39***	-0.41***	-0.37**	-0.37***	-0.29***
	[0.11]	[0.11]	[0.11]	[0.11]	[0.11]	[0.10]	[0.12]	[0.15]	[0.13]	[0.09]
N	52,359	52,357	52,108	52,359	52,359	51,847	52,357	34,917	39,576	52,223
Mean dep. var.	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.30	0.29	0.29
Kleibergen-Paap F-stat.	25.40	25.23	25.03	25.51	25.51	30.84	23.45	12.04	16.50	26.69
Contracts in trade	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓									
Apprentice age		✓								
Appr. duration			✓							
1st contract				✓						
Exp. opportunism					✓					
Yrs. since 1st appr.						✓				
Period FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE							✓			
Appr. province FE								✓		
Appr. country FE									✓	
Period x Trade FE										✓

Notes. The table reports estimates of the effect of master name religiosity on Zero wage. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. In these estimations, parental earthquake exposure is defined as the total number of earthquakes that occurred during the master's parental generation within a 500 km radius of Venice. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A12: Robustness checks, Deferred payment: Earthquake exposure of 500km

	Deferred payment									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: OLS										
Master name religiosity	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]
Panel B: Reduced Form										
Earthquake parental exposure (500km)	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.002*	-0.002*	-0.006***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Panel C: 2SLS										
Master name religiosity	-0.22***	-0.21***	-0.21***	-0.21***	-0.21***	-0.20***	-0.23***	-0.15	-0.13	-0.28***
	[0.08]	[0.08]	[0.08]	[0.08]	[0.08]	[0.07]	[0.09]	[0.10]	[0.08]	[0.08]
N	37,231	37,230	37,057	37,231	37,231	36,878	37,230	24,299	28,127	37,102
Mean dep. var.	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.76	0.77	0.79
Kleibergen-Paap F-stat.	19.54	19.40	19.34	19.91	19.87	24.22	17.38	10.97	14.32	22.04
Contracts in trade	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓									
Apprentice age		✓								
Appr. duration			✓							
1st contract				✓						
Exp. opportunism					✓					
Yrs. since 1st appr.						✓				
Period FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE							✓			
Appr. province FE								✓		
Appr. country FE									✓	
Period x Trade FE										✓

Notes. The table reports estimates of the effect of master name religiosity on Deferred payment. Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. In these estimations, parental earthquake exposure is defined as the total number of earthquakes that occurred during the master's parental generation within a 500 km radius of Venice. Panel A presents OLS estimates, Panel B presents reduced-form estimates, and Panel C presents 2SLS estimates instrumenting master name religiosity with parental earthquake exposure. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

A5.1.2 Exclusion restriction

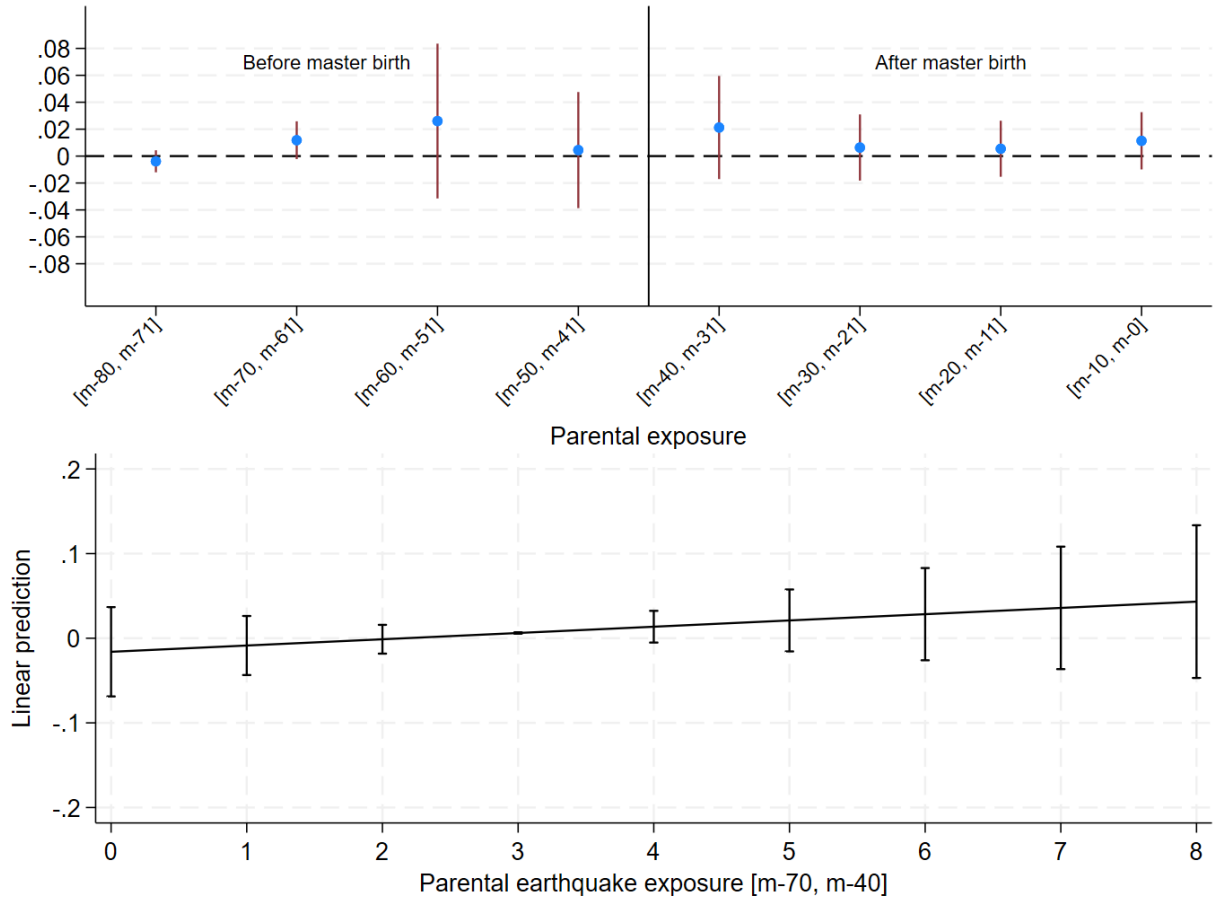
In this paper, exogenous variation in master name religiosity comes from earthquake exposure in the parental generation. The exclusion restriction requires that earthquakes affect the demand for guarantors only through their impact on masters' religious identity, and not through any other channel. A natural concern is that earthquakes might induce a broader shift toward naming traditionalism rather than a specific shift toward religiosity. To assess this, I replicate the first-stage analysis using the master common name index as the outcome.

The top panel of Figure A5 shows estimates of earthquake exposure, calculated in successive decades between m and $m - 80$, on the master common name index. The bottom panel estimates the linear relationship between parental earthquake exposure in the window $[m - 70, m - 40]$ and the same index. Both specifications include trade and period fixed effects and cluster errors at the master level. Coefficients are small and statistically indistinguishable from zero throughout both before and after the master's birth window and, in particular, exposure in the parental window does not predict name commonality. Together with the results of the main text, this suggests that earthquake exposure induced a specific shift toward religious naming, not a general turn to traditionalism.

To test how strong alternative channels would need to be to overturn the main 2SLS estimates, I apply the Conley, Hansen, and Rossi (2012) plausibly exogenous approach. While standard IV inference imposes the assumption that there is no direct effect of the instrument on the dependent variable, the plausibly exogenous approach relaxes this assumption by allowing a non-zero γ direct effect. This results in a union of confidence intervals for β that traces how inference on β shifts as the magnitude and sign of γ vary.

