Witchcraft Beliefs as a Cultural Legacy of the Atlantic Slave Trade: Evidence from Two Continents[*]

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Abstract

This paper argues that the historical slave trade contributed to the propagation of persistent witchcraft beliefs on both sides of the Atlantic Ocean and establishes two key empirical patterns. First, it shows that in Sub-Saharan Africa, representatives of ethnic groups which were more heavily exposed to the Atlantic slave trade in the past are more likely to believe in witchcraft today, thus establishing a link between historical trauma and contemporary culture. Second, exploring the role of the slave trade in cultural transmission across continents, this paper finds that Afro-descendants in modern Latin America are substantially more likely to believe in witchcraft relative to other ancestral groups. Moreover, accounting for ancestry and other relevant factors, people residing in regions historically more reliant on African slave labor are also more likely to be witchcraft believers. These findings support ethnographic narratives on the connection between slave trade, slavery, and the entrenchment of witchcraft beliefs and shed light on the nature of these beliefs and related practices as a cultural framework for interpreting misfortune and a mechanism of enslavement in local communities.

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1 Introduction

Beliefs in witchcraft, broadly defined as the ability of certain people to use supernatural techniques to cause harm or acquire wealth at the expense of others, are highly widespread in the modern world. According to recent surveys, conducted in dozens of countries and multiple continents over the past decade, many millions of individuals across the globe claim to believe in witchcraft.[1] Such beliefs are not simply an innocuous relic of the past, but a cultural phenomenon that has very real ramifications, from impeding wealth accumulation and restricting economic mobility to eroding social relations and inciting violence (Gershman, 2016; Forsyth, 2016).[2]

Yet, despite the growing evidence on the heavy burden of witchcraft beliefs within communities around the world, particularly in developing countries, our understanding of their origins and factors contributing to their persistence remains quite limited. This paper highlights the deep historical roots of contemporary witchcraft beliefs by showing that the observed variation in their prevalence across Sub-Saharan Africa and Latin America can be traced back to the Atlantic slave trade, the backbone of an extractive economic system that was connecting these two continents for about four centuries.

The idea that the slave trade experience directly promoted witchcraft beliefs among affected societies in Sub-Saharan Africa is motivated by two striking patterns documented in archival records and elaborated upon in recent work by historians and cultural anthropologists. First, since the slave trade represented a source of severe hardship for the majority of affected local population, it was interpreted as a form of witchcraft and its perpetrators were labeled as witches. That is, a preexisting cultural framework of understanding misfortune was leveraged to identify the source of evil and the enemies in a dangerous new conflict. Importantly, the nature of the slave trade fit right into the "zero-sum" worldview typical of witchcraft believers: European witches and their local accomplices, were literally enriching themselves at the expense of other people's lives. Second, historical accounts indicate that the rise of the Atlantic slave trade turned local witch trials into a common

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[1]This rough estimate is based on simple extrapolation of nationally-representative survey data from the Pew Research Center. These surveys are discussed in greater detail in the following sections.

[2]The social costs of witchcraft beliefs come in many forms. The most visible of them are the severe sanctions imposed on the accused and convicted witches, from expropriation of their property and ostracism to ritual killing. But the fears of witchcraft attacks and accusations also have a broad range of behavioral consequences including economic self-restraint and lack of cooperation in communities. Although most evidence on these side-effects of witchcraft beliefs is anecdotal, a quantitative study by Gershman (2016) documents a robust link between the prevalence of witchcraft beliefs and the depletion of social capital captured by survey measures of interpersonal trust, charitable giving, and participation in group activities.

vehicle for meeting the growing demand for captives, as a result of which people convicted of witchcraft were routinely sold into slavery as punishment. Naturally, such "confirmation" of the existence of witches through regular trials and related rituals was likely to reinforce local beliefs in witchcraft.

In order to systematically explore the role of the Atlantic slave trade in strengthening witchcraft beliefs across Sub-Saharan Africa, we set up an empirical framework linking individual-level data on self-reported beliefs in witchcraft, collected by the Pew Forum of Religion and Public Life in 2008–2009, to ethnicity-level estimates of historical slave exports from Nunn and Wantchekon (2011). Our analysis reveals that representatives of ethnic groups that were more severely raided during the Atlantic slave trade era are more likely to believe in witchcraft today. Consistent with the narrative on the direct impact of slave trade on the propagation of witchcraft beliefs and the role of intergenerational cultural transmission, this main finding continues to hold after accounting for other possible channels captured by a myriad of relevant characteristics at the individual, regional, and ethnic-group levels, such as educational attainment, local development, ethnic diversity, precolonial institutions, and interpersonal trust. Interestingly, no significant connection exists between the Atlantic slave trade and a whole array of other magico-religious beliefs, which points to the special place of witchcraft beliefs in this historical context.

Beyond directly accounting for a range of important factors in our empirical analysis, we also pursue an instrumental-variables (IV) strategy as an auxiliary way to mitigate the possible endogeneity problem. First, following the literature on the long-term effects of African slave trades, we employ distance to the coast from the historical ethnic homeland as a source of plausibly exogenous variation in the intensity of slave raids. Second, in an attempt to refine this instrument, we exploit the data on the volume of slaves embarked by location to calculate historical proximity to the closest major slave port. Both strategies reinforce the main result and show that, if anything, our baseline estimates understate the impact of the Atlantic slave trade on witchcraft beliefs. Overall, mid-range IV estimates imply that, other things equal, a one-standard-deviation increase in our slave exports measure is associated with an average increase in the likelihood of believing in witchcraft by roughly 0.13 standard deviations, or close to 7 percentage points (12% of the sample mean), a substantial magnitude comparable, for example, to the reported negative effect of slave trade on trust (Nunn and Wantchekon, 2011). The fact that we are able to observe a significant relationship between the Atlantic slave trade, officially terminated in the nineteenth century, and *contemporary* witchcraft beliefs shows that a deep historical trauma can have a persistent effect on people's beliefs.

Having established the instrumental role of the Atlantic slave trade in fostering witch-craft beliefs at the source, in Sub-Saharan Africa, the paper next turns to Latin America, the main destination of African captives. According to numerous historical records and ethnographic studies, witchcraft beliefs were not simply mechanically transported across the ocean as part of the cultural heritage of the enslaved. Just like at home, they were also relied upon by the salves to explain their unfortunate position in the unknown land and, along with related practices and rituals, became a powerful tool of cultural resistance against the slave owners, the newly identified witches. In a rigorous investigation of this matter, we use survey data collected by the Pew Research Center in 2013–2014 to demonstrate that the current distribution of witchcraft beliefs across individuals and regions in Latin America is indeed reflective of the population movements and associated transatlantic cultural exchange during the slave trade era. Specifically, we show that in Latin America, Afro-descendants, most of whom trace their ancestry back to the Africans brought to the continent as slaves, are substantially more likely to believe in witchcraft compared to other ancestral groups, even after accounting for individual socio-demographic characteristics, regional development, and country fixed effects. Furthermore, conditional on ancestry and other relevant factors, current residents of regions located in the tropical coastal lowlands, a geographic belt in which African slave labor was most heavily used, are also more likely to believe in witchcraft. These findings highlight the continuity of witchcraft beliefs across space, as well as their persistence over time through generations of Afro-descendants and, more generally, the population of regions historically most exposed to African slavery.

Finally, we exploit another wave of surveys, this time mostly covering Muslim-majority nations in Asia and the Middle East, to conduct a placebo test based on the geography of witchcraft beliefs. We show that in this sample, outside the Atlantic world, the likelihood of believing in witchcraft is completely unrelated to either distance to the coast or elevation, suggesting that the importance of these factors in the African and Latin American cases, respectively, is indeed unique due to their connection to the historic slave trade.

This paper fits into multiple strands of research. First, it directly relates to the growing literature on the origins, persistence, and transmission of culture in general and long-standing traditional beliefs, customs, and practices, in particular.[3] Our findings are in line with the studies that identify the deep determinants of culture and relate in particular to research exploring the long-run interplay between institutions and culture (Alesina and Giuliano, 2015).[4] Specifically, we formally demonstrate the tight connection between the

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[3]Gershman (2017) provides a comprehensive review of recent studies in this field.

[4]Recent examples include Becker et al. (2016) and Lowes et al. (2017).

institution of slavery, of which the slave trade is an integral part, and the prominence of witchcraft beliefs in the Atlantic world. Unlike earlier research focusing on the triggers of witch trials and killings, such as weather shocks (Oster, 2004; Miguel, 2005) or religious competition (Leeson and Russ, 2018), this paper searches for the roots of modern witchcraft *beliefs* in the long history of transatlantic slave trade. Importantly, we do not argue that witchcraft beliefs originated as a result of slave trade, but rather view the latter as an important factor that contributed to the entrenchment and propagation of preexisting beliefs. Thus, our findings should be viewed as complementary to the studies rationalizing the origins and purpose of various beliefs in the supernatural including, for example, Leeson (2014) on oracles, Gershman (2015) on the evil eye belief, and Nunn and Sanchez de la Sierra (2017) on bulletproofing spells.

Second, this paper contributes to the literature on historical development studying the persistent impact of events from distant past on contemporary socioeconomic outcomes (Nunn, 2014). More specifically, it adds to the subset of this literature that focuses on the long-term effects of African slave trades, one of the crucial episodes in global history that affected populations across multiple continents.[5] In the context of Sub-Saharan Africa, previous empirical studies have argued that, among other things, the slave trade had an adverse effect on economic development (Nunn, 2008a), eroded interpersonal trust (Nunn and Wantchekon, 2011), fostered the practice of polygamy (Dalton and Leung, 2014) and the spread of HIV (Bertocchi and Dimico, 2019), increased conflict (Boxell et al., 2019), reduced access to finance (Pierce and Snyder, 2018), and shaped the gender division of labor (Teso, 2019). This paper shows that contemporary variation in the prevalence of witchcraft beliefs may also be traced back to the history of the Atlantic slave trade which, given the harmful implications of these beliefs for economic self-advancement and social relations, also points to a new cultural channel through which slave trade could have contributed to African underdevelopment.

Third, this study adds to the literature on the long-term consequences of the Atlantic slave trade *outside* Africa by looking at its impact on the cultural landscape of the New World, the main destination of African captives. While there is a large body of research focusing on the long-run effects of slavery in the Americas on various socioeconomic outcomes including human capital, inequality, institutions, and political attitudes,[6] there is virtually no work within economics investigating the cultural exchange that resulted from

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[5]See Bertocchi (2016) and Nunn (2017) for a detailed overview of this literature.

[6]See, among many others, Nunn (2008b), Acemoglu et al. (2012), Bruhn and Gallego (2012), Bertocchi and Dimico (2014), and Acharya et al. (2016b).

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the massive forced relocation of people from the African continent. We fill this gap by showing that the variation in the prevalence of witchcraft beliefs across Latin America partly represents the legacy of this transatlantic cultural exchange.

Finally, this paper builds on and contributes to an extensive literature in history and anthropology on the cultural impact of the Atlantic slave trade and the deep determinants of witchcraft beliefs. This literature, discussed in the following sections, provides case studies that help to understand the channels connecting slave trade to local beliefs on both sides of the Atlantic. Our analysis instead represents a systematic empirical investigation of this relationship.

The rest of the paper is organized as follows. The next section summarizes ethnographic and historical studies regarding the impact of slave trade on the propagation of witchcraft beliefs in Africa and pins down the two main mechanisms of this influence. Section 3 empirically explores this relationship. Section 4 investigates the cultural transmission fostered by the Atlantic slave trade by studying the prevalence of witchcraft beliefs in modern Latin America. Section 5 presents a placebo test looking at the geography of witchcraft beliefs outside the Atlantic world. Section 6 concludes.

2 Witchcraft and slave trade in African ethnography

In her detailed account of the Temne people of Northern Sierra Leone, Shaw (1997; 2002) argues that many aspects of their culture, including witchcraft beliefs and witchfinding practices, were shaped by the slave trade experience and may be viewed as collective "memories" of this historical trauma. Upon closer examination, these "memories" appear to persist not just among the Temne, but also other African societies affected by the Atlantic slave trade.

Historical records and ethnographic studies reveal two common patterns that provide an insight into this connection between witchcraft beliefs and the slave trade. First, Africans commonly perceived slave trade as a form of witchcraft through which European witches and their local collaborators enriched themselves at the expense of less powerful individuals unable to avoid being captured and shipped across the ocean. Second, in response to rising demand for slaves, witchcraft accusations and trials became an important tool for convicting and enslaving individuals across communities. Through both channels, examined in greater detail further below, the slave trade fostered witchcraft beliefs and related practices supporting an anxiety-ridden worldview that persisted over time among affected ethnic groups like the Temne.

2.1 Slave trade as a form of witchcraft in a zero-sum world

One of the few well-established general facts about witchcraft beliefs is that their most direct purpose is to "explain" all sorts of misfortune including sickness, death, bad harvest, and business failure. In this regard, for millions of Africans, the Atlantic slave trade represented a major source of misfortune and suffering for over four centuries. As Sweet (2003) puts it, the Atlantic slave trade was "a new form of social and economic malevolence" introduced by Europeans which severely disrupted the life in local communities and led to wars, disease, forced migration, and other misfortunes (pp. 162–163). In response, the victims and witnesses of these misfortunes relied on their cultural framework for understanding evil: they interpreted the slave trade as an act of witchcraft and labeled its enablers as witches and cannibals. Schuler (1979) emphasizes that such interpretation was natural, given the magnitude of torture inflicted on the victims of slave trade: "The wrenching away of people from their kin, the experience of the middle passage, and people's reduction to units of labour in the New World – all accompanied by excessively high death rates – were cataclysmic misfortunes that could *only* be accounted for by the actions of the most viciously anti-social creatures, i.e., sorcerers" (p. 132).

One of the early detailed accounts linking slave trade and witchcraft appears in the work of Wyatt MacGaffey on the Bakongo people of Central Africa who remembered the slave trade as a "form of witchcraft, whereby large numbers of Africans were improperly and prematurely transported to the other shore" (MacGaffey, 1972, pp. 54–55). The slave traders were viewed as witches who stole African souls and transfered them to a faraway continent imagined as including both Europe and America (MacGaffey, 1968, pp. 174). Law (2011) argues that such equation of slave trade and witchcraft was common throughout Africa, as was the perception of European slave traders as witches consuming the souls of their victims, reportedly going back to 1450s in the Gambia River region (pp. 10–11). As noticed by Argenti (2007), the fear of cannibalism, referring to the consumption of both body and spirit, in the context of the Atlantic slave trade was fitting since captives sold across the ocean never returned to their homeland and the "transshipment was every bit as terminal as death" (p. 112).

Thornton (2003) provides an interesting perspective from the viewpoint of slaves arriving in the Americas from Central Africa, citing their own testimonies as well as those of the Jesuit priest Alonso de Sandoval. Based on years of experience meeting slaves on ships disembarking in the port of Cartagena in the seventeenth century, the missionary could see a clear pattern: the captives believed that the ocean voyage was "a type of witchcraft" in which upon arrival, "they would be made into oil and eaten" (p. 281–282). Similarly,

according to Sweet (2003), it was "widely understood that Europeans carried away black bodies in order to "eat" them."[7] The witnesses and victims of the slave trade developed vivid images of this deeply disturbing practice in which Europeans "used their hidden powers to enslave Africans and commodify their bodies for their own enrichment" (p. 162):

> For Central Africans, crossing *kalunga* (the Atlantic Ocean) in slave ships represented a premature death at the hands of witches, who nourished themselves on black bodies in the land of the dead (the Americas). The "profits" from these black bodies were then returned to Africa in a variety of trade goods. Cooking oil was believed to be pressed from African flesh. The red wines that Portuguese traders sold were said to be the blood of their African victims. European cheeses were African brains. And gunpowder was thought to be the ashen residue of African bones that were burned by Europeans.

Hawthorne (2010) echoes this narrative in his study of Upper Guinea adding that, although coastal communities widely viewed slave traders as witches or cannibals, they were compelled to cooperate since those who "failed to sate the hunger of white witches for black bodies risked being consumed" (p. 96).