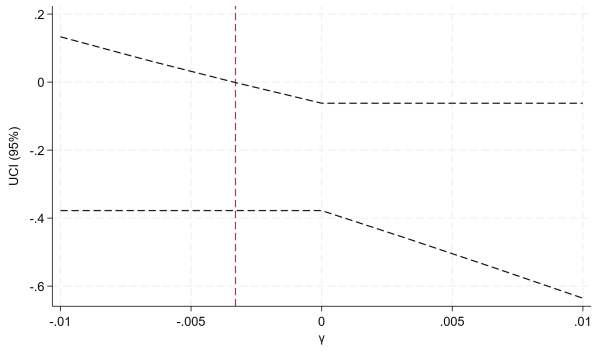
Figure A6 plots the union-of-CIs for a direct effect of $\gamma = [-RF, RF]$, where RF is the standardized reduced–form effect of parental earthquake exposure on guarantor demand. For the IV estimates to be invalid, the direct effect of earthquakes through non-religious channels would need to be at least one-third to two-thirds as large as the total reduced-form effect, but operating in the same direction. This seems implausibly large given evidence that natural and other adverse shocks can raise risk aversion and precautionary behavior (e.g., Barro, 2006; Callen et al., 2014; Cameron and Shah, 2015). The exclusion restriction therefore appears credible in this setting.

Figure A5: Parental exposure to earthquakes and master name commonality

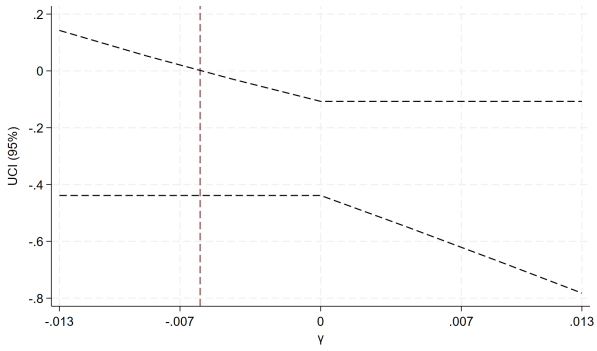


Notes. The figure documents the first-stage association between parental earthquake exposure and the master common name index. The top panel plots coefficients from regressing the master common name index on earthquake exposure calculated at different windows, where m is the year in which master i appears in the corpus of contracts. The vertical line separates bins before and after masters' birth according to historical records on the structure of guild labor relations. The bottom panel shows the linear relationship between parental earthquake exposure and the master common name index. The vertical lines represent the 95% CIs.

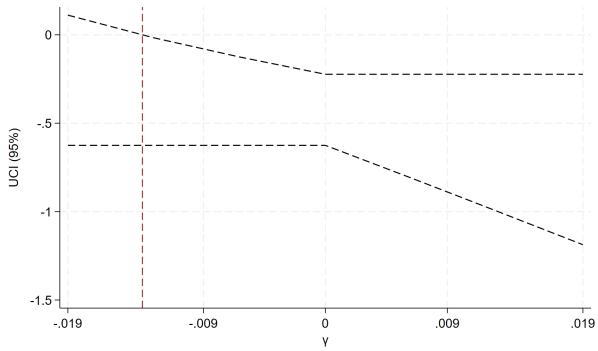
Figure A6: Conley–Hansen–Rossi union of 95% confidence intervals



(a) Guarantor



(b) Zero wage



(c) Deferred payment

Notes. The figure reports Conley, Hansen, and Rossi (2012) union-of-confidence-interval bounds for the 2SLS coefficient of master name religiosity on each outcome shown in panels (a)–(c), allowing for violations of the exclusion restriction on parental earthquake exposure. The horizontal axis plots γ, the assumed direct effect of parental earthquake exposure on the outcome. For each value of γ in the interval, the vertical axis shows the lower and upper bounds of the 95% confidence set. In each panel, the vertical line marks the value of γ at which the upper bound of the confidence set crosses zero. Values of γ beyond this threshold overturn the sign of the 2SLS estimates.

A5.2 Marian apparitions

This subsection examines the robustness of the Marian apparitions results, which speak to the "supernatural watchers" mechanism. Specifically, I incorporate a richer set of covariates and fixed effects, perform a subsample analysis with masters with above-average name religiosity, and change the temporal and spatial windows used to define exposure to Marian apparitions.

Table A13–Table A15 show that the negative association between Marian apparitions and contractual safeguards is stable across specifications that add other master-level controls (first-contract indicator, years since first apprentice, prior experience with early exit) and additional fixed effects for day of year, apprentice province and country of origin, and time $\times$ trade interactions.

Table A16 shortens the influence window and defines the apparition variable using only miracles that occurred in the year preceding the contract. This table also includes specifications with master fixed effects.

Table A17 and Table A18 vary the spatial radius used to define exposure to Miracles, using 200 km and 400 km instead of the baseline 300 km. When the radius is narrowed to 200 km, the effects become somewhat larger in absolute value, suggesting that the impact of apparitions is strongest for geographically closer events, which are more likely to be salient to Venetian masters. When the radius is expanded to 400 km, by contrast, the coefficients move toward zero and some of them are no longer statistically significant. The "supernatural watchers" mechanism has thus contractual consequences only when religious primes occur within a spatial range that can realistically trigger the concern that a moral deity is watching.

Table A19 restricts the analysis to contracts signed by masters whose name religiosity is below the 25th percentile. Within this subsample, the estimated coefficients are sill negative but not statistically significant under conventional thresholds. Moreover, Table A20 repeats the main estimations including master fixed effects.

Finally, Table A21 examines whether the effect of Marian apparitions on the demand for third-party guarantors varies with the apprentice's religious identity. The intuition behind this test is that if masters operate under a rational-actor model of divine punishment, they should expect supernatural monitoring to primarily constrain those who genuinely believe in divine intervention. Consequently, the reduction in the need for formal safeguards following a miracle should be more pronounced when cooperating with highly religious apprentices (e.g., Gervais, Shariff, and Norenzayan, 2011).

Across specifications, the main effect of a Marian apparition on the demand for third-party guarantors remains negative and close in magnitude to the baseline estimates, corresponding to a reduction of roughly 1.6–2.7 percentage points. In addition, the interaction

between Marian apparitions and apprentice name religiosity is negative in all specifications, though statistically significant only in Columns (1), (2), and (4). The lack of a strong interaction effect added to a strong direct effect regardless of the apprentice's profile would suggest that the impact of "divine surveillance" is not fully consistent with a rational-actor logic.

Table A13: Robustness checks, Guarantor: Marian apparitions

	Guarantor						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Marian apparition	-0.017***	-0.016***	-0.017***	-0.016***	-0.016**	-0.019***	-0.016***
	[0.006]	[0.006]	[0.006]	[0.006]	[0.007]	[0.007]	[0.006]
N	52,357	52,357	51,845	52,355	34,911	39,569	51,640
Mean dep. var.	0.73	0.73	0.73	0.73	0.75	0.73	0.73
Master religiosity	✓	✓	✓	✓	✓	✓	✓
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Triennial FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. province FE					✓		
Appr. country FE						✓	
Triennial x Trade FE							✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on Guarantor. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A14: Robustness checks, Zero wage: Marian apparitions

	Zero wage						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Marian apparition	-0.017***	-0.017***	-0.017***	-0.017***	-0.021***	-0.021***	-0.014**
	[0.006]	[0.006]	[0.006]	[0.006]	[0.007]	[0.007]	[0.006]
N	52,357	52,357	51,845	52,355	34,911	39,569	51,640
Mean dep. var.	0.29	0.29	0.29	0.29	0.30	0.29	0.29
Master religiosity	✓	✓	✓	✓	✓	✓	✓
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Triennial FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. province FE					✓		
Appr. country FE						✓	
Triennial x Trade FE							✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on Zero wage. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A15: Robustness checks, Deferred payment: Marian apparitions