Interestingly, along with Europeans, local chiefs involved in and profiting from the slave trade were also commonly seen as witches. According to Thornton (2003), in seventeenth-century West Central Africa, witches were commonly found and were particularly dangerous among those in a position of power including European and African rulers, slave traders, and merchants in general. Likewise, Argenti (2007) points out that, in the Cameroon Grassfields, even though the elite class was unlikely to be subject to direct witchcraft accusations, the "whole social stratum of slave traders and labor recruiters" could nevertheless be identified as the "true source of cannibalism in the polity" (p. 116–117). De Rosny (1985), a French Jesuit priest and anthropologist who worked in Cameroon, explains that suspicions of witchcraft were commonly directed at the local leaders during the slave trade era, since

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[7]Olaudah Equiano, a noted abolitionist and writer who was enslaved as a child and sent to West Indies in the mid-eighteenth century, recalled in his autobiography how the expectation of being eaten caused tremendous dread among the captives (Palmié, 1995, p. 48). Shaw (2002) reports similar recollections by Joseph Wright, a former slave in Freetown, and claims that "the conviction that slaves carried away in the Atlantic trade were eaten by Europeans persists in Sierra Leone to this day" (p. 230–232). This anecdotal evidence suggests that the perception of slave traders as cannibals was clearly present both at the mature stages of the Atlantic slave trade and even after its demise. Such persistence could reflect either a lack of information about the realities of slavery in the New World – which were horrifying but did not feature literal cannibalism on the part of European slave owners – or an unwillingness among Africans to update their pre-existing beliefs based on limited and necessarily indirect evidence (or both).

in the "anguished times of the slave traffic, certain chiefs had served as intermediaries, entering into negotiations to supply whites with compatriots and reap a profit" (p. 61). He directly links the experience of slave trade to the most popular local type of sorcery beliefs, *ekong*, which essentially refers to enslavement via an act of witchcraft.

Recent advances in the cognitive science of supernatural beliefs (Boyer, 2018) help explain why the activation of witchcraft beliefs and accusations against the dominating side of the slave trade was natural. Parren (2017) theorizes that witchcraft beliefs are likely to gain traction in groups under external threat by turning a misfortune into coalitional conflict thereby mobilizing the affected group members against common threat. This general idea certainly fits the context of slave trade, as identification of both the source of misfortune and the parties to blame was particularly straightforward. The notion of coalitional psychology being triggered by witchcraft beliefs and accusations also explains why they became an effective tool of cultural resistance among slaves in the New World, as discussed in section 4.

Austen (1993) places the relationship between the slave trade and witchcraft beliefs into a broader discourse on the economic and social setting of which such beliefs are symptomatic. In his words, the export of slaves from Africa "provides the major historical reference for the equation of capital accumulation, zero-sum economics, and witchcraft" (p. 100). Indeed, the view of slave traders as witches enriching themselves at the expense of the majority of local population is very much in line with the typical zero-sum worldview of witchcraft believers, according to which one person's gain is always someone else's loss.[8] Harms (1981) discusses this phenomenon in his study of the Bobangi people of the Zaire River basin who believed that "trade and witchcraft were inseparable" (p. 203) and any wealth gained through trade was illicitly earned "in cooperation with the dark forces of the universe" (p. 198). Across affected communities, the zero-sum nature of slave trade was strikingly obvious, as wealth was created by causing enormous human suffering. As succinctly formulated by Hawthorne (2010), "Europeans and Eurafricans turned people into profit – slaves into tobacco, alcohol, cloth, and other things – which was witchcraft par excellence" (p. 88). Thus, the Atlantic slave trade was perceived as a zero-sum "system of cannibalistic consumption," whereby evil sorcerers turned Africans into "human commodities exported overseas and duly wasted by the plantation economies of the New World" (Palmié, 2002, p. 179).

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[8]See, for example, Sanders (2003) for a case study on wealth distribution, zero-sum thinking, and witchcraft beliefs in modern Tanzania.

Like Austen, Warnier (1995) views the Atlantic slave trade as a crucial period promoting witchcraft beliefs in Africa and further points out their persistence in a system characterized by high disparities between social classes under extractive institutions of the post-slave-trade era. He argues that witchcraft beliefs among the Duala and the Bamileke of Cameroon are "based on and developed by the disappearances due to the slave trade, the wealth of the slave-traders and their agents during the period of the slave trade, on the mortality in the plantations and the wealth of recruiting agents and chiefs during the colonial period, on the inequalities experienced in illness and death, and the ostentatious fortunes of the big men in the public service and in business in the independent state" (p. 269). Similarly, Shaw (2002) underscores the continuity of the idea of "cannibalistic trade" which was "reconfigured during the legitimate trade through accusations that chiefs and traders devoured, sacrificed, and made their dependents into medicines" (p. 246). Thus, the historical memory of the Atlantic slave trade era "formed a lens through which the predatory and extractive relationships of the legitimate trade could be evaluated." These observations are consistent with the narrative on the "modernity of witchcraft" relating recent revival of witchcraft beliefs in Sub-Saharan Africa to the disruption of traditional social structures and rising economic disparities in the process of modernization and globalization in the twentieth century (Geschiere, 1997). According to the arguments presented above, the salience of witchcraft beliefs in contemporary Africa may in fact be linked to a much earlier "modernity shock" manifested in the onset and centuries-long presence of the Atlantic slave trade.

2.2 Witchcraft trials and accusations as tools of enslavement

Ironically, those same people who viewed slave trade as an act of witchcraft were in danger of being accused of witchcraft and sold into slavery as punishment. As abundant historical evidence indicates, rising demand for slaves turned witch trials into a ubiquitous tool of "producing" new captives.

There were several ways to extract slaves during the era of the Atlantic slave trade. The two major channels included, first, wars or slave raids resulting in kidnappings and, second, trials that determined guilt for various offenses including theft, murder, inability to pay back debts, adultery, treason, and, importantly, witchcraft (Nunn, 2017). Hawthorne (2010) paints a detailed picture of how witchcraft trials played a crucial role in producing slaves in the coastal areas of Upper Guinea. He points out that, in contrast to raids and wars aimed at outside communities, trials were recognized as legitimate internal affairs and "resulted in community members condemning one of their own to enslavement" (p. 81).

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Among all transgressions for which a person could be charged, witchcraft was one of the most serious crimes. Hawthorne cites historical records of Europeans in Upper Guinea regarding practices of enslaving accused witches and their relatives. The latter were very common and, in the words of Francisco de Lemos Coelho, a Portuguese observer writing in 1684, there was "no lack of witches in the land" (p. 83). Manuel Álvares, a Portuguese missionary, describes a typical early-seventeenth-century trial by poison ordeal as a result of which convicted witches and their immediate kin were sold to slave traders. Hawthorne speculates that "as the number of ships arriving in Bissau and Cacheu increased and as coastal groups stepped up the production of slaves to garner imports after 1750, the frequency of witchcraft accusations and trials increased as well" (p. 87).

Further down West Africa's Atlantic coast, in Northern Sierra Leone, witchcraft trials were similarly a common method of enslaving local population. Shaw (2002) cites the late-eighteenth-century records of John Matthews, an agent for an English slave-trading firm, who notes that slaves, apart from those taken as prisoners of war, were often "sold for witchcraft, and other real, or imputed, crimes" and "purchased in the country with European goods and salt" (p. 215). Matthews provides the details of witchfinding practices in Sierra Leone via divinatory interrogation of the corpse pointing out that witchcraft trials frequently resulted in the enslavement of both the accused and their family if the "deceased were a great man, and the accused poor" (p. 216). Shaw argues that witchcraft trials blossomed during the era of the Atlantic slave trade and that associated ritual practices persisted over time, despite their gradual separation from enslavement following the Anti-Slave-Trade Act of 1807.[9] Finally, she emphasizes that the "development of witchfinding as the ritual production of slaves for the Atlantic trade" was only one part of the nexus between witchcraft and slave trade. In line with the discussion in the preceding section, Shaw reminds about the other side of the story: "those who profited from the ritual conviction of witches were implicitly recognized as the biggest witches of all" (p. 223).

Moving further south, in Angola, witchcraft accusations were effectively used in supplying slaves. Ferreira (2012) provides several specific examples and even cites local authorities in the eighteenth-century Benguela that acknowledged the widespread use of witchcraft accusations following someone's death as "a way of robbing and enslaving one another" (p. 75). Vansina (2005), also based on Angolan experience, offers a similar description and suggests that trial by ordeal was often applied in cases of deaths attributed to witchcraft

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[9]She quotes from the diary of a nineteenth-century English traveler who witnessed an investigation into the sudden death of a young girl. He comments that a possibility was raised regarding the death resulting from witchcraft and "had the slave trade existed, some unfortunate individual might have been accused and sold into captivity" (p. 218).

and the culpable witch was detected through divination. Astonishingly, he argues that enslavement was essentially an inevitable outcome of a witchcraft trial by ordeal: "If the accused died, a number of his relatives were enslaved and sold, and if the accused was innocent, the same number of the 'family' of the accuser underwent this fate" (p. 12). Manning (1990) reports that accusations of witchcraft were a common mechanism of enslavement in Loango and Angola (p. 90). He further suggests that such accusations increased in frequency as the "maturation of the system of slave supply led to the perfection of new techniques both for collecting slaves and for profiting from them" (p. 131). Gustafsson (2005) relies on the observations from the Finnish missionary Rautanen in the late-nineteenth-century Ovamboland, split between today's Angola and Namibia, where de facto slave trade was monopolized by local kings and continued well after its *de jure* abolition by the Portuguese. Rautanen remarked that "witchcraft accusations were the most common vehicle used by King Kambonde and Chief Nehale for seizing people" (p. 46). Furthermore, among others, Gustafsson argues that the increased intensity of witch trials was directly linked to rising demand for slaves and the growth of trade with Europeans which reinforced the system of extracting slaves from local communities via "continuous witchcraft accusations" (p. 58).

Further historical evidence on the active use of witch trials and accusations as a way to generate slaves comes from other African regions exposed to the Atlantic slave trade including Cameroon (Warnier, 1995; Argenti, 2007), Calabar (Fyfe, 1960), the Cross River area (Röschenthaler, 2006), Guinea (Hair, 1998), the Bight of Biafra (Nwokeji, 2010), the kingdom of Kongo (Harms, 1981; Young, 2007; Heywood, 2009), and Zambia (Hinfelaar, 2007).[10] Thus, witch trials were a common vehicle for supplying slaves across Sub-Saharan Africa and their expansion in response to increasing demand for captives was arguably a prominent factor reinforcing witchcraft beliefs among affected populations.

The historical narrative paints a rather convincing picture linking the rise of the Atlantic slave trade to the propagation of witchcraft beliefs in Sub-Saharan Africa. If these beliefs are transmitted across generations as part of ancestral cultural package, the consequences of the slave trade shock could still be seen in contemporary data. The following section provides a rigorous empirical investigation of this proposition.

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[10]In her study on slave settlements in the Cross River area, Röschenthaler (2006) notes that slaves were feared by free villagers because they "were known for their knowledge of strong 'medicines' and powerful magic" (p. 78). In their view, slaves sold by their own people must have committed crimes or possessed destructive witchcraft powers. This observation suggests that witchcraft convictions were taken seriously by the local population. As will be discussed in section 4, the same was also true for some of the slave owners in the New World.

3 Evidence from Sub-Saharan Africa

Our investigation begins in Sub-Saharan Africa, the continent of origin for millions of slaves transported to the Americas between the 15th and 19th centuries. As argued in the previous section, the slave trade experience likely reinforced local beliefs in witchcraft and contributed to their persistence. Hence, we link the variation in contemporary prevalence of witchcraft beliefs across Sub-Saharan Africa to the differential historical exposure of various ethnic groups to the slave trade.

3.1 Data

The baseline dataset employed in this part of our analysis largely relies on a series of surveys conducted by the Pew Forum on Religion and Public Life between December 2008 and April 2009 in nineteen countries of Sub-Saharan Africa.[11] Although the original intent of these surveys was to investigate the religious landscape of Sub-Saharan Africa with specific focus on Islam and Christianity, the questionnaires covered a wide range of issues including people's adherence to traditional beliefs and practices and their views on social and political issues.

Among other things, the surveys contain information on witchcraft beliefs. Following Gershman (2016), we combine two (yes or no) questions to construct the baseline indicator of witchcraft beliefs corresponding to the broad definition used in the introduction. The first question simply asks whether a respondent believes in "witchcraft," without any clarification, whereas the second question inquires about the belief in the "evil eye," or that "certain people can cast curses or spells that cause bad things to happen to someone." Thus, the former question leaves the notion of witchcraft vague and open to interpretation, while the latter spells out the basic concept of causing harm via supernatural means.[12] To minimize potential for measurement error, we define self-proclaimed witchcraft believers

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[11]These are: Botswana, Cameroon, Chad, Democratic Republic of the Congo (DRC), Djibouti, Ethiopia, Ghana, Guinea-Bissau, Kenya, Liberia, Mali, Mozambique, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, and Zambia. Rwanda and South Africa effectively drop out from the main empirical analysis since the key data on the ethnicity of respondents are absent in these two cases. See http://www.pewforum.org/datasets for more details.

[12]As discussed in Gershman (2016), the "evil eye" label assigned in the second question is misleading since the corresponding belief is actually a different cultural phenomenon reflecting the fear of uncontrollable supernatural destructive power of envious glances (Gershman, 2015).

as individuals who reply "yes" to at least one of the above questions.[13] Such believers constitute 54% of the full sample of 19 countries, with national-level prevalence rate ranging from 31% in Ethiopia to 96% in Tanzania.[14]

The Pew Forum surveys contain information on basic sociodemographic characteristics, as well as the region of residence and self-reported ethnicity of respondents.[15] The latter is particularly important since estimates of slave exports, our main explanatory variable capturing the exposure to historical slave trades, are available at the ethnic-group level (Nunn and Wantchekon, 2011). Our matching of respondents' ethnicities in the baseline survey to the slave exports dataset, which adopts the classification from Murdock's (1959) map of African ethnic homelands, resulted in more than 300 unique groups.[16] Nunn and Wantchekon (2011) provide estimates of slave exports by century and distinguish between the Atlantic and Indian Ocean trades. As a starting point, we use their preferred measure, defined as log(1 + exports/area), which normalizes the total number of slaves exported between 1400 and 1900 by the area (in square kilometers) of respective ethnic homelands as shown on Murdock's map.[17] Figure B.1 in appendix B shows the distribution of slave exports and the prevalence of witchcraft beliefs at the ethnic group level, along with country boundaries.

3.2 Empirical framework and baseline results

Our estimating equation relates individual-level beliefs in witchcraft to the ethnicity-level measure of slave exports and a range of other relevant characteristics:

$$\text{witch}_{i,e,r,c} = \alpha_c + \beta \, \text{slavexp}_e + \mathbf{X'_e}B + \mathbf{X'_{i,e,r,c}}\Gamma + \mathbf{X'_{r,c}}\Omega + \varepsilon_{i,e,r,c}.$$

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[13]The patterns reported in this section are qualitatively robust to using the standalone question on "witchcraft" to define the outcome variable. In the full sample, the correlation between responses to the evil eye and witchcraft questions is 0.55.

[14]The share of respondents who could not be identified as either believers or non-believers due to "don't know" answers and refusal to reply is 5.72% in the full sample. These are dropped from further analysis.

[15]Regions of residence mostly correspond to first-level subnational administrative units, with 188 of them in the original sample of nineteen countries and 174 after excluding Rwanda and South Africa.

[16]See Gershman (2016) for details. With a few adjustments, this matching also connects our dataset to the *Ethnographic Atlas* containing useful information on precolonial characteristics of ethnic groups (Murdock, 1967).

[17]Using alternative area units, namely, measuring slave exports per 10, 50, or 100 square kilometers does not qualitatively affect the results reported below. Note that using the basis of 100 square kilometers is mathematically equivalent (up to an additive constant) to defining the slave exports index as log(0.01 + exports/area), as in Bertocchi and Dimico (2019), where homeland area is measured in square kilometers.

Here, the binary outcome variable witch$_{i,e,r,c}$ captures whether individual i belonging to an ethnic group e and residing in region r of country c believes in witchcraft or not, and slavexp$_e$ reflects the intensity of slave exports for ethnic group e. Control variables at the ethnic, individual, and regional levels are represented by vectors $\mathbf{X'_e}$, $\mathbf{X'_{i,e,r,c}}$, and $\mathbf{X'_{r,c}}$, respectively. Finally, α_c stands for country fixed effects and $\varepsilon_{i,e,r,c}$ is the individual-level idiosyncratic component. The model is estimated via ordinary least squares (OLS), with standard errors clustered at both ethnic and regional levels.[18]

We start with a parsimonious specification representing our initial attempt at estimating the total effect of slave trade on contemporary witchcraft beliefs. Since there may be multiple mechanisms at work behind this relationship, it is instructive to first obtain this baseline estimate before focusing on the direct effect of the slave trade, namely, its historical impact on witchcraft beliefs through channels outlined in section 2 persisting due to intergenerational cultural transmission. The parsimonious model includes the main two variables of interest, ethnicity-level pre-treatment controls, and country fixed effects. Our pre-treatment control variables aim to capture three potentially confounding characteristics of ethnic groups that reflect their prosperity, institutions, and disease environment as plausibly determined prior to the slave trade. First, we control for an indicator of historical reliance on agriculture for subsistence which is associated with both early development and contemporary welfare (Michalopoulos et al., 2019). Second, we control for historical presence of slavery in society, which could have facilitated slave exports and has also been linked to exogenous local characteristics such as land quality (Fenske, 2013). Third, we control for disease environment as proxied by the average malaria stability index within respective ethnic homelands (Kiszewski et al., 2004). Beyond affecting the European presence in Africa, susceptibility to malaria might also be directly related to the prevalence of witchcraft beliefs since these are often invoked to explain illness (Muela et al., 1998). Moreover, as recently shown by Esposito (2018), captives from malaria-ridden regions of Africa were more valued by slave traders, which could have differentially affected the exposure of ethnic groups to slave raids.

Next, we introduce relevant post-treatment characteristics in order to control for possible transmission channels and isolate the direct effect, arguably attributable to cultural transmission.[19] Our first set of additional controls includes a range of sociodemographic indicators, namely age, age squared, gender, religion, education, poverty, household size,

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[18]Maximum likelihood estimation of equivalent probit specifications yields very similar results.

[19]As described below and in appendix C, we also perform a proper mediation analysis investigating the role of some potential mechanisms.

and an urban location dummy.[20] Accounting for poverty and education is particularly important a priori since previous studies linked the slave trade experience to lower levels of income (Nunn, 2008a) and human capital (Obikili, 2016).

Our next group of control variables includes post-treatment ethnicity-level indicators, particularly those capturing European colonial influence, which is plausibly related to the intensity of slave trade and could have in turn affected the prevalence and persistence of witchcraft beliefs. To some extent, our three baseline pre-treatment controls reflect two crucial characteristics that have been argued to affect the colonization process, namely early economic prosperity and disease environment (Acemoglu et al., 2005). We supplement these with two additional measures of societal complexity and precolonial prosperity from the *Ethnographic Atlas*, namely historical settlement pattern (an ordinal scale, ranging from nomadic to sophisticated permanent settlements) and an index of political centralization (jurisdictional hierarchy beyond local community).[21] We also use three ethnic-homeland-level variables to directly capture some of the European influences beyond the slave trade: an indicator for the presence of a colonial railway line, an indicator for the intersection with historical travel routes of major European explorers, and the number of early-twentieth-century Christian missions per square kilometer (Nunn and Wantchekon, 2011).

The final set of controls covers region-of-residence-level variables. First, we control for the average land suitability for agriculture as an important exogenous factor of early development and a contributor to the current prosperity level. We also include a post-treatment measure of local development, namely nighttime luminosity per capita. In addition, we control for regional ethnolinguistic fractionalization using the subnational diversity dataset of Gershman and Rivera (2018b).[22] As argued by Nunn (2008a) and Whatley and Gillezeau (2011), slave trade may have contributed to increased ethnic fractionalization, yet another possible factor influencing cultural beliefs in African regions. Finally, motivated by the

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[20]Religion is represented by four aggregate categories: Christian, Muslim, traditional, and unaffiliated. An overwhelming majority of respondents identify themselves as either Muslims or Christians, with 1.8% of the sample claiming to follow traditional/animist religion and 2.2% unaffiliated. There are three educational categories: completed primary or less, some secondary or completed secondary, post-secondary and higher. Poverty indicator is equal to one, if a respondent reports insufficient money to buy food, health care, or clothing. See appendix A for detailed definitions of all variables.

[21]Hawthorne (2010) argues that the level of political centralization directly affected the susceptibility of societies to slave trade, based on his research on Upper Guinea. Whatley (2014) argues that the direction of causality goes the other way, that is, the slave trade experience affected precolonial African institutions as measured by the structure of political authority.

[22]We use the standard ELF index based on the most detailed list of ethnolinguistic groups. Picking diversity indices constructed for larger linguistic families does not affect the reported results.

studies connecting weather shocks to witch trials (Oster, 2004; Miguel, 2005), we introduce two more regional controls: a measure of rainfall anomaly in the two-year period preceding the surveys and a measure of spatial variability in temperature, both of which are precisely defined in appendix A.[23] As an alternative to including this set of local-level controls, we also present specifications with region fixed effects.

Table 1 shows the estimation results, from the parsimonious model in column 1 to those including additional groups of individual, ethnic, and regional controls in columns 2–4. Models 5 and 6 incorporate region-of-residence rather than country fixed effects into specifications of columns 1 and 4, respectively (regional controls are obviously omitted in the latter case). The top row of the table displays the estimates of interest suggesting that, across specifications, the overall intensity of slave exports at the ethnic-group level is positively and significantly related to contemporary prevalence of witchcraft beliefs. In addition, column 2 reveals some of their sociodemographic correlates.[24] As expected, other things equal, more educated and wealthy individuals are less likely to believe in witchcraft. On the other hand, people who claim to follow traditional/animist religion are more likely to be witchcraft believers than Christians, Muslims, or unaffiliated. Residents of urban areas are also more likely to believe in witchcraft, although the respective coefficient loses statistical significance after controlling for regional-level characteristics. The coefficient estimate on slave exports is somewhat diminished after inclusion of individual-level controls in column 2, consistent with the idea that some of them may reflect specific channels through which slave trade affected witchcraft beliefs. Upon closer examination, as revealed in Table B.1 in appendix B, it is religion rather than poverty, education, or urban location that is the main factor responsible for attenuation in the coefficient of interest.[25] Table B.1 also shows that age and gender are not statistically significant once other sociodemographic factors are being accounted for.

Interestingly, none of the control variables at the ethnicity or regional levels included in models 3 and 4 are statistically significant, while the coefficient on slave exports does not change much relative to its value in column 2. Overall, estimates in columns 1–4 imply that, while controlling for relevant characteristics at the individual, ethnic, and regional levels does reduce the point estimate on slave exports to some extent, it does not appear that the

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[23]Although these measures are conceptually unrelated to the historical slave trade, we include them in the analysis as potentially interesting predictors of witchcraft beliefs in their own right.

[24]These are consistent with the "raw" patterns reported in graphical form by Gershman (2016).

[25]To the extent that witchcraft beliefs represent a layer of traditional African religions, this result is not surprising. Recall, however, that, as mentioned above, the total share of self-identified animists and unaffiliated in our sample is just 4%.

Table 1: Witchcraft beliefs and total slave exports

	(1)	(2)	(3)	(4)	(5)	(6)
Slave exports (total)	0.042***	0.038**	0.036**	0.035**	0.033***	0.039***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.009)	(0.010)
Religion: Muslim		−0.019	−0.024	−0.019		−0.002
		(0.018)	(0.020)	(0.020)		(0.020)
Religion: traditional		0.419***	0.426***	0.424***		0.438***
		(0.062)	(0.062)	(0.063)		(0.058)
Religion: unaffiliated		0.141***	0.175***	0.180***		0.150***
		(0.038)	(0.042)	(0.040)		(0.042)
Education: secondary		−0.036***	−0.038***	−0.038***		−0.037***
		(0.012)	(0.013)	(0.013)		(0.012)
Education: post-secondary		−0.056***	−0.059***	−0.061***		−0.064***
		(0.021)	(0.022)	(0.022)		(0.021)
Poverty indicator		0.034**	0.036**	0.038***		0.033**
		(0.014)	(0.015)	(0.015)		(0.015)
Urban location		0.036**	0.036**	0.030		0.001
		(0.016)	(0.018)	(0.019)		(0.017)
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	Yes	No	Yes
Additional ethnic controls	No	No	Yes	Yes	No	Yes
Regional controls	No	No	No	Yes	No	No
Region FE	No	No	No	No	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	No	No
Observations	19305	18238	16768	16768	19305	16768
Adjusted R^2	0.15	0.17	0.18	0.18	0.20	0.24
Ethnic clusters	309	307	285	285	309	285
Regional clusters	174	174	171	171	174	171

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at both ethnic and regional levels. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Pre-treatment ethnicity-level controls include predominant reliance on agriculture, historical presence of slavery, and mean malaria stability index. e) The set of individual controls also includes age, age squared, gender, and household size (ten categories); respective estimates are omitted for brevity. The reference categories for religion and education are, respectively, "Christian" and "completed primary or less." f) Additional ethnicity-level controls include settlement pattern, political centralization, indicators for colonial railways and European explorer routes, and the density of Christian missions. g) Regional-level controls include nighttime lights per capita, mean land suitability for agriculture, spatial variability of temperature, recent precipitation anomaly, and ELF.

mediating channels captured by these controls are the primary drivers of our relationship of interest. This is consistent with the notion that slave trade directly contributed to the prevalence of witchcraft beliefs through channels pinpointed in section 2, and this effect persisted due to intergenerational cultural transmission. An important limitation of the above analysis is that such "naïve" mediation models containing both mediators and the treatment variable may suffer from the so-called intermediate-variable bias arising from the presence of intermediate confounders, that is, variables influenced by treatment that also affect the mediator and the outcome (Acharya et al., 2016a).[26] In order to account for this issue, we conducted a proper formal mediation analysis exploring the role of poverty, education, and European colonial presence as possible mediators, the details of which are presented in appendix C. Specifically, we relied on the sequential g-estimation method of Acharya et al. (2016a) to capture the average controlled direct effect (after accounting for mediators), or ACDE, of slave exports on witchcraft beliefs, which is identified even in the presence of intermediate confounders. As shown in Table C.1, the ACDEs are similar in magnitude to the baseline coefficient in column 1 of Table 1 (as well as the relevant estimates in Table B.1) suggesting that these three candidate mechanisms did not play an important transmission role and lending credence to the direct nature of the relationship under examination.

Columns 5 and 6 of Table 1 represent perhaps the most stringent specifications which include fixed effects corresponding to subnational regions in the sample. Here, the estimates of interests are based on within-region cross-ethnicity variation in the exposure to historical slave trade. Robustness to this specification strongly points to the role of intergenerational cultural transmission in the propagation of the slave trade shock at the ethnic group level. Overall, our baseline OLS estimates imply that, other things equal, a one-standard-deviation increase in the intensity of slave trade is associated with an average increase in the likelihood of believing in witchcraft by roughly 0.06 standard deviations, or 3 percentage points (5.4% relative to the sample mean of 56% for specifications in columns 3, 4, and 6), a non-trivial magnitude.[27] This roughly corresponds to the difference between representatives of an ethnic group that was not directly affected by the slave trade and the Ndob people of Cameroon whose historical exposure is measured at about 1.4 slaves per square kilometer. An even larger increase in exposure from 0 to 3.8 slaves per square

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[26]As the authors point out, this problem is particularly likely to afflict the studies that examine present-day consequences of historic events and institutions.

[27]As a point of comparison, the coefficient on poverty indicator is of similar magnitude. The IV estimates in section 3.5 suggest that the true impact of the slave trade intensity is substantially larger.

kilometer (corresponding to the Sena people of Mozambique) would be associated with an almost 6 percentage point increase in the prevalence of witchcraft beliefs among co-ethnics.

Given the mechanisms linking the slave trade to witchcraft beliefs explored in section 2, what should matter for our relationship of interest is not just the exposure to slave trade, but the magnitude of this shock. In order to separate between the extensive and intensive margins of the slave trade, we generate a slave trade indicator equal to one for individuals representing ethnic groups with a positive value of historical slave exports and zero, otherwise. In our baseline sample (corresponding to specification in column 1 of Table 1), this indicator is equal to 0 for 146 ethnic groups out of 309, which covers roughly 32% of the sample. We next replace the baseline slave exports measure with the slave trade indicator and rerun our earlier analysis. As the top panel of Table B.2 in appendix B shows, the coefficient estimates of interest are positive across the board and statistically significant at the 10% level in all specifications with country fixed effects. The weakening of statistical significance is to be expected, if the magnitude of the shock is indeed important, since the enormous variation in historical slave exports across ethnic groups (ranging from 0 to about 40 slaves per square kilometer) is reduced to a crude binary indicator. Nevertheless, estimates from baseline specifications in columns 1–4 imply that, other things equal, a representative of an ethnic group historically exposed to *any* volume of slave trade is roughly 4 percentage points more likely to be a witchcraft believer. To explore the intensive margin of the slave trade, we next rerun our baseline regressions for the restricted sample of individuals representing ethnic groups with positive values of historical slave exports. As can be seen in the bottom panel of Table B.2, despite a substantial reduction in sample size, the estimates are positive and statistically significant like those in the unrestricted sample. Furthermore, the standardized estimates are somewhat larger compared to the unrestricted baseline.[28] Overall, this exercise suggests that, consistent with our priors, the size of the slave trade shock reflecting the magnitude of historical trauma did matter for the entrenchment of witchcraft beliefs in affected societies.

As is well-established in the literature, there were substantial differences between the Atlantic and the Indian Ocean slave trades. Importantly, although the latter was in place earlier than the former, the overall scale of the Atlantic slave trade was much greater. Nunn (2008a) cites the estimates, according to which approximately 12 million (surviving) slaves were exported from Africa during the Atlantic slave trade, whereas the Indian, Red Sea, and

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[28]For example, column 1 estimates in the unrestricted and restricted samples imply that a one-standard-deviation increase in the intensity of slave trade is associated with an average increase in the likelihood of believing in witchcraft by, respectively, 0.068 and 0.082 standard deviations (or 3.4 and 4.1 percentage points).

trans-Saharan trades altogether involved 6 million captives. For ethnicities in our sample, the estimates from Nunn and Wantchekon (2011) suggest the totals of around 9.2 and 0.7 million slaves exported during the Atlantic and Indian Ocean slave trades, respectively, between 1400 and 1900. Beyond this difference in the volumes of the two trades, Campbell (2003) summarizes some of their other key contrasting features. First, while the Atlantic slave trade mostly involved African males shipped to the New World plantations or mines, the majority of slaves traded across the Indian Ocean were children and females performing a wide range of domestic services.[29] Male slaves were employed not only in agriculture, but also as administrative workers, craftsmen, and traders. The wide variety of tasks assigned to African slaves in the Indian Ocean world meant that they had a higher tendency to assimilate and learn local languages. Furthermore, violence was rarely used as a means of coercion. Another very important difference is that, unlike in the Atlantic world, slaves traded across the Indian Ocean were *not* commonly captured as a result of raids and trials. Instead, the majority entered slavery through indebtedness. According to Campbell, some people even became slaves voluntarily to gain social security, since, unlike many ordinary freemen, most slaves at least received food and shelter, which improved their chances of survival. Not surprisingly, these differences between the Atlantic and Indian Ocean slave trades have important implications, as shown in previous studies. For instance, only the Atlantic slave trade appears to have affected both the rates of polygamy and attitudes to gender roles in contemporary Africa (Teso, 2019), consistent with biased preferences for male versus female slaves.

In order to acknowledge the distinctive features of the Atlantic and Indian Ocean trades, we re-estimate the models from Table 1 after decomposing the overall slave exports into two categories and include them simultaneously in the regression equation. Table 2 reveals that while the estimates in the top row corresponding to the Atlantic slave exports are all positive, significant, and slightly larger in magnitude than those in Table 1, the estimates in the second row corresponding to the Indian Ocean trade are all tiny and statistically insignificant. Hence, the apparent influence of the slave trade as a whole is only reflective of the Atlantic Ocean trade, which is likely driven by some of the factors discussed above. First, naturally, because of its enormous scale, the Atlantic trade was simply a shock of a much larger magnitude, with deeper and more persistent effects. Second, as mentioned earlier, enslavement during the Indian Ocean trade commonly happened through indebtedness and it appears that witchcraft trials were not actively used to produce captives in

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[29]The main exception were the plantations of the Mascarene islands organized similarly to those in the Americas.