	Deferred payment						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Marian apparition	-0.027***	-0.027***	-0.027***	-0.026***	-0.032***	-0.029***	-0.030***
	[0.005]	[0.005]	[0.005]	[0.005]	[0.007]	[0.006]	[0.005]
N	37,225	37,225	36,872	37,224	24,294	28,122	36,587
Mean dep. var.	0.79	0.79	0.79	0.79	0.76	0.77	0.79
Master religiosity	✓	✓	✓	✓	✓	✓	✓
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Triennial FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. province FE					✓		
Appr. country FE						✓	
Triennial x Trade FE							✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on Deferred payment. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice province FE, and apprentice country FE correspond to day-of-year, apprentice province-of-origin, and apprentice country-of-origin fixed effects, respectively. All specifications include time and master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A16: Marian apparitions: 1-Year Window

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition (1-year influence)	-0.015**	-0.025**	-0.003	-0.008	-0.027***	-0.026**
	[0.007]	[0.012]	[0.007]	[0.011]	[0.006]	[0.012]
N	52,103	19,276	52,103	19,276	37,051	12,054
Mean dep. var.	0.73	0.73	0.29	0.31	0.79	0.73
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓	✓	✓	✓	✓	✓
Apprentice age	✓	✓	✓	✓	✓	✓
Appr. duration	✓	✓	✓	✓	✓	✓
Master religiosity	✓		✓		✓	
Master FE		✓		✓		✓
Triennial FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. In these estimations, marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the year preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. Master religiosity is a standardized index of the religious salience of the master's given name. All specifications include time fixed effects. Odd-numbered columns include trade fixed effects; even-numbered columns include master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A17: Marian apparitions: 200km area

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition (200km)	-0.019***	-0.034**	-0.035***	-0.026**	-0.039***	-0.027*
	[0.007]	[0.014]	[0.007]	[0.013]	[0.007]	[0.015]
N	52,103	19,276	52,103	19,276	37,051	12,054
Mean dep. var.	0.73	0.73	0.29	0.31	0.79	0.73
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓	✓	✓	✓	✓	✓
Apprentice age	✓	✓	✓	✓	✓	✓
Appr. duration	✓	✓	✓	✓	✓	✓
Master religiosity	✓		✓		✓	
Master FE		✓		✓		✓
Triennial FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. In these estimations, marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract in a radius of 200km around Venice. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. Master religiosity is a standardized index of the religious salience of the master's given name. All specifications include time fixed effects. Odd-numbered columns include trade fixed effects; even-numbered columns include master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A18: Marian apparitions: 400km area

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition (400km)	0.003	0.006	-0.023***	-0.021**	-0.015***	0.007
	[0.005]	[0.010]	[0.005]	[0.009]	[0.004]	[0.010]
N	52,103	19,276	52,103	19,276	37,051	12,054
Mean dep. var.	0.73	0.73	0.29	0.31	0.79	0.73
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation	✓	✓	✓	✓	✓	✓
Apprentice age	✓	✓	✓	✓	✓	✓
Appr. duration	✓	✓	✓	✓	✓	✓
Master religiosity	✓		✓		✓	
Master FE		✓		✓		✓
Triennial FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. In these estimations, marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract in a radius of 400km around Venice. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. Master religiosity is a standardized index of the religious salience of the master's given name. All specifications include time fixed effects. Odd-numbered columns include trade fixed effects; even-numbered columns include master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A19: Marian apparitions: Masters with a weak religious identity

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition	-0.018	-0.014	-0.001	-0.000	-0.016	-0.016
	[0.013]	[0.012]	[0.012]	[0.012]	[0.010]	[0.010]
N	12,067	12,001	12,067	12,001	8,781	8,731
Mean dep. var.	0.73	0.73	0.27	0.27	0.84	0.84
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓		✓		✓
Apprentice age		✓		✓		✓
Appr. duration		✓		✓		✓
Triennial FE	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual provisions: guarantor requirements, zero-wage arrangements, and deferred payment. The sample is restricted to masters whose religious name index falls below the 25th percentile. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. Master religiosity is a standardized index of the religious salience of the master's given name. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A20: Marian apparitions: Master fixed effects

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition	-0.023**	-0.023**	-0.008	-0.007	-0.013	-0.011
	[0.012]	[0.011]	[0.011]	[0.011]	[0.011]	[0.011]
N	19,402	19,276	19,402	19,276	12,133	12,054
Mean dep. var.	0.73	0.73	0.31	0.31	0.73	0.73
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓		✓		✓
Apprentice age		✓		✓		✓
Appr. duration		✓		✓		✓
Master FE	✓	✓	✓	✓	✓	✓
Triennial FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. All specifications include time and master fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A21: The effect of Marian apparitions across values of apprentice name religiosity

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Marian apparition	-0.019***	-0.016***	-0.021***	-0.020***	-0.029***	-0.027***
	[0.001]	[0.001]	[0.002]	[0.003]	[0.003]	[0.003]
Apprentice name religiosity	0.005***	0.004***	0.001***	0.002***	0.001*	0.001**
	[0.001]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Marian apparitions x Apprentice name religiosity	-0.004***	-0.003***	-0.000	-0.001*	0.000	0.001
	[0.001]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]
N	39,569	39,383	39,569	39,383	28,122	27,995
Mean dep. var.	0.73	0.73	0.29	0.29	0.77	0.77
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓		✓		✓
Apprentice age		✓		✓		✓
Appr. duration		✓		✓		✓
Master religiosity	✓	✓	✓	✓	✓	✓
Triennial FE	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓

Notes. The table reports OLS estimates of the effect of Marian apparitions on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Marian apparition is a binary variable that takes the value of one when a Marian miracle takes place in the two years preceding the signature of the apprenticeship contract. Apprentice religiosity is a standardized index of the religious salience of the master's given name Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. Master religiosity is a standardized index of the religious salience of the master's given name. All specifications include time, trade, and apprentice country-of-origin fixed effects. Standard errors clustered at the master and apprentice country-of-origin levels are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

A5.3 Religious norms

This subsection provides supporting evidence for the validity of the Pentecost RD design used to capture the effect of religious norms on safeguard demand.

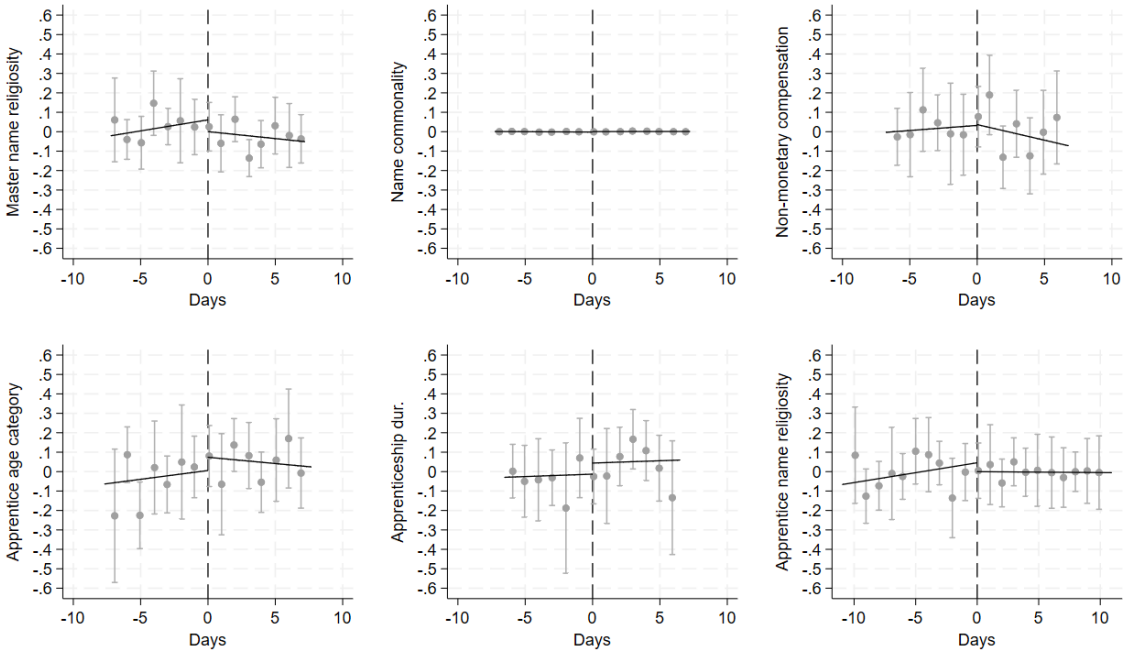
Figure A7 shows that master name religiosity, the common-name index, non-monetary compensation, apprentice age, apprenticeship duration, and apprentice name religiosity are virtually continuous at the cutoff. Contracts on either side of Pentecost are therefore similar in these observable characteristics, ruling out the possibility that the identified discontinuity in safeguard demand is driven by compositional changes around the cutoff.