Table 2: Decoupling the slave trades

	(1)	(2)	(3)	(4)	(5)	(6)
Slave exports (Atlantic)	0.046***	0.041**	0.039**	0.038**	0.035***	0.041***
	(0.016)	(0.017)	(0.017)	(0.017)	(0.009)	(0.010)
	[0.015]	[0.016]	[0.016]	[0.016]	[0.008]	[0.009]
	{0.010}	{0.010}	{0.010}	{0.010}	{0.008}	{0.008}
Slave exports (Indian)	−0.014	−0.006	−0.017	−0.013	−0.028	−0.004
	(0.019)	(0.023)	(0.022)	(0.022)	(0.033)	(0.025)
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	Yes	No	Yes
Additional ethnic controls	No	No	Yes	Yes	No	Yes
Regional controls	No	No	No	Yes	No	No
Region FE	No	No	No	No	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	No	No
Observations	19305	18238	16768	16768	19305	16768
Adjusted R^2	0.15	0.17	0.18	0.18	0.20	0.24
Ethnic clusters	309	307	285	285	309	285
Regional clusters	174	174	171	171	174	171

Notes. a) Apart from decoupling the slave trades, model specifications are identical to those in Table 1, see the corresponding notes for details. b) In addition to baseline double clustered standard errors for the main set of coefficients reported in parentheses, the table provides alternative standard errors adjusted for two-dimensional spatial autocorrelation using the method of Conley (1999). The standard errors in square and curly brackets are constructed assuming a window with weights equal to one for observations less than, respectively, five and twenty degrees apart and zero for observations further apart. Significance levels are indicated for baseline standard errors.

East Africa. Interestingly, both the historical evidence on witch trials as a tool of enslavement and the popular narratives about slave traders as witches reviewed in section 2 come exclusively from the Atlantic trade experience. Motivated by the estimates in Table 2, in what follows we focus on the Atlantic slave trade, while keeping the Indian Ocean slave exports as a control variable in all specifications.[30]

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[30]The distinction between the Atlantic and Indian Ocean slave trades is not made in the seminal empirical work by Nunn (2008a) and Nunn and Wantchekon (2011) who only consider aggregate slave exports. However, a simple reanalysis shows that the baseline negative association between slave trade and trust reported by Nunn and Wantchekon (2011) is almost entirely driven by the Atlantic slave trade. This is consistent with both the differential magnitude of the respective shocks and the distinctions in the primary technologies of "slave production" documented for the two types of trade. Specifically, if enslavement in the context of the Indian Ocean trade indeed largely resulted from indebtedness rather than random kidnappings, the culture of mistrust as a means of avoiding captivity becomes less relevant.

As mentioned above, conceptually, it is the overall magnitude of the historical shock that should matter for the relationship of interest, which is why the cumulative volume of slave exports over the period of trade is a good baseline measure. However, along with the magnitude of the shock, its recency may also play a role. Specifically, under intergenerational cultural transmission it is plausible to expect more recent experiences to matter the most. In order to investigate this idea, we make use of the disaggregated slave exports data and estimate selected specifications from Table 2 separately for each century between 1400 and 1900.[31] Table B.3 in appendix B shows the estimation results, where the coefficient estimates are standardized to enhance comparability of magnitudes. It is clear that indeed, slave exports in the nineteenth century are most strongly and significantly related to contemporary witchcraft beliefs, even compared to the cumulative baseline. The other centuries generally yield positive but much smaller estimates, consistent with the notion that the cultural impact of the slave trade is fading over time.

Tables 1 and 2 demonstrate that our baseline estimates are rather insensitive to the many included potentially confounding factors and the coefficient of interest is stable across specifications. Still, there could be certain relevant unobservable or imperfectly measured characteristics that bias our results. We thus implement a procedure developed by Oster (2019) which allows to evaluate the magnitude of selection bias based on the changes in the coefficient estimate of interest and the R^2 in response to the inclusion of additional control variables. In order to do so, we calculate Oster's delta values interpreted as the degree of selection on unobservables relative to observables that would be necessary to completely explain away the baseline result. For specifications in columns 4 and 6 of Table 2, these delta values are equal to 6.3 and 2.5, respectively, suggesting a very high degree of selection on unobservables required to "overthrow" the main result.[32]

Finally, Table 2 shows two sets of alternative standard errors (associated with the main coefficients of interest) that are adjusted for two-dimensional spatial autocorrelation using the method of Conley (1999). As recently argued by Kelly (2019), in order to properly account for spatial autocorrelation in the error terms when applying the Conley procedure,

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[31]The data for 1400s and 1500s are lumped together in the original dataset. Importantly, the coverage of ethnic groups and the magnitude of trade varies dramatically across these four centuries. For example, the number of groups with positive Atlantic trade exports (within the baseline sample of 309 ethnicities) is 22, 24, 55, and 111 for respective centuries. The mean values of the normalized log measure of the Atlantic exports are only 0.017 and 0.063 for 1400–1500s and 1600s, whereas for 1700s and 1800s they are 0.13 and 0.1. Century-by-century estimates should be viewed with these caveats in mind.

[32]In these calculations, we set the value of $R_{\max}$ equal to $1.3\tilde{R}$, where $\tilde{R}$ is the R^2 in the respective regression with the full set of controls (Oster, 2019).

one has to choose a large enough "distance window" encompassing spatially related obser-
vations. Hence, we calculate the standard errors for two spatial cutoff values: 5 degrees,
as done by Nunn and Wantchekon (2011), and 20 degrees, which is the most conservative
value yielding the lowest t-statistic in Kelly's simulations for his sample of African tribes.
The estimates based on the 5-degree cutoff shown in square brackets are somewhat smaller
than the baseline double-clustered standard errors thus increasing the statistical signifi-
cance of our coefficient estimates. Even more notably, the "conservative" cutoff value of
20 degrees yields substantially *lower* standard errors (reported in curly brackets). This is
not particularly surprising since the outcome of Conley correction obviously depends on
specific spatial pattern present in the data. It should also be emphasized that our anal-
ysis does not explore spatial persistence per se but rather focuses on cultural persistence
across generations within ethnic groups. Most bluntly, in specifications with subnational
region fixed effects, we are comparing representatives of different ethnic groups residing in
the same province and exploit the differential historical exposure of their ancestors to the
Atlantic slave trade thus moving even closer to isolating the cultural transmission channel
as opposed to capturing any mechanical spatial persistence.

3.3   Other beliefs in the supernatural

As follows from earlier studies, the slave trade era left a massive imprint on culture across
Sub-Saharan Africa. Existing beliefs and values had to be reconsidered in light of the
gruesome reality of the "cannibalistic trade." Reinforcement of witchcraft beliefs appears
to have been one of such cultural responses, but one may also wonder whether the slave
trade experience had a similarly persistent impact on other beliefs in the supernatural.
For instance, according to Law (2011), enslaved individuals commonly believed that after
death their souls would return to Africa, which sometimes led to suicide in attempt to get
back home. Bay (2001), based on her research on Dahomey, hypothesizes that *bo*, special
protective charms still used in the region today, became popular during the slave trade era
as a means of reducing the likelihood of capture and dealing with insecurity and anxiety.

To address this issue, we exploit the data on other beliefs available in the Pew Forum
survey. Specifically, the module used to construct our measure of witchcraft beliefs starts
with a common preamble "Which, if any, of the following do you believe in?" and contains
the following additional items: 1) heaven, where people who have led good lives are eter-
nally rewarded; 2) hell, where people who have led bad lives and die without being sorry
are eternally punished; 3) reincarnation – that people will be reborn in this world again
and again; 4) angels; 5) miracles; 6) evil spirits; 7) that sacrifices to spirits of ancestors

can protect you from bad things happening; 8) that certain spiritual people can protect you from bad things happening; 9) that juju, shrines, or other sacred objects can protect you from bad things happening. We estimate the relationship between these beliefs and the Atlantic slave trade using the same specifications as earlier for witchcraft beliefs.

Table 3 reveals the results while also replicating the earlier estimates for witchcraft beliefs in the bottom right corner for reference. It is clear that, with the exception of witchcraft beliefs and beliefs in evil spirits in the bottom panel of the table, none of the superstitions listed in Table 3 are robustly associated with historical slave exports.[33] Thus, it appears that witchcraft beliefs are a special element of local culture in terms of being related to the slave trade experience, in line with the narratives outlined in section 2.

3.4 Witchcraft, mistrust, and the slave trade

In their seminal study, Nunn and Wantchekon (2011) have shown that higher intensity of historical slave trades directly contributed to persistently lower levels of trust across ethnic groups in Sub-Saharan Africa, consistent with the idea that mistrust was a useful norm which permitted to stay relatively safe during the dangerous times of slave raids. More recently, Gershman (2016) has demonstrated that the local prevalence of witchcraft beliefs in Sub-Saharan Africa is negatively associated with trust and various indicators of proso-cial behavior, possibly reflecting the formation of antisocial attitudes due to the fears of bewitchment and witchcraft accusations. The present investigation has so far argued that contemporary variation in the prevalence of witchcraft beliefs in Sub-Saharan Africa represents in part a cultural legacy of the Atlantic slave trade. This triad of interrelated results raises two natural questions. First, is trust a yet-unaccounted-for important omitted variable that could explain the connection between witchcraft beliefs and slave trade? Second, is the propagation of witchcraft beliefs a possible transmission channel in the relationship between mistrust and slave trade? In other words, to what extent are witchcraft beliefs and mistrust two distinct outcomes of the slave trades rather than mediating channels?

To address the first question, we introduce trust as an additional individual-level control variable. The are two relevant items in the Pew Forum survey, one of which is the standard "generalized trust" question while the other captures trust in people of other religion. The first trust indicator equals unity, if a respondent believes that "most people can be trusted," and the second indicators equals unity, if a respondent "generally trusts people who have different religious values." Table 4 demonstrates that the inclusion of either measure of

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[33]Significant results for beliefs in evil spirits are not surprising since these are closely related to witchcraft beliefs, with the pairwise correlation coefficient equal to 0.63 in the full sample.

Table 3: Atlantic slave trade and various beliefs in the supernatural

	Heaven			Hell		
Slave exports (Atlantic)	0.005	0.005	−0.003	0.010	0.008	0.006
	(0.004)	(0.003)	(0.005)	(0.007)	(0.007)	(0.009)
Observations	18767	17267	17267	18638	17146	17146
Ethnic clusters	307	285	285	307	285	285
Regional clusters	174	171	171	174	171	171
	Reincarnation			Angels		
Slave exports (Atlantic)	0.017	0.023*	0.014	0.010	0.005	0.006
	(0.013)	(0.013)	(0.011)	(0.008)	(0.009)	(0.010)
Observations	17510	16111	16111	18457	16975	16975
Ethnic clusters	307	285	285	308	286	286
Regional clusters	174	170	170	174	170	170
	Miracles			Sacrifices		
Slave exports (Atlantic)	0.019**	0.013*	0.007	0.005	0.002	0.006
	(0.008)	(0.007)	(0.010)	(0.011)	(0.012)	(0.013)
Observations	18434	16934	16934	18290	16836	16836
Ethnic clusters	308	286	286	307	285	285
Regional clusters	174	171	171	174	171	171
	Spiritual people			Juju		
Slave exports (Atlantic)	0.015	0.014	0.022*	0.003	0.001	0.014
	(0.012)	(0.012)	(0.011)	(0.010)	(0.012)	(0.015)
Observations	18309	16863	16863	18064	16643	16643
Ethnic clusters	308	286	286	307	286	286
Regional clusters	174	170	170	174	170	170
	Evil spirits			Witchcraft		
Slave exports (Atlantic)	0.037**	0.031**	0.040***	0.041**	0.038**	0.041***
	(0.015)	(0.015)	(0.009)	(0.017)	(0.017)	(0.010)
Observations	18354	16852	16852	18238	16768	16768
Ethnic clusters	307	285	285	307	285	285
Regional clusters	174	171	171	174	171	171
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Additional ethnic controls	No	Yes	Yes	No	Yes	Yes
Regional controls	No	Yes	No	No	Yes	No
Region FE	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	No	Yes	Yes	No

Notes. Apart from the outcome variables, specifications are identical to those in columns 2, 4, and 6 of Table 2.

Table 4: Witchcraft beliefs and the Atlantic slave trade: controlling for trust

	(1)	(2)	(3)	(4)	(5)	(6)
Slave exports (Atlantic)	0.038[**]	0.038[**]	0.030[*]	0.030[*]	0.032[***]	0.032[***]
	(0.018)	(0.018)	(0.017)	(0.017)	(0.012)	(0.012)
Trust (generalized)		−0.018		−0.012		−0.000
		(0.015)		(0.016)		(0.014)
Observations	17248	17248	15066	15066	15066	15066
Ethnic clusters	306	306	283	283	283	283
Regional clusters	174	174	171	171	171	171
	(7)	(8)	(9)	(10)	(11)	(12)
Slave exports (Atlantic)	0.043[***]	0.043[***]	0.034[**]	0.034[**]	0.037[***]	0.037[***]
	(0.016)	(0.017)	(0.017)	(0.017)	(0.011)	(0.011)
Trust (other religion)		−0.032[**]		−0.030[**]		−0.019
		(0.013)		(0.013)		(0.012)
Observations	18255	18255	15947	15947	15947	15947
Ethnic clusters	309	309	285	285	285	285
Regional clusters	174	174	171	171	171	171
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	No	Yes	Yes	Yes	Yes
Additional ethnic controls	No	No	Yes	Yes	Yes	Yes
Regional controls	No	No	Yes	Yes	No	No
Region FE	No	No	No	No	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	No	No

Notes. Apart from controlling for individual trust, specifications in even-numbered columns are identical to those in columns 1, 4, and 6 of Table 2. Specifications in odd-numbered columns provide reference estimates for cases when individual trust is not accounted for.

trust (top and bottom panels, respectively) does not have any noticeable impact on the coefficient of interest relating Atlantic slave trade and witchcraft beliefs. Thus, it does not seem to be the case that the depletion of trust due to the slave trade experience explains our main result so far.[34]

Next, we mimic the setup in Nunn and Wantchekon (2011) to see whether it is the prevalence of witchcraft beliefs that mediates the relationship between trust and slave

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[34]A mediation analysis using the approach described in appendix C yields the same conclusion.

trade.[35] We expand the dataset used in their study, namely the third round of the Afrobarometer (2005–2006), to include two subsequent rounds, the fourth (2008–2009) and the fifth (2011–2013), in order to increase both the sample size and the number of regions, for which the prevalence of witchcraft beliefs can be calculated using the Pew Forum surveys. The latter is especially important since the data on individual-level witchcraft beliefs are absent in the Afrobarometer surveys.

We explore three questions capturing interpersonal trust (in relatives, neighbors, and acquaintances) and three questions capturing trust in institutions (police, courts, and local council). Unlike binary measures from the Pew Forum surveys, the Afrobarometer codes the responses to each trust question on the ordinal 0–3 scale, from "not at all" to "a lot." We set up the regression equations in the same way as earlier and use sociodemographic individual-level controls that are closest to the metrics used above: age, age squared, gender, religion (5 categories), education (10 categories), urban location dummy, and two proxies for wealth, namely employment status (four categories) and living conditions (five categories). In addition to country fixed effects, the Afrobarometer regressions also include dummies for survey rounds.

The results are reported in Table 5. First, consistent with Nunn and Wantchekon (2011) and Gershman (2016), trust is negatively related both to slave exports (with the exception of trust in acquaintances) and the regional prevalence of witchcraft beliefs. Second, in all six cases, controlling for regional witchcraft beliefs has only a minuscule impact on the primary coefficients of interest.

Overall, the findings in this section imply that, rather than being mediating channels, mistrust and witchcraft beliefs represent related parts of the long-term cultural legacy of the Atlantic slave trade, a bundle of mutually reinforcing antisocial beliefs and attitudes.[36]

3.5 IV estimates

Earlier analysis shows that the positive relationship between exposure to the Atlantic slave trade and witchcraft beliefs is robust to the inclusion of numerous control variables at different levels of observation. Furthermore, Oster's delta values imply that the degree of

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[35]Note that such an exercise can also be performed based solely on the Pew Forum sample using the two available trust questions as outcome variables. In that analysis, the relevant point estimates on slave exports have the "correct" negative sign but are statistically insignificant. This could be due, among other things, to the differences in trust measures and the sets of countries covered by the Pew Forum and Afrobarometer surveys.

[36]Admittedly, the analysis of this section should be treated with caution due to endogeneity of the relationship between the examined triad of variables.

Table 5: Trust and the Atlantic slave trade: controlling for witchcraft beliefs

	Relatives		Neighbors		Acquaintances	
	(1)	(2)	(3)	(4)	(5)	(6)
Slave exports (Atlantic)	-0.041^{**}	-0.039^{**}	-0.049^{**}	-0.046^{**}	-0.024	-0.022
	(0.016)	(0.017)	(0.019)	(0.020)	(0.021)	(0.021)
Witchcraft (region)		-0.391^{***}		-0.510^{***}		-0.411^{**}
		(0.102)		(0.157)		(0.192)
Observations	41454	41454	28806	28806	29393	29393
Adjusted R^2	0.12	0.12	0.17	0.17	0.15	0.15
Ethnic clusters	193	193	185	185	186	186
Regional clusters	136	136	133	133	136	136
	Police		Courts		Local council	
	(7)	(8)	(9)	(10)	(11)	(12)
Slave exports (Atlantic)	-0.036^{**}	-0.034^{**}	-0.051^{***}	-0.049^{***}	-0.064^{***}	-0.062^{***}
	(0.016)	(0.017)	(0.014)	(0.015)	(0.013)	(0.014)
Witchcraft (region)		-0.402^{***}		-0.360^{***}		-0.332^{***}
		(0.143)		(0.116)		(0.109)
Observations	40690	40690	39816	39816	39790	39790
Adjusted R^2	0.19	0.19	0.10	0.10	0.14	0.14
Ethnic clusters	193	193	193	193	193	193
Regional clusters	136	136	136	136	136	136

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at both ethnic and regional levels. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) All specifications include the full set of individual, ethnic, and regional controls, along with country and survey round fixed effects. Individual-level controls are age, age squared, gender, education, employment status, religion, and living conditions. The other controls are exactly the same as the ones listed in the notes to Table 1, plus the Indian Ocean slave exports. e) The outcome variables are measured on the ordinal 0–3 scale.

selection on unobservables would have to be very high in order to explain away this result. Still, one should be cautious when interpreting the baseline OLS estimates as causal, since the variation in slave trade intensity is not exogenous. In addition, if extracting slaves from societies with widespread witchcraft beliefs was easier, a variation of a reverse-causality argument could be made under the assumption of long-term cultural persistence.[37] It is also important to keep in mind that the estimates of slave exports are imprecise, and this measurement error could bias the OLS estimates downwards. In order to mitigate these

issues, in this section we use an instrumental variables strategy based on two plausible sources of conditionally exogenous variation in the intensity of slave trade.

First, following the literature on slave trades going back to Nunn and Wantchekon (2011), we measure the distance from the centroid of each ethnic group's historical homeland to the coastline and use this variable as an instrument for slave exports. As widely documented in historical narratives, slave raids generally proceeded from the coast toward the inland part of the continent, which minimized transportation and other costs for slave traders since slaves were purchased at the coast. Second, as an alternative, we measure the distance to the closest major slave trade port in Africa, a related and arguably more relevant predictor of exposure to slave raids. We follow several steps to construct this instrument. First, we identify the geographic coordinates of all embarkation ports in Africa according to the latest version of *Voyages: The Trans-Atlantic Slave Trade Database* (2016), a process yielding 122 unique well-defined locations.[38] We then look at the imputed total number of slaves embarked at each of these ports over the relevant time period.[39] The volume of exports varies dramatically across ports, from 13 slaves in Trade Town to 1.4 *million* in Luanda. To take into account this obvious difference in the importance of ports and thus increase the strength of our instrument, we only select the ports in the first quartile of the slave exports distribution, a set including 32 locations where the total number of embarked slaves exceeded 42000 people. Finally, we measure the distance from the centroid of each ethnic homeland to the closest major port.

Although there is little doubt about the relevance of these instruments, in order to yield consistent estimates they need to additionally satisfy the crucial exclusion restriction, that is, distance to the coast (or to the major slave port) must affect the prevalence of witchcraft beliefs only through its effect on the Atlantic slave exports. In this regard, one concern may be that distance to the coast is historically associated with long-distance maritime trade in general and, through this channel, with initial economic development which could have also affected the salience of witchcraft beliefs. However, as pointed out by Nunn and Wantchekon (2011), there was no such trade in Sub-Saharan Africa prior to the Atlantic and Indian Ocean slave trades. Another concern is that distance to the coast may be

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[37]For example, higher historical prevalence of witchcraft beliefs could have facilitated slave extraction via witch trials. On the other hand, if witchcraft beliefs reinforce mistrust (Gershman, 2016), there is a countervailing effect: cautious mistrustful societies should have been less susceptible to raids (Nunn and Wantchekon, 2011).

[38]The dataset and its detailed description are available at `http://slavevoyages.org`.

[39]We follow Fenske and Kala (2015) and distribute the total number of slaves from unknown ports in known regions in proportion to slave exports at known ports within that region.

associated with various types of European contact including colonial rule. As mentioned at the beginning of section 3.2, we explicitly control for a host of proxy characteristics associated with the determinants of colonial rule as well as direct measures of European presence in the form of colonial railway lines, historical travel routes, and early-twentieth-century Christian missions. One could also argue that historical distance of an individual's ethnic group from the coast may be associated with her current distance to the coast which may in turn be correlated with her personal belief in witchcraft. For instance, residents of large urban agglomerations along the coast may differ in their beliefs from those living in the continent's interior, possibly due to income and educational differences. Fortunately, our analysis directly controls for education, urban location, and a poverty indicator at the individual level and for regional development as captured by nighttime luminosity per capita. Finally, inspired by Nunn and Wantchekon (2011), in section 5, we show that distance to the coast is completely unrelated to witchcraft beliefs in a sample of regions outside the Atlantic world. Such placebo test mitigates the remaining concern about this instrument possibly affecting witchcraft beliefs via unaccounted-for channels other than the slave trade. Overall, while an exclusion restriction cannot be formally tested, the above strategies increase our confidence in the validity of proposed instruments.

The two panels of Table 6 show the IV estimates for selected specifications from Table 2 using two alternative instruments for slave exports introduced above. Across specifications, the coefficient of interest is positive and statistically significant. Compared to OLS values in Table 2, the magnitude of estimates is always substantially larger. This increase is more pronounced for the distance to the coast instrument, in which case the coefficient of interest for three relevant specifications goes up by factors of 2.9, 4.8, and 3.4, respectively. For our second instrument, the IV estimates exceed their OLS counterparts by factors of 1.5, 2, and 1.9. Comparison of the first-stage F-statistics in Table 6 shows that, consistent with priors, our second instrument capturing distance to major embarkation ports is always stronger than simple distance to the coast.[40]

In both cases, our IV analysis suggests that the baseline OLS estimates understate the true impact of the Atlantic slave trade on contemporary witchcraft beliefs. This is consistent with the notion that the data on ethnicity-level volumes of slave exports are

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[40]Limiting the set of ports to the top quartile substantially raises the strength of the instrument. For instance, the first-stage F-statistic falls to 13.72 for specification in column 5 of Table 6, if we define relevant ports as those with above-median volume of exports, and further to 11.83, if all ports, no matter how small, are included. Reducing the set of ports to even larger ones, namely the top decile, makes the instrument less strong compared to the baseline, with an F-statistic of 18.29. The qualitative results remain similar regardless of the chosen set of ports.

Table 6: Witchcraft beliefs and slave exports: IV estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	IV: Distance to the coast			IV: Distance to the port		
Slave exports (Atlantic)	0.123***	0.168***	0.132**	0.084**	0.086**	0.071*
	(0.044)	(0.058)	(0.054)	(0.034)	(0.041)	(0.042)
Kleibergen-Paap F	14.37	15.76	14.02	18.47	22.09	17.57
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Additional ethnic controls	No	Yes	Yes	No	Yes	Yes
Regional controls	No	Yes	No	No	Yes	No
Region FE	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	No	Yes	Yes	No
Observations	19305	16768	16768	19305	16768	16768
Ethnic clusters	309	285	285	309	285	285
Regional clusters	174	171	171	174	171	171

Notes. a) IV/2SLS estimates in all columns. b) Standard errors shown in parentheses are clustered at both ethnic and regional levels. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) The sets of control variables are defined identically to those in Table 1. e) Slave exports in the Indian Ocean trade are controlled for in all specifications. f) First-stage regression estimates are reported in Table B.4 in appendix B.

noisy. Furthermore, if the raids in one ethnic homeland positively affected the prevalence of witchcraft beliefs among neighboring groups via a plausible spillover effect, the true impact of slave trade is further underestimated in the OLS framework. Our second set of IV estimates suggests that, other things equal, a one-standard-deviation increase in the intensity of slave trade is associated with an average increase in the likelihood of believing in witchcraft by roughly 0.13 standard deviations (close to 7 percentage points, or 12% of the sample mean), a substantial magnitude, similar, for instance, to the reported negative effect of slave trade on trust (Nunn and Wantchekon, 2011).

4 Evidence from Latin America

According to the *Trans-Atlantic Slave Trade Database*, 96.3% out of roughly 10.5 million African captives disembarked in the New World landed in Latin America and the Caribbean, with close to 5 million people arriving in Brazil alone.[41] This forced relocation

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[41]Thus, destinations in mainland North America, including ports in the United States and Canada, only account for about 3.7% of all arrivals. The original estimates are available at `https://slavevoyages.org/assessment/estimates` (accessed in June 2017).

of Africans had a massive impact on the economy and society of Latin America and, along with European migrations, transformed the population structure of the continent.[42] Without a doubt, the Atlantic slave trade also shaped the cultural landscape of the continent, although the extent to which the original elements of African culture were preserved or recreated in the New World is being debated (Morgan, 1997).

4.1   Witchcraft beliefs in the transatlantic cultural exchange

The cultural legacy of the Atlantic slave trade in Latin America and the Caribbean is perhaps most visible in the popular syncretic religions combining elements of African beliefs and Christianity. Santería, Candomblé, Voodoo, and Obeah are the well-known examples of such mixed religious traditions. Here, we focus more narrowly on the possible transmission of witchcraft beliefs across the Atlantic Ocean. Indeed, historical evidence implies that such beliefs did represent an important element of the transatlantic cultural exchange that had a peculiar relationship to the slave trade experience. Sweet (2003) and Hawthorne (2010) provide detailed accounts of how certain core spiritual beliefs and rituals, common to the cultures of various ethnic groups, were transferred from the Atlantic coast of Africa to Brazil. Among these, beliefs in witchcraft and sorcery, or *fetiçaria*, as it was known to the Portuguese, were instrumental in providing a framework for understanding evil and misfortune. As the following discussion shows, witchcraft beliefs were not just brought to the Americas, but also reconfigured to fit the realities of slavery.

The evidence presented in section 3 shows that the slave trade experience appears to have fostered witchcraft beliefs among the affected groups in Sub-Saharan Africa. Thus, it is not surprising that the captives held on to the perception of their ordeal as a form of witchcraft during the middle passage, as already documented in section 2 above in a quote from Alonso de Sandoval, a Jesuit priest observing the newly arrived slaves in the 17th-century Cartagena. Schuler (1979) further argues that the common circumstances in which enslaved Africans found themselves and the "shipmate" experience in particular created a "fictive kinship" among them based on shared cultural norms. One manifestation of this solidarity was "the common conviction that malicious sorcery played a part in their misfortune" (p. 124). Similarly, Paton (2012) remarks that "on forced marches to the African coast, on board slave ships, and in their new Atlantic settings, enslaved people

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[42]According to one recent estimate, as of 2010, the Afro-descendant population of Latin America exceeded 130 million people constituting almost a quarter of the regional total (Andrews, 2016). This includes an estimated 97 million Afro-descendants in Brazil, 15 million in Venezuela, and 8 million in the Dominican Republic. The sample does not cover Belize, Guatemala, the Guianas, and smaller Caribbean islands.

were likely to interpret what had happened and was happening to them as the result of religious malevolence" (pp. 248–249). Interestingly, Christian rituals applied to slaves, such as baptism, were typically understood by them as a "means of further ensuring European "enchantment" or power over Africans" (Sweet, 2003, p. 197).

Just like at the source, in Africa, and during the middle passage, at their destination in Latin America, the captives applied a familiar cultural framework to interpret their position in slavery-based societies. In this system of coordinates, their miserable lives were the direct result of witchcraft, and the witches they had to deal with were their masters and aligned elites. As pointed out by several authors, this view reflects the reliance of slaves on their culture as a form of resistance. Schuler (1979) explains how the perception of slave owners as sorcerers helped to define slave resistance in the context of Myalism, an "Afro-Jamaican religious movement with a sorcery-eradication focus" which viewed Europeans and assimilated African elites as ultimate sorcerers (p. 131). Among the forms of resistance, self-protection through charms and "ritual confrontation" with masters-sorcerers complemented strikes, revolts, and other efforts to build a united slave community. Similarly, in the context of Brazil, Sweet (2003) describes vividly how witchcraft beliefs and related practices among slaves were both a common way to deal with their hardships and a powerful tool of cultural resistance, "a stealthy, silent killer of the hated master, and a very real threat to the colonial status quo" (p. 160).[43] Palmié (2002) recites an account by Esteban Montejo, a former slave who worked on the Cuban plantation of Flor de Sagua in the early 1870s, of a "mayombe" ritual in which slaves "engaged in a kind of mystical warfare against abusive owners" (p. 177). Echoing other historians, Palmié concludes that witchcraft beliefs provided the slaves with both an explanation of their predicament and a tool of resistance, and "countering witchcraft with violent sorcery became a political means of restoring moral balance" (p. 181). The persistence of witchcraft beliefs within enslaved communities and their role as a tool of cultural resistance against the masters are consistent with the idea that such beliefs effectively leverage coalitional psychology to promote group survival (Parren, 2017).

In many cases, slave resistance based on performing traditional rituals actually worked. In a remarkable inversion, African slaves were often viewed by their masters and church officials as witches, and their practices were feared. As Sweet (2003) puts it, the masters

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[43]In the same vein, Reis (2011) explores how Candomblé, a popular Brazilian syncretic religion incorporating witchcraft beliefs as an integral element, "helped slaves to cope with and even overcome slavery" in nineteenth-century Bahia (p. 56). It was widely believed that witchcraft could be used by slaves to obtain freedom or even kill their masters. Some of the common spells sought from the professed sorcerers were aimed at taming the masters or softening their willpower (p. 69).

"were acutely aware of the "diabolical" power of African religions, and many lived in constant fear of the "witchcraft" that their slaves might cast upon them" (p. 159). He describes a number of cases from the 17th- and 18th-century Brazil of black slaves engaging in various rituals in order to protect themselves from their masters or even directly harm them via supernatural means. Interestingly, Sweet cites Father André João Antonil warning those masters who administered excessive punishments that they risked revenge from their slaves in the form of witchcraft or poison (pp. 165–166). Olwig (1995) recounts the view of Johan Lorentz Carstens, a prominent 18th-century plantation owner and slave holder from St. Thomas, who apparently believed that some of his slaves were the masters of witchcraft and were able to "project such things as a lump of hair, cut-off nails, and sharp, thin pieces of rusty iron into the bodies of human beings, causing them to die in a short time" (p. 34). The fears of such supernatural abilities may even have been behind a 1701 act making it mandatory that slaves receive instruction in Christianity so that "their wild souls, old bad habits, idolatry, witchcraft, murder and evil would be weakened and broken."