Figure A8 tests for manipulation of the running variable using the local polynomial density estimator of Cattaneo, Jansson, and Ma (2020). The estimation uses 10,320 observations and selects symmetric bandwidths of 23 days on each side. The robust test statistic is $T = 1.91$ with a p-value of 0.056, so the null of a continuous density at the cutoff cannot be rejected at the 5% level.

Table A22 places the cutoff at alternative days around Pentecost. Specification (1) includes the true cutoff for comparison. None of the placebo cutoffs yields a statistically significant discontinuity. Moreover, Figure A9 restricts the sample to apprentices with name religiosity below the 25th percentile and re-estimates the discontinuity in guarantor demand at Pentecost.

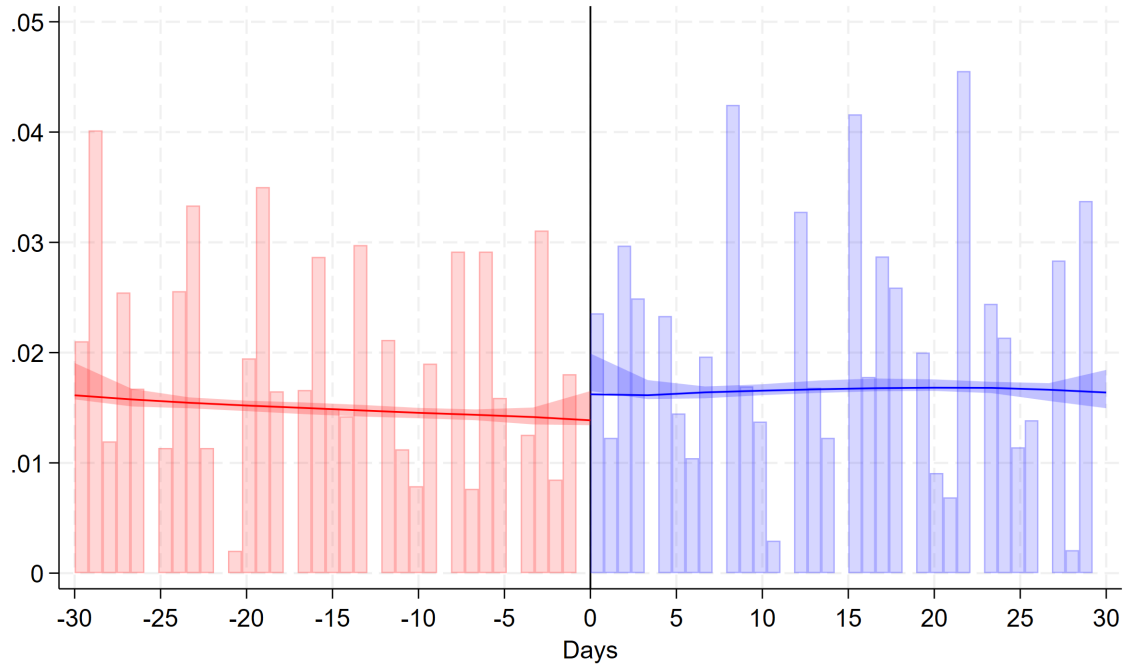
Finally, Figure A10 replicates the analysis using Quinquagesima, namely, the Sunday preceding the start of Lent, as an alternative religious event. If religious salience temporarily raises the perceived costs of distrust, similar discontinuities should appear around other liturgical dates that heighten religious awareness. The figure shows evidence of a drop in guarantor demand and deferred payments at Quinquagesima, with no discontinuity in zero-wage provisions.

Figure A7: Pentecost and covariates



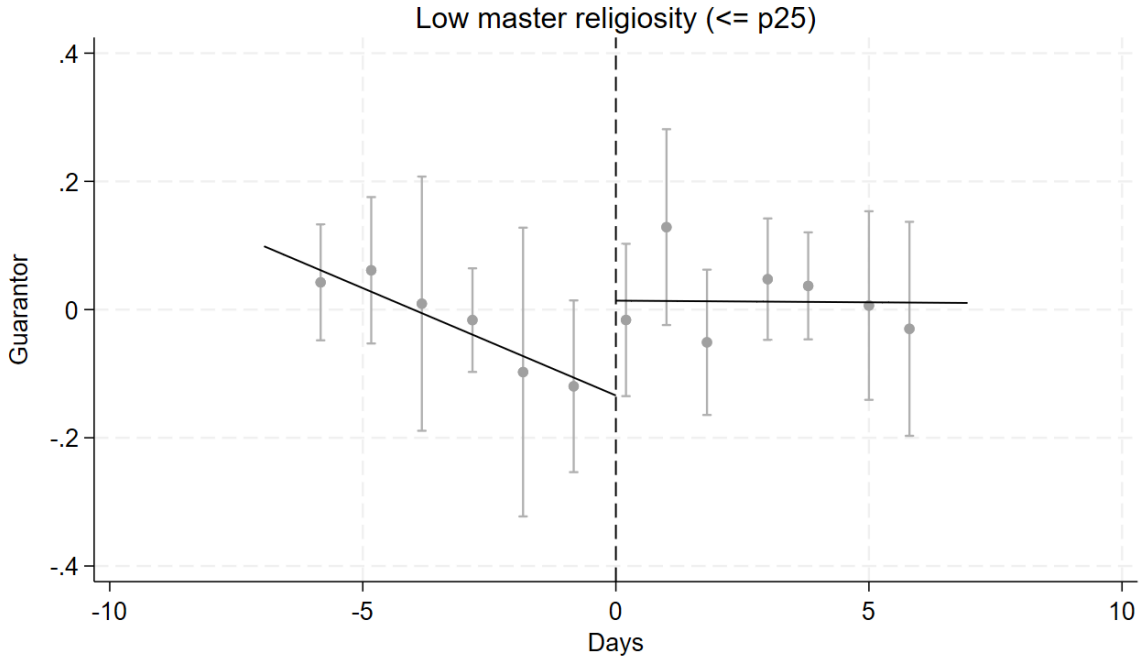
Notes. The figure displays the estimated local–linear RD estimate of master name religiosity, common name index, economic compensation, apprentice age, apprenticeship duration, and apprentice name religiosity at Pentecost. The horizontal axis is days relative to Pentecost. Grey dots are binned daily means of the corresponding dependent variable, residualized on fixed effects (trade, year, and day-of-year), and vertical grey bars show the 95% confidence intervals. The red line segments plot separate local–linear fits on each side of the cutoff, estimated with a triangular kernel and the robust bias–corrected approach of Calonico, Cattaneo, and Titiunik (2014). The calculation of the optimal bandwidths follows Calonico, Cattaneo, and Farrell (2020).

Figure A8: Manipulation test for the running variable around Pentecost



Notes. Histogram of days relative to Pentecost ($r_{\text{pentecost}}$) with local polynomial density estimates based on Cattaneo, Jansson, and Ma (2020). Red (blue) bars represent observations before (after) Pentecost, and solid curves are the estimated densities with 95% confidence bands. The test uses a triangular kernel and symmetric bandwidths of 23 days on each side. The robust test statistic is $T = 1.91$ ($p = 0.056$), so the null of a continuous density at the cutoff cannot be rejected.