Hawthorne (2010) shares multiple cases documented by priests in the 18th-century Maranhão in which African slaves were either accused of *fetiçaria* or described as trying to counteract it by using protective charms identical to those found across the ocean in their Upper Guinean homeland.[44] Recall that, as described in section 2, witchcraft trials were commonly used to "produce" slaves in Sub-Saharan Africa. Indeed, Hawthorne notes ironically that, since Upper Guineans often sold witches as slaves, one expected to find a considerable number of skilled practitioners of witchcraft in Maranhão (p. 239). Interestingly, Sweet (2003) points out that the Catholic Church in Central Africa was known to condemn African healers to slavery, as a result of which "a disproportionate number of African diviners/healers probably found their way into the slave population of Brazil, thereby exaggerating their influence among Brazil's slaves" (p. 198). Sweet summarizes this odd witchcraft-based confrontation between African slaves and their European masters as a "witch versus witch" battle: "Africans, who understood their enslavement to be the result of Portuguese religious malevolence, countered with their most powerful religious antidotes, which were recognized and feared by the Portuguese as "witchcraft." In their attempts to counter the slings and arrows of slavery – mistreatment, malnutrition, disease, kinship instability, and so on – African slaves (and freed Africans) mounted a steady religious assault against the white witches who were causing them such grave misfortune" (p. 164).

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[44]Interestingly, some of the Europeans in Brazil also wore protective "Mandinga pouches" and consulted with black healers in Amazonia, borrowing African practices that were actually not that different from those still present in Portugal at that time (p. 243).

Thus, historical evidence indicates that witchcraft beliefs clearly found their place in slavery-based colonies of Latin America. To African slaves, these beliefs apparently served both as a framework for identifying the sources of their suffering and as a tool of cultural resistance against powerful masters. The latter, in turn, often saw the actions of their slaves as witchcraft and even borrowed some of the African supernatural protection practices in response. It is also plausible that, over time, witchcraft beliefs were transmitted across generations of slaves and their descendants, as well as Europeans and other residents of the continent who were likely to acquire or reinforce such beliefs via their interactions with African culture. The following section formally investigates whether the consequences of this cultural import can be detected in the contemporary data from Latin America.

4.2   Data and empirical analysis

Between October 2013 and February 2014, the Pew Research Center conducted a wave of public opinion surveys, similar to those used in the analysis of section 3, in 18 countries across Latin America and the Caribbean (plus Puerto Rico).[45] These surveys involved over 30000 face-to-face interviews and focused on religious beliefs and practices, as well as social and political views. Just like in the African wave of surveys, the standard questionnaire contained a module on traditional beliefs which allows us to construct individual-level measure of witchcraft beliefs in a consistent way.[46] According to the baseline definition, witchcraft believers constitute 57% of the full Latin American sample and their prevalence rate ranges from about 45% in Bolivia to over 75% in Honduras.[47]

If witchcraft beliefs were indeed of particular importance to African slaves in Latin America and represented a unique part of their cultural heritage, under vertical transmission one should expect to observe a higher prevalence of believers among Afro-descendants relative to other ancestral groups. To explore this channel of persistence, we first clas-

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[45]These include Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. Both Chile and Puerto Rico drop out from our analysis since the key information on race/ethnicity is missing in these two cases. The "Religion in Latin America" dataset is available at http://www.pewforum.org/datasets.

[46]In Latin American surveys, the witchcraft question inquires whether respondents believe that "magic, sorcery or witchcraft can influence people's lives." The "evil eye" question is identical to that in the African wave of surveys. As in section 3, witchcraft believers are defined as those who replied "yes" to at least one of these questions.

[47]The share of respondents who could not be identified as either believers or non-believers due to "don't know" answers and refusal to reply is 2.24% in the full sample. These are dropped from further analysis.
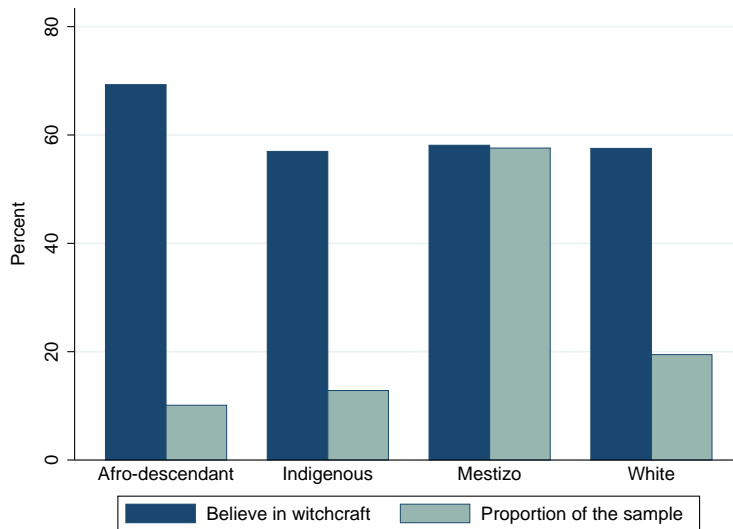
Figure 1: Ancestry and witchcraft beliefs in the Latin American sample.

sify the respondents by ancestry/race and pinpoint the crucial group of Afro-descendants which includes people self-identifying as black, of African descent, mulatto, or giving other similar responses. The other three ancestral categories are white, indigenous, and mestizo. Whites largely represent the descendants of Europeans, the "indigenous" group combines all the numerous Amerindian populations of relevant countries, while mestizos represent mixed-race people of European, African, and indigenous origins. Although none of the four categories are homogeneous, the mestizo group is perhaps the trickiest to character-ize, not just because it is by definition a mixed category, but also because the proportions of different ancestries among mestizos vary across countries and regions in Latin Amer-ica.[48] Having this caveat in mind, it is reasonable to expect a fair share of African ancestry among the mestizo populations, particularly in countries like Brazil and Venezuela.

In the main sample of 17 countries for which the information on race or ethnicity is available, 10.1% of respondents self-identify as Afro-descendants, close to 13% are indige-nous, 19.5% are white, and over 57% are mestizo. As Figure 1 shows, the prevalence of witchcraft beliefs among Afro-descendants (69.3%) is higher relative to other groups (57-58%), consistent with the idea of intergenerational cultural transmission of historically relevant beliefs among black population. Naturally, given the long history of racial discrimi-nation and persistent racial inequality in income, literacy rates, and access to infrastructure in Latin America (Andrews, 2016), it is important to control for potentially confounding sociodemographic characteristics of the respondents rather than making inference based

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[48]See Adhikari et al. (2016) for an overview of genetic studies on admixture in Latin America.

on the raw percentages. Thus, we compile a set of such characteristics, similar to the ones used in section 3 for the African sample, including education, poverty indicator, and urban location dummy, on top of the basic age, gender, and household size measures.[49] We also control for the overall level of economic development at the regional level as measured by nighttime lights per capita. Note that in the Latin American sample, data on the region of residence are available at a highly disaggregated level for most countries, adding up to more than 1000 subnational units.[50]

Our baseline estimating equation is

$$\text{witch}_{i,r,c} = \alpha_c + \beta \, \text{ancestry}_{i,r,c} + \mathbf{X}'_{\mathbf{i,r,c}}\Gamma + \mathbf{X}'_{\mathbf{r,c}}\Omega + \varepsilon_{i,r,c}.$$

The binary outcome variable $\text{witch}_{i,r,c}$ captures whether individual i residing in region r of country c believes in witchcraft or not, and $\text{ancestry}_{i,r,c}$ is either a categorical variable reflecting the four-way classification introduced above or an Afro-descendant dummy. Control variables at the individual and regional levels are represented by vectors $\mathbf{X}'_{\mathbf{i,r,c}}$ and $\mathbf{X}'_{\mathbf{r,c}}$, respectively. Finally, α_c corresponds to country fixed effects and $\varepsilon_{i,r,c}$ is the individual-level idiosyncratic component. The model is estimated via OLS, with standard errors clustered at the regional level.[51]

The estimation results are shown in Table 7, where specifications in columns 1–3 and 4–6 use the four-way ancestry classification and the Afro-descendant indicator, respectively, as the main variable of interest. The coefficient estimate in the top row of column 1 shows that, other things equal, Afro-descendants are, on average, 6.8 percentage points more likely to believe in witchcraft than whites. Both indigenous and mestizo individuals are also more likely to be witchcraft believers than whites, but the relevant point estimates are about half the size of that for Afro-descendants. Furthermore, column 2 shows that part of this association is explained away by the omitted socio-demographic characteristics. After controlling for education, poverty indicator, and other relevant measures, the point estimate on the indigenous category drops dramatically and becomes statistically insignificant, whereas the estimates for Afro-descendants and mestizos remain significant, despite a notable reduction in size. Accounting for individual and regional characteristics, Afro-descendants and mestizos are, respectively, 5 and 2.7 percentage points more likely than

[49]Due to regional differences, religion and education categories are somewhat different across the two continents, see appendix A for the detailed description of all relevant variables.

[50]Still, for Mexico, Argentina, Ecuador, Paraguay, Bolivia, and Uruguay, regions represent first-level subnational administrative units. To take into account the difference in the size of regions in the sample, we additionally control for region area.

[51]Maximum likelihood estimation of equivalent probit specifications yields very similar results.

Table 7: Witchcraft beliefs and African ancestry in Latin America

	(1)	(2)	(3)	(4)	(5)	(6)
	Four-way classification			Afro-descendant indicator		
Afro-descendant	0.068***	0.050***	0.050***	0.041***	0.035***	0.034***
	(0.017)	(0.016)	(0.016)	(0.013)	(0.013)	(0.013)
Indigenous	0.032*	0.007	0.008			
	(0.018)	(0.017)	(0.017)			
Mestizo	0.036***	0.027**	0.027**			
	(0.013)	(0.012)	(0.012)			
Ed.: primary/mid. sch.		−0.015	−0.015		−0.014	−0.014
		(0.010)	(0.010)		(0.010)	(0.010)
Ed.: high school		−0.038***	−0.037***		−0.037***	−0.036***
		(0.012)	(0.012)		(0.012)	(0.012)
Ed.: tech. or some uni.		−0.087***	−0.087***		−0.086***	−0.086***
		(0.017)	(0.017)		(0.017)	(0.017)
Ed.: uni. or higher		−0.106***	−0.105***		−0.106***	−0.105***
		(0.019)	(0.019)		(0.019)	(0.019)
Poverty indicator		0.067***	0.067***		0.067***	0.067***
		(0.008)	(0.008)		(0.008)	(0.008)
Urban location		0.022**	0.024**		0.023**	0.025**
		0.010	0.010		0.010	0.010
Individual controls	No	Yes	Yes	No	Yes	Yes
Regional controls	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24526	24185	24165	24526	24185	24165
Regional clusters	1039	1039	1037	1039	1039	1037
Adjusted R^2	0.03	0.05	0.05	0.03	0.05	0.05

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at the regional level. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Individual controls (not shown in the table) also include age, age squared, gender, religion (four categories), and household size (ten categories). The omitted categories are "white" for ancestry and "completed primary or less" for education, respectively. e) Regional controls include nighttime lights per capita and region area.

whites to be witchcraft believers. This is consistent with our priors since most mestizos have some African ancestry. Estimates in columns 4–6 show that Afro-descendants are, on average, 3.5 percentage points more likely to believe in witchcraft when compared to the rest of the sample pooled into one group. Note also that the estimates for various sociode-

mographic characteristics are largely consistent with those for the African sample: other things equal, lower educational level, poverty, and living in an urban area are associated with a higher likelihood of believing in witchcraft.

In addition to their persistence across generations of Afro-descendants, witchcraft beliefs may have been more likely to survive in regions historically more exposed to African slavery, where, as shown above, such beliefs played a special role among both slaves and their masters, and where cultural exchange occurred most actively. Although reliable quantitative estimates of the historical spatial distribution of African slaves and their descendants in Latin America are not available, its qualitative patterns have been widely documented and primarily reflect geographic factors that made the use of African slave labor more profitable than that of coerced or enslaved indigenous population. Specifically, the major belt of African slavery in Latin America was largely contained within tropical coastal lowlands (TCL).[52]

The key explanation for this geographic pattern has to do with the pre-Columbian population distribution in Latin America and the demographic shock caused by Old-World diseases.[53] Before the arrival of Europeans, the densest sedentary settlements of Latin America were found in temperate zones of the continent, such as Andean highlands and central Mexican plateau, known for their agricultural productivity. High elevation was also instrumental in protecting indigenous populations against new pathogens brought from across the Atlantic. In contrast, indigenous communities of the tropical lowlands had low population density and were directly exposed to the previously unknown diseases leading to the swift decimation of those tribes upon their contact with Europeans. The loss of this source of labor prompted attempts of a forced transfer of native populations to the tropical lowlands that was, however, unsustainable, due both to the high death rate it entailed and the opposition of European settlers in mountainous regions who needed their own local labor source, particularly in mining (Mellafe, 1975). Given the massive decline of the native population and inability to replace it with captives from other regions of the continent, the colonizers ultimately had to rely on African slave labor for agricultural production in tropical lowlands.

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[52]Zelinsky (1949) made perhaps the most ambitious attempt to reconstruct, however crudely, the distribution of black population within Latin America at six points in time between 1570 and 1940. His maps clearly indicate the persistent predominant location of black communities in the TCL, with only a few exceptions. Bruhn and Gallego (2012) provide a rough classification of colonial activities into "good," "bad," and "ugly" for a set of countries in the Americas, but their classification does not map uniquely into the use of African versus local coerced labor and is only available at the crudest subnational level.

[53]See, for example, Zelinsky (1949), Mellafe (1975), and Gallup et al. (2003).

Hawthorne (2010) describes in detail the gradual replacement of enslaved indigenous labor by African slaves on the plantations of Maranhão, Brazil. His account provides two main reasons behind this process, namely the high death rate of the natives due to Old-World pathogens and the perception of Europeans (clear from abundant historical records) that African slaves were more productive. That perception was shaped partly by lower resistance of indigenous populations to tropical diseases, but also by their higher likelihood of escape, thanks to the knowledge of local terrain, and the fact that settled agricultural work was completely unknown and repugnant to Amazonian tribes which typically subsisted by foraging. In contrast, African slaves arriving in Maranhão and Pará from Upper Guinea came from settled agricultural societies and knew very well how to grow crops in tropical environments (pp. 47–49).

The abundant supply of indigenous labor in the highlands also explains why African slave labor was not nearly as actively employed in the mining sector as it was in tropical agriculture. For instance, such large mining centers as Huancavelica in Peru or Zipaquira in Colombia were surrounded by dense local settlements and were thus worked by indigenous people (Mellafe, 1975). This is not to say that African slaves were entirely absent in the mining sector. Indeed, Lane (2005) notes that, although most silver mining was carried out by coerced indigenous labor, most gold mining was in fact done by African slaves and their descendants. This division is perfectly consistent with the geographic factors outlined above, since silver mines "tended to be located in the remote, dry, and often cold high-country interior of Spanish America, whereas gold mines were mostly distributed in lower, hotter, and wetter zones" (p. 162). The abundance of local indigenous labor, as well as the higher costs associated with the danger of losing expensive African slaves to mining-related disasters or a high-altitude sickness favored the use of coerced native labor in silver mines.[54] Overall, available estimates suggest that indigenous population accounted for roughly 80% of all workers in the mines of Potosi and Zacatecas at the peak of colonial activities (p. 173).

In addition to the fundamental role of geography in explaining the relative scarcity or abundance of indigenous labor, two other factors help to understand the geographic distribution of African slaves and their descendants. First, slave-based agricultural production sites were often located in relative proximity to ports and European settlements in Latin America that were predominantly found in coastal lowland areas (Zelinsky, 1949). Second,

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[54]This is particularly true of Potosi, where extreme altitudes require a substantial acclimatization period for any worker not native to those areas, and partly explains why the use of African slave labor was more common in Zacatecas and other Mexican mining sites located at relatively low elevation.

independent black communities (*quilombos*) resulting from ship wrecks, individual or mass escapes of slaves, were always founded in tropical locations and typically concentrated "in the northern and coastal provinces of Colombia and Venezuela, along the coasts of Central America, in the coastal belts and remote interior regions of the Portuguese possessions in Brazil, and particularly in some of the islands of the Caribbean" (Mellafe, 1975, p. 34) thus contributing to the TCL geography of the Afro-descendant population in Latin America.

Given this evidence, we consider three proxies to capture a region's historical exposure to African slavery based on its geographic features. First, we calculate the distance from the centroid of each respondent's region of residence to the coastline. Although this measure should capture the coastal element of the distribution of Afro-descendants, it is rather naive, particularly because of the coastal proximity of the Andes, which, as discussed before, hosted some of the most populous indigenous communities of the continent.[55] Second, we measure each region's average elevation to capture the lowland element of the population geography in Latin America.[56] Finally, in order to mitigate the drawbacks of the previous two one-dimensional measures, we build a proxy for the "tropical coastal lowlands" triad based on ecological maps of the Latin American continent.

We start off with a digital map of ecological regions of Central and South America produced as part of an effort by the U.S. Geological Survey Earth Resources Observation and Science Center and the U.S. Environmental Protection Agency to develop a consistent map of ecoregions for the Western Hemisphere (Griffith et al., 1998).[57] The boundaries of ecoregions, available at three levels of aggregation, are based on various environmental features of the continent including geology, physiography, soil type, potential and existing vegetation, climate, and land cover. For Central and South America and the Caribbean, the maps contain 12 ecoregions at level I, 35 at level II, and 121 at level III, where regions at finer levels are nested within upper-level classifications. We exploit the classification at levels II and III and flag all ecoregions roughly fitting in the TCL category. This process leads to a baseline of 15 level-II regions and 9 additional level-III regions (listed under

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[55]Although the largest slave ports in Latin America were located on the Atlantic coast, there were also several major ports of entry on the Pacific coast (including Panama, Guayaquil, Trujillo, Callao, and Valparaiso) servicing the western part of the continent (Mellafe, 1975). Thus, distance to the coastline is a more relevant measure, even if still naive, than distance to the Atlantic coast.

[56]We take the natural logarithm of both distance to the coast and elevation measures due to extreme skewness of these variables.

[57]To cover Mexico, we combine this base layer with a similar map of North American ecoregions from the Commission for Environmental Cooperation. All of these digital maps are available online at http://ecologicalregions.info.
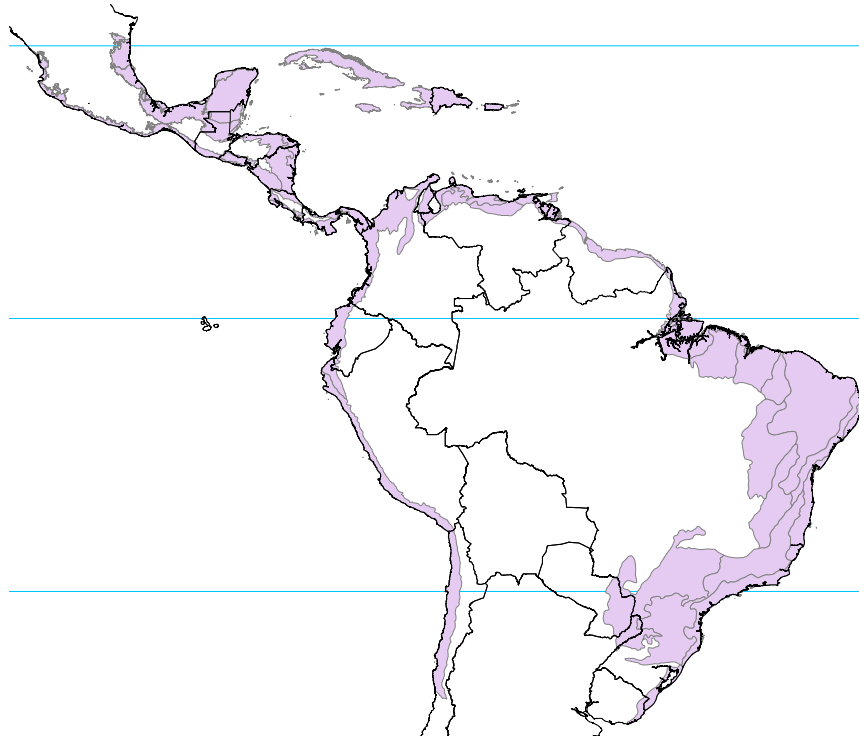
Figure 2: The ecological regions of the tropical coastal lowlands (TCL).

Notes. The shaded area represents ecological regions in the TCL. According to historical evidence, the concentration of African slaves and their descendants was the highest in these parts of Latin America. Gray and black boundaries represent the frontiers of ecological regions within TCL as outlined by Griffith et al. (1998) and countries in the baseline sample, respectively. We combine the above ecological map with the map of administrative regions in our sample to measure the share of each region's area located in TCL which we then use as a proxy for local historical exposure to African slavery.

relevant definition in appendix A) with geographical features historically favoring the use of African slave labor, as shown in Figure 2. Finally, for each region in our survey sample, we measure the fraction of its area located in the TCL.

We next rerun the regressions presented above, but now adding our regional geography measures, one by one and altogether. The results are presented in Table 8. The first column reproduces model 3 from Table 7, while further columns add new variables to that equation. Our geographic factors are significant and with expected signs in columns 2–4. Residents of regions located closer to the coast, at lower altitudes, or within tropical coastal lowlands are more likely to believe in witchcraft, even after directly controlling for their ancestry and other sociodemographic characteristics. When present simultaneously, elevation and regional share in the TCL remain statistically significant, whereas the "naive" distance to

the coast measure becomes insignificant.[58] To further check the robustness of our results, in column 6, we include two more regional geographic characteristics to the equation, namely the absolute latitude of the region's centroid and mean land suitability for agriculture. These controls do not significantly affect the primary coefficients of interest. As expected, across specifications, adding geographic variables somewhat reduces the coefficient on the Afro-descendant category compared to the baseline in column 1 since ancestry is correlated with measures of local geography.

Overall, our empirical results suggest that witchcraft beliefs persisted not just across generations of Afro-descendants, but also in geographic areas where the use of African slave labor was most prominent. These findings imply both persistence of witchcraft beliefs over time and spatial spillovers, but we cannot distinguish between the following two interpretations. One possibility is that the prevalence of witchcraft beliefs among Africans was historically higher compared to Europeans and Amerindians, even before the onset of the Atlantic slave trade, which explains their prominence among Afro-descendants in contemporary Latin America. However, as argued above, both the slave trade and the experience of slavery in the New World contributed to the activation of witchcraft beliefs among African captives. Thus, it is likely that the elevated levels of witchcraft beliefs among Afro-Latin Americans partly reflect the direct impact of tragic past experiences on the culture of their ancestors and are not simply an outcome of "mechanical" transmission across continents. Regardless of the interpretation, the Atlantic slave trade played an instrumental role in spreading witchcraft beliefs throughout Latin America.

5   The geography of witchcraft beliefs: a placebo test

In sections 3 and 4, we established several empirical patterns in the geographic distribution of witchcraft beliefs in Sub-Saharan Africa and Latin America. In the former case, a negative reduced-form relationship between witchcraft beliefs and historical distance to the coast reflects the cultural impact of the exposure to slave trade. In the latter case, a negative relationship between witchcraft beliefs and both distance to the coast and elevation reflects the geography of African slavery in Latin America. In both cases, there are good a priori reasons to expect the said geographic patterns. In fact, if these patterns are explained solely by the history of the Atlantic slave trade, one should *not* be able to find

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[58]The three geographic variables are rather highly correlated. The pairwise across-region correlation coefficients are all around 0.58 in absolute value.

Table 8: Witchcraft beliefs, ancestry, and geography in Latin America

	(1)	(2)	(3)	(4)	(5)	(6)
Afro-descendant	0.050***	0.043***	0.041**	0.042**	0.039**	0.040**
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Indigenous	0.008	0.008	0.015	0.009	0.013	0.015
	(0.017)	(0.017)	(0.016)	(0.017)	(0.016)	(0.016)
Mestizo	0.027**	0.027**	0.025**	0.025**	0.025**	0.026**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Log distance to the coast		−0.019***			−0.002	−0.002
		(0.005)			(0.007)	(0.007)
Log elevation			−0.023***		−0.016***	−0.013*
			(0.005)		(0.006)	(0.007)
Share in TCL				0.075***	0.045***	0.046***
				(0.016)	(0.016)	(0.017)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Basic regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Add. regional controls	No	No	No	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24165	24165	24165	24165	24165	24134
Regional clusters	1037	1037	1037	1037	1037	1035
Adjusted R^2	0.05	0.05	0.05	0.05	0.05	0.05

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at the regional level. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Additional regional controls include absolute latitude of the region's centroid and mean land suitability for agriculture. The rest of the controls are the same as in Table 7.

similar relationships outside the Atlantic world, that is, in regions that were not subjected to the mechanisms explored above.

In order to perform such a placebo test, we exploit yet another set of surveys conducted by the Pew Forum on Religion and Public Life in 2011–2012 in 25 countries outside Sub-Saharan Africa.[59] This wave of studies concentrated on religious beliefs and socio-political views of Muslim populations in these countries and, like earlier surveys, contained a module

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[59]These include: Afghanistan, Albania, Algeria, Azerbaijan, Bangladesh, Bosnia and Herzegovina, Egypt, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kosovo, Kyrgyzstan, Lebanon, Malaysia, Morocco, Pakistan, Palestinian territories, Russia, Tajikistan, Thailand, Tunisia, Turkey, and Uzbekistan. We exclude Niger since, being part of Sub-Saharan Africa, it does not satisfy the basic placebo test requirement. The "World's Muslims" dataset is available at `http://www.pewforum.org/datasets`.

on traditional beliefs which allows us to construct a consistent indicator of witchcraft beliefs. We further exploit the most detailed available data on the respondents' region of residence in order to define boundaries for calculating local geographic features, namely distance to the coast from the region's centroid and average elevation.[60] We set up an estimating equation similar to those in sections 3 and 4, in which the indicator of personal belief in witchcraft is regressed on a set of control variables, country fixed effects, and regional-level geographic characteristics of interest, namely distance to the coastline and elevation. In our baseline specification, individual sociodemographic controls include age, age squared, gender, education, household size, and urban location dummy, while regional controls are area, luminosity per capita, absolute latitude, and mean suitability of land for agriculture.[61] We estimate three models, one for each geographic variable used in earlier analysis, and compare the results to those from "parallel" specifications for the Atlantic-world samples.

Table 9 presents the findings from our placebo test. The first two columns compare the relationship between witchcraft beliefs and distance to the coast in African and Asian samples. In contrast to the strong negative reduced-form association observed in Sub-Saharan Africa, the relevant coefficient is tiny and insignificant in the Asian sample.[62] Similarly, unlike in Latin America (columns 3 and 5), there is no significant relationship whatsoever between witchcraft beliefs and the log of either distance to the coast or elevation in the placebo sample (columns 4 and 6). The absence of such geographic patterns in a

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[60]Due to the absence of data on subnational regions of residence, four countries (Bosnia and Herzegovina, Egypt, Jordan, and Kosovo) drop out of the sample. With some abuse of language, Table 9 refers to the resulting baseline sample simply as "Asia." The findings reported below are qualitatively identical to those in the actual restricted "Asia sample" that excludes Albania, Algeria, Morocco, and Russia. The share of witchcraft believers in the baseline sample is around 65%.

[61]Morocco drops out from the sample due to missing data on education. In addition, three regions for which the centroids are located below the sea level are excluded when using the log transformation of elevation. Unlike African and Latin American surveys, the "World's Muslims" dataset does not include the questions necessary to construct a poverty indicator used in earlier analysis. Furthermore, since the survey only covers Muslims, religion is obviously not included as a covariate. The results are fully robust to model specifications excluding regional controls and plausibly endogenous individual characteristics (education, household size, and urban location dummy). Standard errors are clustered at the regional level.

[62]Note that the actual reduced-form equation for Sub-Saharan Africa corresponding to the exercise in section 3.5 would use distance to the coast from the historical homeland of a respondent's ethnic group. Instead, here we use distance from the region of residence for accuracy of comparison across samples. The correlation between two distance-to-the-coast measures (historical and actual) is around 0.88. Note also that in the African case we use raw (non-log-transformed) distance-to-the-coast measure, as in Nunn and Wantchekon (2011). In the case of Latin America, the raw measure is much more severely skewed, which is why we take its logarithm.

Table 9: The geography of witchcraft beliefs within and outside the Atlantic world

	(1)	(2)	(3)	(4)	(5)	(6)
	Africa	Asia	L. America	Asia	L. America	Asia
Distance to the coast	-0.143^{***}	0.004				
	(0.043)	(0.034)				
Log distance to the coast			-0.015^{***}	-0.001		
			(0.005)	(0.010)		
Log elevation					-0.022^{***}	0.001
					(0.005)	(0.010)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22725	23470	27044	23470	27044	23404
Regional clusters	188	363	1157	363	1157	360
R^2	0.15	0.14	0.04	0.14	0.04	0.14

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at the regional level. c) Individual controls are age, age squared, gender, education, household size, and urban location dummy. d) Regional controls include nighttime lights per capita, region area, absolute latitude of the region's centroid and mean land suitability for agriculture. e) Distance to the coast in columns 1 and 2 is rescaled to be expressed in thousands of kilometers.

world region that was not directly involved in the Atlantic slave trade is reassuring for the validity and interpretation of our results for Africa and Latin America.

6 Concluding remarks

This paper shows that the variation in contemporary witchcraft beliefs on both sides of the Atlantic Ocean can be partly explained by the history of the Atlantic slave trade. In Sub-Saharan Africa, witchcraft beliefs are more prevalent among ethnic groups that were more heavily exposed to the Atlantic slave trade in the past. In Latin America, such beliefs are more prevalent among Afro-descendants and residents of those regions where the use of African slave labor was historically more intense. These findings are consistent with historical and ethnographic narratives about the role of the Atlantic slave trade in propagation of witchcraft beliefs and demonstrate how big shocks can reinforce certain elements of culture and contribute to their transmission and persistence. They also shed light on the nature of witchcraft beliefs and related practices as a cultural framework for interpreting misfortune, a tool for resisting evil, and a mechanism of exerting power in local communities.

Appendices

A   Description of variables

Pew Forum individual-level variables in section 3 (Sub-Saharan Africa)

Raw data and documentation for "Tolerance and Tension: Islam and Christianity in Sub-Saharan Africa" are available at `http://www.pewforum.org/datasets`.

Personal belief in witchcraft. Dummy variable equal to 1, if the respondent claims to believe in witchcraft or the evil eye, i.e., that "certain people can cast curses or spells that cause bad things to happen to someone" (or both), and 0, otherwise.

Religion. Four categories: Christian, Muslim, traditional religion, unaffiliated.

Education. Level of educational attainment, three categories: completed primary or less, some secondary or completed secondary, post-secondary and higher.

Poverty indicator. Dummy variable equal to 1, if the respondent reports insufficient money to buy food, health care, or clothing. The original question is: "Have there been times during the last year when you did not have enough money: 1) to buy food your family needed? 2) to pay for medical and health care your family needed? 3) to buy clothing your family needed?"

Household size. Eight categories: three or fewer, four, five, six, seven, eight, nine, ten or more.

Other beliefs. Measures of personal and regional beliefs are constructed in the same way as for witchcraft. Other beliefs include the following: heaven, where people who have led good lives are eternally rewarded; hell, where people who have led bad lives and die without being sorry are eternally punished; reincarnation – that people will be reborn in this world again and again; angels; miracles; evil spirits; that sacrifices to spirits of ancestors can protect you from bad things happening; that certain spiritual people can protect you from bad things happening; that juju, shrines, or other sacred objects can protect you from bad things happening.

Generalized trust. Dummy variable equal to 1, if the respondent replies that "most people can be trusted," and 0, otherwise.

Trust in people of other religion. Dummy variable equal to 1, if the respondent replies that she "generally trusts people who have different religious values," and 0, otherwise.

Ethnicity-level variables in section 3 (Sub-Saharan Africa)

Slave exports. Number of exported slaves of a given ethnicity normalized by the area of homeland historically inhabited by the respective ethnic group (in square kilometers), available separately for the Atlantic and Indian Ocean trades (and by century for the results shown in Table B.3 of appendix B). The baseline variables are log-transformed, as described in the text. *Source:* Nunn and Wantchekon (2011), dataset available at `http://scholar.harvard.edu/nunn/pages/data-0`.

Settlement pattern. A measure of residence fixity, on the ordinal scale: nomadic or fully migratory (1); seminomadic (2); semisedentary (3); compact but impermanent settlements (4); neighborhoods of dispersed family homesteads (5); separated hamlets, forming a single community (6); compact and relatively permanent settlements (7); complex settlements (8). *Source:* Murdock (1967).

Jurisdictional hierarchy beyond local community. A measure of political centralization, on the ordinal scale: no levels, no political authority beyond community (1); one level, for example, petty chiefdoms (2), two levels, for example, larger chiefdoms (3); three levels, for example, states (4); four levels, for example, large states (5). *Source:* Murdock (1967).