Figure A9: Manipulation test for the running variable around Pentecost



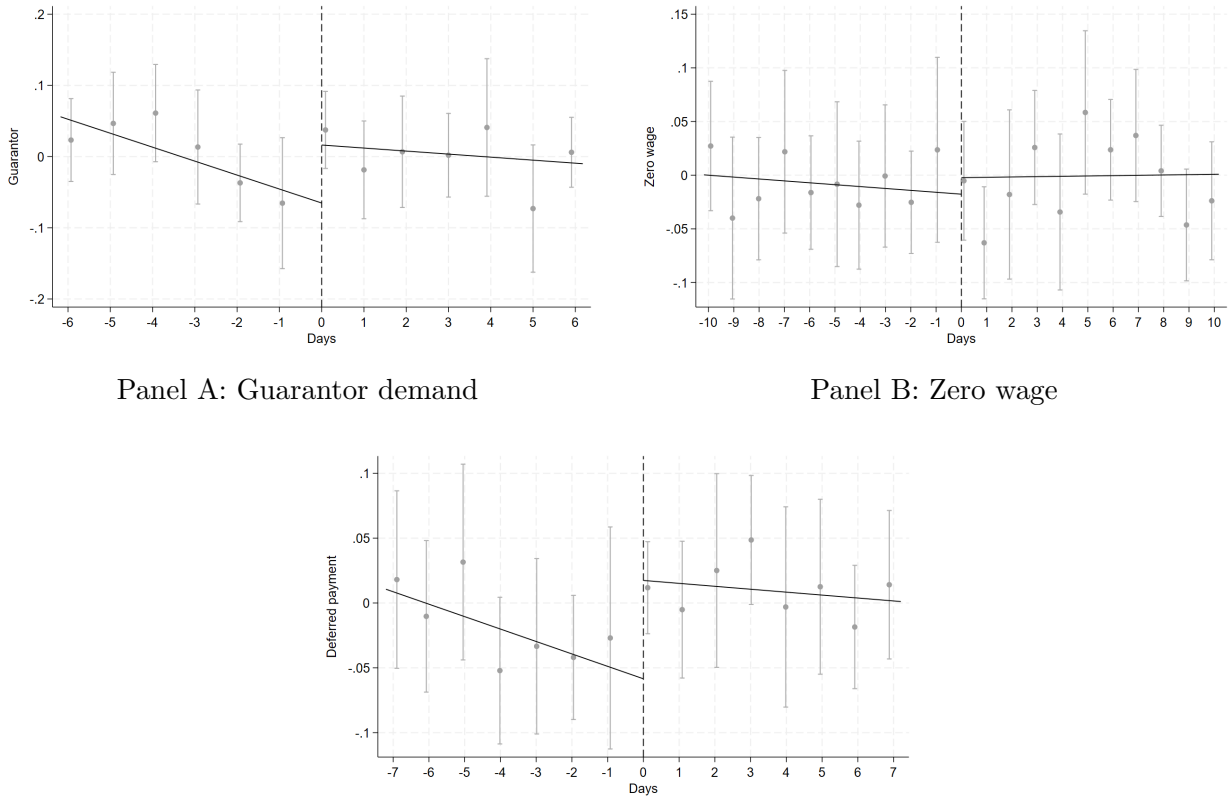
Notes. The figure displays estimated local–linear RD estimates at Pentecost for guarantor demand restricting the sample to apprentices with name religiosity below the 25th percentile. The horizontal axis is days relative to Pentecost. Grey dots are binned daily means of the dependent variable, residualized on covariates (name religiosity and master name commonality) and fixed effects (trade, year, and day-of-year), and vertical grey bars show the 95% confidence intervals. The red line segments plot separate local–linear fits on each side of the cutoff, estimated with a triangular kernel and the robust bias–corrected approach of Calonico, Cattaneo, and Titiunik (2014). The calculation of the optimal bandwidths follows Calonico, Cattaneo, and Farrell (2020).

Table A22: Pentecost RD estimates for guarantors with placebo cutoffs

Spec.	Cutoff	RD est.	SE	Left BW	Right BW
(1)	0	0.11	0.05	5.33	5.33
(2)	−1	−0.05	0.04	6.89	6.89
(3)	1	−0.01	0.02	9.12	9.12
(4)	−2	−0.00	0.04	7.58	7.58
(5)	2	−0.00	0.05	9.16	9.16
(6)	−7	−0.02	0.05	6.11	6.11
(7)	7	0.01	0.08	3.95	3.95
(8)	−14	0.01	0.08	5.52	5.52
(9)	14	0.05	0.04	6.31	6.31
(10)	−21	−0.11	0.09	3.98	3.98
(11)	21	0.05	0.06	4.98	4.98

Notes. The table presents RD estimates for guarantor demand with the true cutoff at Pentecost (Spec. 1, day 0) and placebo cutoffs at various days before and after Pentecost. "RD est." is the estimated discontinuity at each cutoff. "Left BW" and "Right BW" indicate the optimal bandwidths in days on each side of the cutoff, calculated following Calonico, Cattaneo, and Farrell (2020). Standard errors are robust bias-corrected.

Figure A10: Quinquagesima and contractual safeguards



Panel A: Guarantor demand

Panel B: Zero wage

Panel C: Deferred payment

Notes. The figure displays estimated local–linear RD estimates at Pentecost for three contract terms. The horizontal axis is days relative to Pentecost. Grey dots are binned daily means of the dependent variable, residualized on covariates (name religiosity and master name commonality) and fixed effects (trade, year, and day-of-year), and vertical grey bars show the 95% confidence intervals. The red line segments plot separate local–linear fits on each side of the cutoff, estimated with a triangular kernel and the robust bias–corrected approach of Calonico, Cattaneo, and Titiunik (2014). The calculation of the optimal bandwidths follows Calonico, Cattaneo, and Farrell (2020).

A5.4 Religious parochialism

This subsection complements the empirical analysis of Section 3.4.3.

Table A23 re-estimates the IV specifications that allow the effect of master name religiosity on safeguard demand to vary with apprentice name religiosity, progressively adding the controls and fixed effects used in the previous robustness checks. Across all columns and panels, the main coefficient on master name religiosity and its interaction with apprentice name religiosity remain negative and statistically significant, with magnitudes close to those in Table 4. First-stage F-statistics for both the master and the apprentice interaction instruments are generally above conventional thresholds, and the Anderson-Rubin test rejects the null in all specifications.

Table A24 uses alternative radii (400 km and 500 km) to define parental exposure to earthquakes. At both distances, the main effect and the interaction retain their sign and significance across all three panels, with first-stage F-statistics that remain well above conventional thresholds and Anderson-Rubin tests that reject the null throughout.

Table A25 replaces the composite religiosity index with its individual components—biblical names (Panel A), saint names (Panel B), and church patron mentions (Panel C)—for both masters and apprentices. The interaction between the master and apprentice components is negative across all three panels, though its magnitude and statistical significance vary across measures. Saint names and church patron mentions yield the most consistent results, while the interaction based on biblical names is negative but imprecisely estimated in some columns. The direct effect of the master component remains negative and significant throughout.

Table A23: Master name religiosity and parochial behavior

	Panel A: Third-party guarantor						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Master name religiosity	-0.362**	-0.357**	-0.312**	-0.371**	-0.485***	-0.488**	-0.294**
	[0.153]	[0.152]	[0.135]	[0.156]	[0.180]	[0.214]	[0.127]
Master name religiosity x apprentice name religiosity	-0.164**	-0.162**	-0.148**	-0.167**	-0.197**	-0.203**	-0.128**
	[0.073]	[0.072]	[0.066]	[0.074]	[0.088]	[0.100]	[0.060]
Apprentice name religiosity	0.028**	0.027**	0.024**	0.028***	0.036***	0.036**	0.022**
	[0.011]	[0.011]	[0.010]	[0.011]	[0.013]	[0.016]	[0.009]
N	52,357	52,357	51,845	52,355	39,576	34,917	52,221
Mean dep. var.	0.73	0.73	0.73	0.73	0.73	0.75	0.73
F-stat. Rel. master	13.01	13.08	14.51	12.74	13.02	9.36	15.09
F-stat. Rel. appr	10.00	10.08	10.97	9.92	9.91	7.29	11.51
AR F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Panel B: Zero wage						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Master name religiosity	-0.387**	-0.399***	-0.398***	-0.409***	-0.319**	-0.309*	-0.235**
	[0.151]	[0.153]	[0.145]	[0.157]	[0.136]	[0.159]	[0.105]
Master name religiosity x apprentice name religiosity	-0.143**	-0.147**	-0.149**	-0.151**	-0.125*	-0.120*	-0.082*
	[0.071]	[0.072]	[0.071]	[0.073]	[0.064]	[0.071]	[0.048]
Apprentice name religiosity	0.024**	0.025**	0.025**	0.025**	0.023**	0.023*	0.013*
	[0.011]	[0.011]	[0.010]	[0.011]	[0.010]	[0.012]	[0.007]
N	52,357	52,357	51,845	52,355	39,576	34,917	52,221
Mean dep. var.	0.29	0.29	0.29	0.29	0.29	0.30	0.29
F-stat. Rel. master	13.01	13.08	14.51	12.74	13.02	9.36	15.09
F-stat. Rel. appr	10.00	10.08	10.97	9.92	9.91	7.29	11.51
AR F-test (p-value)	0.00	0.00	0.00	0.00	0.01	0.03	0.02
	Panel C: Deferred payment						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Master name religiosity	-0.572***	-0.580***	-0.544***	-0.564***	-0.526***	-0.615***	-0.592***
	[0.203]	[0.206]	[0.187]	[0.204]	[0.169]	[0.221]	[0.192]
Master name religiosity x apprentice name religiosity	-0.184*	-0.186*	-0.173*	-0.176*	-0.145*	-0.158	-0.167*
	[0.100]	[0.102]	[0.095]	[0.098]	[0.082]	[0.101]	[0.093]
Apprentice name religiosity	0.037**	0.037**	0.035***	0.036**	0.035***	0.042**	0.035***
	[0.015]	[0.015]	[0.014]	[0.014]	[0.013]	[0.017]	[0.013]
N	37,230	37,230	36,877	37,229	28,127	24,299	37,101
Mean dep. var.	0.79	0.79	0.79	0.79	0.77	0.76	0.79
F-stat. Rel. master	10.45	10.40	11.32	10.11	12.83	9.56	11.91
F-stat. Rel. appr	7.62	7.59	8.11	7.55	9.23	7.13	8.69
AR F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
1st contract	✓						
Exp. opportunism		✓					
Yrs. since 1st appr.			✓				
Period FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. country FE					✓		
Appr. province FE						✓	
Period × Trade FE							✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors (Panel A), zero-wage provisions (Panel B), and deferred payments (Panel C). Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice country FE, and apprentice province FE, correspond to day-of-year, apprentice country-of-origin, and province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(4) and (7). In column (5), standard errors are clustered at the master and apprentice country-of-origin level. In column (6), standard errors are clustered at the master and apprentice province-of-origin level. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A24: Master name religiosity and parochial behavior: Alternative measures of parental exposure

	400km radii		500km radii	
	Panel A: Third-party guarantor			
	(1)	(2)	(3)	(4)
Master name religiosity	-0.351***	-0.289***	-0.268**	-0.233**
	[0.125]	[0.110]	[0.126]	[0.116]
Master name religiosity x apprentice name religiosity	-0.108**	-0.084**	-0.091**	-0.076**
	[0.043]	[0.039]	[0.040]	[0.038]
Apprentice name religiosity	0.025***	0.021***	0.020**	0.018**
	[0.008]	[0.007]	[0.008]	[0.007]
N	52,357	52,106	52,357	52,106
Mean dep. var.	0.73	0.73	0.73	0.73
F-stat. Rel. master	18.31	18.99	14.50	14.99
F-stat. Rel. appr	19.35	23.69	16.12	18.09
AR F-test (p-value)	0.00	0.00	0.01	0.03
	Panel B: Zero wage			
	(1)	(2)	(3)	(4)
Master name religiosity	-0.573***	-0.530***	-0.499***	-0.493***
	[0.159]	[0.146]	[0.161]	[0.157]
Master name religiosity x apprentice name religiosity	-0.113**	-0.088*	-0.099**	-0.083*
	[0.053]	[0.050]	[0.050]	[0.050]
Apprentice name religiosity	0.032***	0.029***	0.028***	0.027***
	[0.010]	[0.009]	[0.010]	[0.010]
N	52,357	52,106	52,357	52,106
Mean dep. var.	0.29	0.29	0.29	0.29
F-stat. Rel. master	18.31	18.99	14.50	14.99
F-stat. Rel. appr	19.35	23.69	16.12	18.09
AR F-test (p-value)	0.00	0.00	0.00	0.00
	Panel C: Deferred payment			
	(1)	(2)	(3)	(4)
Master name religiosity	-0.420***	-0.373***	-0.307**	-0.292**
	[0.134]	[0.120]	[0.125]	[0.119]
Master name religiosity x apprentice name religiosity	-0.110**	-0.084**	-0.091**	-0.074*
	[0.046]	[0.043]	[0.039]	[0.039]
Apprentice name religiosity	0.026***	0.023***	0.020**	0.019**
	[0.009]	[0.008]	[0.008]	[0.008]
N	37,230	37,056	37,230	37,056
Mean dep. var.	0.79	0.79	0.79	0.79
F-stat. Rel. master	14.22	14.37	10.99	11.36
F-stat. Rel. appr	16.24	19.12	13.06	14.76
AR F-test (p-value)	0.00	0.00	0.00	0.00
Contracts in trade	✓	✓	✓	✓
Common name	✓	✓	✓	✓
Non-mon. compensation		✓		✓
Apprentice age		✓		✓
Appr. duration		✓		✓
Period FE	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors (Panel A), zero-wage provisions (Panel B), and deferred payments (Panel C). Master name religiosity is a standardized index of the religious salience of the master's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. All specifications include time and trade fixed effects. Standard errors clustered at the master levels are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A25: Master name religiosity and parochial behavior: Individual measures of the religious name index

	Guarantor		Zero wage		Deferred payment	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Biblical names						
Log. master biblical mentions	-0.266**	-0.222*	-0.375***	-0.341***	-0.570***	-0.542***
	[0.132]	[0.120]	[0.136]	[0.129]	[0.180]	[0.174]
Log. master biblical mentions x Log. apprentice biblical mentions	-0.306**	-0.270**	-0.225	-0.204	-0.303	-0.295
	[0.145]	[0.128]	[0.137]	[0.126]	[0.191]	[0.181]
Log. apprentice biblical mentions	0.221**	0.195**	0.165*	0.150*	0.230*	0.224*
	[0.100]	[0.089]	[0.096]	[0.088]	[0.132]	[0.126]
N	52,357	52,106	52,357	52,106	37,230	37,056
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
F-stat. Rel. master	18.84	19.91	18.84	19.91	16.48	16.86
F-stat. Rel. appr	10.21	10.92	10.21	10.92	8.69	9.10
AR F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
Panel B: Saint names						
Log. master saint mentions	-0.114**	-0.092*	-0.171***	-0.160***	-0.262***	-0.251***
	[0.054]	[0.052]	[0.054]	[0.054]	[0.059]	[0.059]
Log. master saint mentions x Log. apprentice saint mentions	-0.106***	-0.100***	-0.099***	-0.093***	-0.127***	-0.127***
	[0.037]	[0.035]	[0.036]	[0.036]	[0.043]	[0.043]
Log. apprentice saint mentions	0.169***	0.159***	0.160***	0.151***	0.206***	0.206***
	[0.057]	[0.055]	[0.057]	[0.056]	[0.067]	[0.066]
N	52,357	52,106	52,357	52,106	37,230	37,056
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
F-stat. Rel. master	68.84	67.29	68.84	67.29	58.40	57.15
F-stat. Rel. appr	40.86	40.15	40.86	40.15	32.34	32.00
AR F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
Panel C: Church patron names						
Log. master church patron mentions	-0.138**	-0.112*	-0.184***	-0.170***	-0.264***	-0.247***
	[0.063]	[0.060]	[0.063]	[0.063]	[0.063]	[0.063]
Log. master church patron mentions x Log. apprentice church patron mentions	-0.085**	-0.083**	-0.095***	-0.093***	-0.109***	-0.116***
	[0.034]	[0.033]	[0.034]	[0.034]	[0.037]	[0.038]
Log. apprentice church patron mentions	0.149***	0.144***	0.167***	0.164***	0.194***	0.205***
	[0.057]	[0.056]	[0.056]	[0.057]	[0.061]	[0.062]
N	52,357	52,106	52,357	52,106	37,230	37,056
Mean dep. var.	0.73	0.73	0.29	0.29	0.79	0.79
F-stat. Rel. master	60.49	58.53	60.49	58.53	61.96	60.42
F-stat. Rel. appr	61.78	58.64	61.78	58.64	63.95	61.16
AR F-test (p-value)	0.00	0.01	0.00	0.00	0.00	0.00
Contracts in trade	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓		✓		✓
Apprentice age		✓		✓		✓
Appr. duration		✓		✓		✓
Period FE	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓

Notes. The table reports estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Log. N of biblical mentions is the natural logarithm of the number of biblical figures sharing the master's given name, log. N of saints mentions is the natural logarithm of the number of saints sharing the master's given name, and log. N of church patron mentions is the natural logarithm of the number of church patrons sharing the master's given name. The instrument for the three independent variables is parental earthquake exposure, calculated as the total number of earthquakes in the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

A5.5 Apprentice hold-ups

This subsection examines the robustness of the early exit results and provides details on the sorting and interaction analyses discussed in Section 5.

Table A26 re-estimates the main specifications using parental earthquake exposure within a 400 km radius as the instrument. The negative coefficients are larger in absolute value and statistically significant in most columns, ranging from −0.130 to −0.169, with first-stage F-statistics that remain above conventional thresholds.

Table A27 expands the radius to 500 km. The coefficients shrink substantially, ranging from −0.001 to −0.024, and none reaches conventional significance levels. This pattern mirrors the spatial attenuation observed in the main safeguard results.

Table A28 replaces the composite religious name index with its three individual components: the log number of biblical figures sharing the master's name (Panel A), the log number of saints (Panel B), and the log number of church patron mentions (Panel C). Across all three panels, the point estimates are consistently negative and of comparable magnitude. As with the main results, the coefficients are imprecisely estimated in most columns, with statistical significance concentrated in Column (7), which includes country fixed effects. The first-stage F-statistics vary across components, with saint names and church patron mentions generally yielding stronger statistics than biblical names.

Table A29 adopts a stricter definition of early exit, where the outcome is a binary variable that equals one if the apprentice left and never returned to the workshop. The mean of the dependent variable drops from 0.08 to 0.06, reflecting the more restrictive criterion. The coefficients remain negative and stable across specifications, ranging from −0.046 to −0.071, with Column (7) again yielding a statistically significant estimate of −0.046 ($p < 0.01$) and Column (9) a marginally significant estimate of −0.065 ($p < 0.10$).

Table A30 examines assortative matching along religious lines. Panel A reports OLS estimates, Panel B the reduced form, and Panel C the 2SLS estimates of the association between master name religiosity and apprentice name religiosity. Across all panels and specifications, the relationship is positive and highly significant. In the 2SLS estimates, a one-standard-deviation increase in master name religiosity is associated with an increase of approximately 1.2–1.4 standard deviations in apprentice name religiosity, suggesting strong assortative matching. The result is robust to the inclusion of trade fixed effects, common name controls, and apprentice country and province-of-origin fixed effects.

Finally, Table A31 includes the interaction between master and apprentice name religiosity in the early-exit specifications. The interaction is negative across all columns, suggesting that early exit tends to be lower when both master and apprentice have strong religious

identities. However, the estimates are not statistically significant under conventional thresholds in most specifications, and the Anderson-Rubin test fails to reject the null in all but Column (5). Apprentice name religiosity on its own is not associated with a lower probability of early exit.

Table A26: Master name religiosity and early exit: 400km earthquake exposure

	Early exit								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Master name religiosity	-0.156**	-0.135***	-0.130**	-0.139**	-0.135***	-0.141***	-0.169***	-0.163***	-0.133***
	[0.065]	[0.051]	[0.051]	[0.055]	[0.046]	[0.053]	[0.022]	[0.053]	[0.049]
N	52,360	52,359	52,106	52,106	51,847	52,357	39,576	34,917	52,223
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kleibergen-Paap F-stat.	16.06	29.22	28.88	25.76	36.22	28.49	92.58	18.46	31.91
Contracts in trade		✓	✓	✓	✓	✓	✓	✓	✓
Common name		✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation			✓	✓					
Apprentice age			✓	✓					
Appr. duration			✓	✓					
Appr. name religiosity				✓					
1st contract					✓				
Exp. opportunism					✓				
Yrs. since 1st appr.					✓				
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE								✓	
Appr. country FE							✓		
Appr. province FE						✓			
Period × Trade FE									✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on apprentice early exit. Master name religiosity is a standardized index of the religious salience of the master's given name. The instrument is parental earthquake exposure, defined as the total number of earthquakes experienced by the master's parental generation in a radius of 400km around Venice. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE and apprentice province FE, correspond to day-of-year and apprentice province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(6) and (9). In column (7), standard errors are clustered at the master and apprentice country-of-origin level. In column (8), standard errors are clustered at the master and apprentice province-of-origin level. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A27: Master name religiosity and early exit: 500km

	Early exit								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Master name religiosity	-0.003	-0.001	-0.002	-0.003	-0.007	-0.004	-0.024	-0.020	-0.006
	[0.057]	[0.048]	[0.048]	[0.051]	[0.043]	[0.050]	[0.024]	[0.071]	[0.047]
N	52,360	52,359	52,106	52,106	51,847	52,357	39,576	34,917	52,223
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kleibergen-Paap F-stat.	12.80	25.33	25.00	22.20	30.92	23.45	28.74	19.03	26.69
Contracts in trade		✓	✓	✓	✓	✓	✓	✓	✓
Common name		✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation			✓	✓					
Apprentice age			✓	✓					
Appr. duration			✓	✓					
Appr. name religiosity				✓					
1st contract					✓				
Exp. opportunism					✓				
Yrs. since 1st appr.					✓				
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE								✓	
Appr. country FE							✓		
Appr. province FE						✓			
Period × Trade FE									✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on apprentice early exit. Master name religiosity is a standardized index of the religious salience of the master's given name. The instrument is parental earthquake exposure, defined as the total number of earthquakes experienced by the master's parental generation in a radius of 500km around Venice. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE and apprentice province FE, correspond to day-of-year and apprentice province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(6) and (9). In column (7), standard errors are clustered at the master and apprentice country-of-origin level. In column (8), standard errors are clustered at the master and apprentice province-of-origin level. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A28: Robustness checks: Individual measures of the religious name index

	Early exit								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Biblical names									
Log. master biblical mentions	-0.101	-0.096	-0.086	-0.089	-0.102	-0.108	-0.096***	-0.094	-0.099
	[0.076]	[0.071]	[0.069]	[0.072]	[0.064]	[0.076]	[0.028]	[0.063]	[0.068]
N	52,360	52,359	52,106	52,106	51,847	52,355	39,576	34,917	52,221
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kleibergen-Paap F-stat.	16.28	21.35	21.84	20.07	26.83	18.87	207.70	21.66	23.32
Panel B: Saint names									
Log. master saint mentions	-0.058	-0.055	-0.050	-0.055	-0.059*	-0.064	-0.057***	-0.057	-0.062
	[0.042]	[0.039]	[0.039]	[0.042]	[0.036]	[0.042]	[0.015]	[0.038]	[0.040]
N	52,360	52,359	52,106	52,106	51,847	52,355	39,576	34,917	52,221
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kleibergen-Paap F-stat.	36.98	63.05	61.86	53.34	73.08	54.38	207.61	44.34	59.64
Panel C: Church patron names									
Log. master church patron mentions	-0.065	-0.061	-0.056	-0.064	-0.066	-0.073	-0.064***	-0.062	-0.069
	[0.048]	[0.044]	[0.044]	[0.048]	[0.041]	[0.048]	[0.017]	[0.040]	[0.045]
N	52,360	52,359	52,106	52,106	51,847	52,355	39,576	34,917	52,221
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Kleibergen-Paap F-stat.	31.57	50.64	49.64	42.53	57.02	44.11	306.87	52.41	50.32
Contracts in trade		✓	✓	✓	✓	✓	✓	✓	✓
Common name		✓	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation			✓	✓					
Apprentice age			✓	✓					
Appr. duration			✓	✓					
Appr. name religiosity				✓					
1st contract					✓				
Exp. opportunism					✓				
Yrs. since 1st appr.					✓				
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE						✓			
Appr. country FE							✓		
Appr. province FE								✓	
Period × Trade FE									✓

Notes. The table reports estimates of the effect of master name religiosity on three contractual safeguards: third-party guarantors, zero-wage provisions, and deferred payments. Log. N of biblical mentions is the natural logarithm of the number of biblical figures sharing the master's given name, log. N of saints mentions is the natural logarithm of the number of saints sharing the master's given name, and log. N of church patron mentions is the natural logarithm of the number of church patrons sharing the master's given name. The instrument for the three independent variables is parental earthquake exposure, calculated as the total number of earthquakes in the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE, apprentice country FE, and apprentice province FE, correspond to day-of-year, apprentice country-of-origin, and apprentice province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(6) and (9). In column (7), standard errors are clustered at the master and apprentice country-of-origin level. In column (8), standard errors are clustered at the master and apprentice province-of-origin level. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A29: Master name religiosity and early exit

	Early exit (never returned)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Master name religiosity	-0.063	-0.059	-0.056	-0.061	-0.071*	-0.061	-0.046***	-0.059*	-0.065*
	[0.044]	[0.040]	[0.040]	[0.043]	[0.038]	[0.040]	[0.011]	[0.033]	[0.038]
N	52,360	52,359	52,106	52,106	51,847	52,357	39,576	34,917	52,223
Mean dep. var.	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Kleibergen-Paap F-stat.	19.20	31.64	31.55	27.72	37.67	31.40	91.65	22.16	36.43
Contracts in trade		✓	✓	✓	✓	✓	✓	✓	✓
Common name		✓	✓	✓	✓		✓	✓	
Non-mon. compensation			✓	✓					
Apprentice age			✓	✓					
Appr. duration			✓	✓					
Appr. name religiosity				✓					
1st contract					✓				
Exp. opportunism					✓				
Yrs. since 1st appr.					✓				
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Doy FE						✓			
Appr. country FE							✓		
Appr. province FE								✓	
Period × Trade FE									✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on apprentice early exit. Master name religiosity is a standardized index of the religious salience of the master's given name. The instrument is parental earthquake exposure, defined as the total number of earthquakes experienced by the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE and apprentice province FE, correspond to day-of-year and apprentice province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(6) and (9). In column (7), standard errors are clustered at the master and apprentice country-of-origin level. In column (8), standard errors are clustered at the master and apprentice province-of-origin level. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A30: Master name religiosity and the preference for religious apprentices

	Apprentice name religiosity			
	(1)	(2)	(3)	(4)
Panel A: OLS				
Master name religiosity	0.062***	0.068***	0.065***	0.065***
	[0.004]	[0.005]	[0.001]	[0.009]
Panel B: Reduced Form				
Earthquake parental exposure	0.034***	0.034***	0.033***	0.035***
	[0.004]	[0.004]	[0.001]	[0.006]
Panel C: 2SLS				
Master name religiosity	1.44***	1.33***	1.19***	1.33***
	[0.36]	[0.28]	[0.13]	[0.34]
N	52,358	52,357	39,576	34,917
Mean dep. var.	0.00	0.00	0.01	0.02
Kleibergen-Paap F-stat.	19.19	31.63	91.65	22.16
Contracts in trade		✓	✓	✓
Common name		✓	✓	✓
Time FE	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓
Appr. country FE			✓	
Appr. province FE				✓

Notes. The table reports estimates of the association between master name religiosity and apprentice name religiosity. Master and apprentice name religiosity are standardized indexes of the religious salience of the master and apprentice's given name. Parental earthquake exposure is the total number of earthquakes experienced by the master's parental generation. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.

Table A31: Master name religiosity and early exit

	Early exit						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Master name religiosity	-0.086	-0.078	-0.096	-0.093	-0.071***	-0.078	-0.085
	[0.068]	[0.066]	[0.065]	[0.069]	[0.021]	[0.071]	[0.062]
Master religiosity x apprentice religiosity	-0.025	-0.022	-0.029	-0.029	-0.008	-0.013	-0.023
	[0.028]	[0.027]	[0.028]	[0.029]	[0.009]	[0.041]	[0.026]
Apprentice name religiosity	0.006	0.005	0.007	0.006	0.004**	0.005	0.006
	[0.005]	[0.005]	[0.005]	[0.005]	[0.002]	[0.006]	[0.004]
N	52,357	52,106	51,845	52,355	39,576	34,917	52,221
Mean dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08
F-stat. Rel. master	12.81	13.02	14.41	12.74	91.65	10.31	15.09
F-stat. Rel. appr	9.89	10.08	10.90	9.92	215.39	12.65	11.51
AR F-test (p-value)	0.33	0.39	0.22	0.30	0.00	0.14	0.27
Contracts in trade	✓	✓	✓	✓	✓	✓	✓
Common name	✓	✓	✓	✓	✓	✓	✓
Non-mon. compensation		✓					
Apprentice age		✓					
Appr. duration		✓					
1st contract			✓				
Exp. opportunism			✓				
Yrs. since 1st appr.			✓				
Time FE	✓	✓	✓	✓	✓	✓	✓
Trade FE	✓	✓	✓	✓	✓	✓	✓
Doy FE				✓			
Appr. country FE					✓		
Appr. province FE						✓	
Period × Trade FE							✓

Notes. The table reports 2SLS estimates of the effect of master name religiosity on apprentice early exit across values of mastern name religiosity. Master and apprentice name religiosity are, respectively, a standardized index of the religious salience of the master and apprentice's given names. The instrument for master name religiosity is parental earthquake exposure, defined as the total number of earthquakes experienced by the master's parental generation. The instrument for the interaction master name religiosity x apprentince name religiosity is the interaction between parental earthquake exposure and apprentice name religiosity. Contracts in trade is the log number of contracts in the master's trade over the five years preceding the contract. Common name is a normalized rank index of the master's given name popularity in the sample. Non-monetary compensation is a composite index of in-kind payments provided by the master. Apprentice age is the apprentice's age at contract signing, and apprenticeship duration is the contract length in years. First contract is a binary variable equal to one if the contract is the first signed by the master. Experienced opportunism is a binary variable equal to one if the master has previously experienced apprentice early exit. Years since first apprentice is the number of years elapsed between the current contract and the master's first contract. Day-of-year FE and apprentice province FE, correspond to day-of-year and apprentice province-of-origin fixed effects, respectively. All specifications include time and trade fixed effects. Standard errors clustered at the master level are reported in brackets in columns (1)-(4) and (7). In column (5), standard errors are clustered at the master and apprentice country-of-origin level. In column (6), standard errors are clustered at the master and apprentice province-of-origin level. *p $\leq$ 0.1; **p $\leq$ 0.05; ***p $\leq$ 0.01.