Historical reliance on agriculture. Dummy variable equal to 1, if the contribution of agriculture to subsistence exceeds 50%, and 0, otherwise. *Source:* Murdock (1967).

Historical presence of slavery. Dummy variable equal to 1, if slavery within society is "absent or near absent," and 0, otherwise. *Source:* Murdock (1967).

Malaria stability index. Index measuring the stability of malaria transmission based on regionally dominant vector mosquitoes. Takes values from 0 to 39 and is available for cells at 0.5 degree resolution. The variable used in the analysis is the average value of the index across cells falling in each ethnic homeland. *Source:* Kiszewski et al. (2004).

Colonial railways. Dummy variable equal to 1, if a colonial railway line, as recorded for 1911 by the Century Company, was present anywhere within the ethnic homeland, and 0, otherwise. *Source:* own calculations using the shapefile downloaded at `http://scholar.harvard.edu/nunn/pages/data-0`.

European explorers. Dummy variable equal to 1, if a major route of European explorers during precolonial and early colonial periods, as recorded for 1911 by the Century Company, passed through the ethnic homeland, and 0, otherwise. *Source:* own calculations using the shapefile downloaded at `http://scholar.harvard.edu/nunn/pages/data-0`.

Christian missions. The total number of Catholic and Protestant missions, as recorded in 1924 by William Roome, located within the ethnic homeland, per square kilometer. *Source:* own calculations using the shapefile downloaded at `http://scholar.harvard.edu/nunn/pages/data-0`.

Distance to the coastline. Great circle distance from the ethnic homeland's centroid to the closest location on the coastline. Computed using the haversine formula and measured in km. *Source:* own calculations using the coastline shapefile downloaded at `http://www.naturalearthdata.com`.

Distance to major slave port. Great circle distance from the ethnic homeland's centroid to the closest major slave port. Computed using the haversine formula and measured in km. Major slave ports are defined as 32 ports in the first quartile of the distribution by the number of embarked slaves as recorded in the 2016 edition of the Transatlantic Slave Trade Database. *Source:* own calculations using the data on slave embarkations by port available at `http://slavevoyages.org`.

Region-level variables in section 3 (Sub-Saharan Africa)

Nighttime lights per capita. Data on luminosity come from the Defense Meteorological Satellite Program's Operational Linescan System (DMSP-OLS) that reports stable images of Earth at night captured between 20:00 and 21:30. The measure ranges from 0 to 63 and is available for cells at 30 arc-second resolution, see Henderson et al. (2012) for technical details. We aggregate luminosity data for 2008 and 2009 at the regional level and then take their average. The latter is then divided by the region's population size (see below) to obtain the final measure of lights per capita. *Source:* `http://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html`.

Population size. Data on population counts come from LandScan Africa (2013) for cells at 30 arc-second resolution. We calculate the sum of all grid values in each region to find regional population counts. *Source:* `http://web.ornl.gov/sci/landscan`.

Mean suitability of land for agriculture. Index of suitability of land for rain-fed agriculture (maximizing technology mix). Coded on the scale from 1 (very high suitability) to 8 (not suitable) for cells at 5 arc-minute resolution. The variable used in the analysis is the average value of the suitability index across cells in each region. *Source:* FAO GAEZ dataset (plate 46) downloaded at `http://webarchive.iiasa.ac.at/Research/LUC/GAEZ/index.htm` and own calculations.

Spatial variability of temperature. Raw data on annual mean temperature and precipitation (1950–2000) are available for cells at 30 arc-second resolution. Spatial variability is calculated as the standard deviation of cell values for each region. *Source:* Hijmans et al. (2005) and own calculations, raw data available at `http://www.worldclim.org/current`.

Rainfall anomaly. Average monthly precipitation during the period 2006-2008 (two years before the survey wave) relative to the long-run average (1951-2000), censored at 100%. Raw pixel-level data are available at 0.5° resolution from the Global Precipitation Climatology Centre (full data reanalysis, version 7). The final measure is derived by spatial averaging over the pixels in each region. *Source:* Schneider et al. (2015) and own calculations, raw data available at `http://www.cgd.ucar.edu/cas/catalog/surface/precip/gpcc.html`.

Ethnolinguistic fractionalization. Standard ELF indices constructed at different levels of linguistic aggregation based on regional-level data on ethnolinguistic composition. For Nigeria, the indices were recalculated using the data from the 2013 Demographic and Health Survey at the level of geopolitical zones, to be consistent with the Pew Forum administrative division. *Source:* Gershman and Rivera (2018b), own calculations for Nigeria, and, for the Democratic Republic of the Congo, GIS-based indices constructed using the World Language Mapping System and disaggregated population data from LandScan, as described in Gershman and Rivera (2018a).

Region area. Area of the region measured in square km. *Source:* own calculations based on Albers projection.

Afrobarometer individual-level variables in section 3 (Sub-Saharan Africa)

Raw survey data and codebooks are available at `http://www.afrobarometer.org/data`.

Trust questions. Measures of interpersonal trust are based on the following questions: "How much do you trust each of the following types of people: your relatives? your neighbors? other people you know?" Measures of trust in institutions are based on the following questions: "How much do you trust each of the following, or haven't you heard enough about them to say: police? courts of law? elected local government council?" The answers are coded on the scale from 0 (not at all) to 3 (a lot).

Employment status. The original question is: "Do you have a job that pays a cash income? Is it full-time or part-time? And are you presently looking for a job (even if you are presently working)?" Four categories: no (not looking); no (looking); yes, part-time; yes, full-time.

Religion. Five categories: Christian, Muslim, traditional religion, unaffiliated, other.

Living conditions. The original question is: "In general, how would you describe your own present living conditions?" Five categories: very bad; fairly bad; neither good nor bad; fairly good; very good.

Education. Ten categories: no formal schooling; informal schooling only (including Koranic schooling); some primary schooling; primary school completed; some secondary school/high school; secondary school completed/high school completed; post-secondary qualifications, other than university, e.g., a diploma or degree from polytechnic or college; some university; university completed; post-graduate.

Pew Forum individual-level data in section 4 (Latin America)

Raw data and documentation for "Religion in Latin America" are available at `http://www.pewforum.org/datasets`.

Personal belief in witchcraft. Dummy variable equal to 1, if the respondent claims to believe either that "magic, sorcery or witchcraft can influence peoples lives" or in the evil eye, i.e., that "certain people can cast curses or spells that cause bad things to happen to someone" (or both), and 0, otherwise.

Race/ancestry. Four categories: Afro-descendant, indigenous, mestizo, white. The Afro-descedant category includes the following responses: Afro-descedant, Afroboliviano, black, Garifuna, mulatto, negro, Palenquero of San Basilio, Raizal of San Andres and Providencia. The indigenous category includes the following responses: Amerindian, Andean indigenous, Aymara, Chiquitano, Guarani, indigenous, Lecos, Moxeño, native, Quechua, rain-forest indigenous, Tacana. The mestizo category includes the following responses: mestizo, mestizo (ladino), mestizo (creole), mixed (white and indigenous). The white category includes the following responses: white, blanco.

Afro-descendant dummy. Dummy variable equal to 1, if the respondent is classified as Afro-descendant, and 0, otherwise.

Religion. Four categories: Catholic, Protestant, unaffiliated, other.

Education. Level of educational attainment, five categories: less than elementary; complete primary or middle school; some or complete high school; technical or some university; complete university or higher.

Poverty indicator. Identical to the definition in section 3 analysis, see above.

Household size. Identical to the definition in section 3 analysis, see above.

Region-level variables in section 4 (Latin America)

Nighttime lights per capita. Identical to the definition in section 3 analysis (see above), but uses 2014 LandScan data to calculate regional population size.

Region area. Identical to the definition in section 3 analysis, see above.

Mean suitability of land for agriculture. Identical to the definition in section 3 analysis, see above.

Absolute latitude. Absolute latitude of a region's centroid. *Source:* own calculations.

Distance to the coastline. Identical to the definition in section 3 analysis, see above.

Elevation. Elevation data at the pixel level are available from the USGS GTOPO30 digital dataset at 30 arc-second resolution. Mean elevation is calculated as the average value across pixels in each region and is measured in meters. *Source:* own calculations using the raster file downloaded at `http://www.fao.org/geonetwork/srv/en/main.home`.

Regional share in the tropical coastal lowlands. Share of region's area located in the zone defined as "tropical coastal lowlands" representing a set of level-II and level-III ecological regions of Latin America. Level-II regions are: Dry Gulf of Mexico Coastal Plains and Hills, Northwestern Plain of the Yucatan Peninsula, Southern Pacific Coastal Plains and Hills, Humid Gulf of Mexico Coastal Plains and Hills, Yucatan Peninsula Plains and Hills, Sierra Los Tuxtlas, Western Pacific Plain and Hills, Soconusco/Guatemalan Coastal Plains and Hills, Greater Antilles, Caribe/Pacific Lowland Plains and Hills, Venezuelan Coastal Andes, Peruvian/Atacaman Deserts, Amazon and Coastal Lowlands, Caatinga, and Atlantic Forests. The coastal area of the Amazon and Coastal Lowlands in the Amazon river mouth region

is delineated using the boundary of the Marajó varzeá subregion as depicted in the World Wildlife Fund's map of terrestrial ecoregions. Level-III regions are: Pacific Volcanic Lowlands, Caribbean Coastal Plains and Hills, Miskito Lowland Pine Savanna, Costa Rica/Panama Pacific Plains and Hills, Gurupi Plains and Low Tablelands, Northern Maranhão Plains, Northern Piauí Plains, Espinhaço/Diamantina Hills and Low Mountains, Brazil/Uruguay Coastal Pampa. *Source:* own calculations, original digital maps of ecoregions are available at `http://ecologicalregions.info`.

Pew Forum individual-level variables in section 5 (placebo test)

Raw data and documentation for "The World's Muslims" are available at `http://www.pewforum.org/datasets`.

Personal belief in witchcraft. Identical to the definition in section 3 analysis, see above.

Education. Level of educational attainment, six categories: no schooling; some/complete primary school; some/complete middle school; some/complete high school; technical or some university; university or higher.

Household size. Identical to the definition in section 3 analysis, see above.

Region-level variables in section 5 (placebo test)

Nighttime lights per capita. Identical to the definition in section 3 analysis (see above), but uses 2014 LandScan data to calculate regional population size.

Distance to the coastline. Identical to the definition in section 3 analysis, see above; measured in kilometers. Excludes the (inland) Caspian Sea and the Arctic Ocean coastline.

Elevation. Identical to the definition in section 4 analysis (see above), but using GTOPO30 panels covering the countries of interest; measured in kilometers. *Source:* own calculations using the raster file downloaded at `https://webmap.ornl.gov/ogc/dataset.jsp?ds_id=10003`.

Mean suitability of land for agriculture. Identical to the definition in section 3 analysis, see above.

Region area. Identical to the definition in section 3 analysis, see above.

Absolute latitude. Absolute latitude of a region's centroid. *Source:* own calculations.

B   Supplementary figures and tables

(a) Historical slave exports

(b) Contemporary witchcraft beliefs
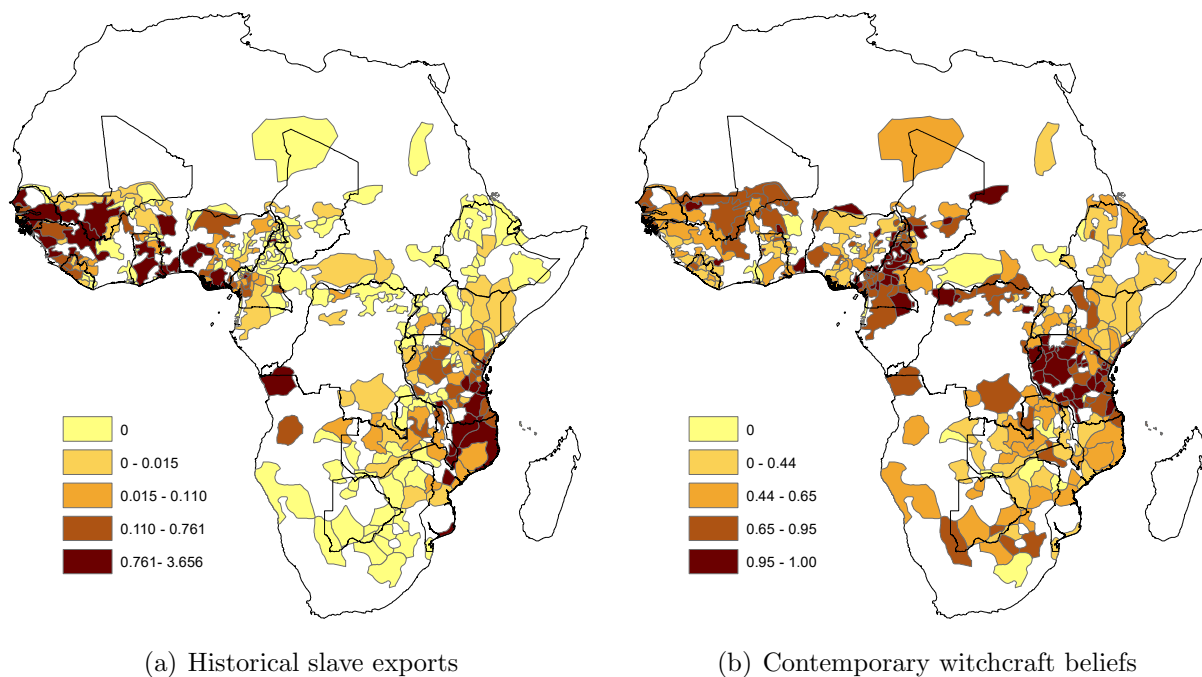
Figure B.1: Slave exports and witchcraft beliefs across ethnic groups of Sub-Saharan Africa.

Notes. Historical slave exports for each ethnic group are calculated as log(1+exports/area), which normalizes the total number of slaves exported between 1400 and 1900 by the area of respective ethnic homeland measured in square kilometers (Nunn and Wantchekon, 2011). The prevalence of contemporary witchcraft beliefs is calculated for each ethnic group based on survey responses. The color coding in each case first separates the group with zero values and then breaks down the remaining distribution of values into quartiles. Black and gray boundaries represent the frontiers of countries and ethnic homelands, respectively.

Table B.1: Controlling for sociodemographic variables

	(1)	(2)	(3)	(4)	(5)	(6)
Slave exports (total)	0.042**	0.042**	0.044***	0.041**	0.038**	0.038**
	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Age	0.002	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age squared	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender	−0.012*	−0.012	−0.006	−0.012*	−0.015**	−0.008
	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)
Poverty indicator		0.042***				0.034**
		(0.014)				(0.014)
Education: secondary			−0.044***			−0.036***
			(0.013)			(0.012)
Education: post-secondary			−0.064***			−0.056***
			(0.022)			(0.021)
Urban location				0.020		0.036**
				(0.016)		(0.016)
Religion: Muslim					−0.012	−0.019
					(0.018)	(0.018)
Religion: traditional					0.430***	0.419***
					(0.062)	(0.062)
Religion: unaffiliated					0.143***	0.141***
					(0.039)	(0.038)
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18238	18238	18238	18238	18238	18238
Adjusted R^2	0.16	0.16	0.16	0.16	0.17	0.17
Ethnic clusters	307	307	307	307	307	307
Regional clusters	174	174	174	174	174	174

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at both ethnic and regional levels. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) The reference categories for religion and education are, respectively, "Christian" and "completed primary or less." e) All specifications are estimated for the same sample, in which the values of all pre-treatment and individual-level controls are non-missing. f) Inclusion of the household size categorical variable on its own leads to a very slight increase in the coefficient of interest to 0.043 (significant at the 1% level). This specification is omitted for brevity. h) Specification in column 6 is identical to that in column 2 of Table 1.

Table B.2: Extensive vs. intensive margins of the slave trade

	(1)	(2)	(3)	(4)	(5)	(6)
	Extensive margin					
Slave trade indicator	0.044**	0.039*	0.042*	0.039*	0.022	0.018
	(0.022)	(0.022)	(0.023)	(0.022)	(0.023)	(0.020)
Observations	19305	18238	16768	16768	19305	16768
Adjusted R^2	0.15	0.17	0.18	0.18	0.20	0.23
Ethnic clusters	309	307	285	285	309	285
Regional clusters	174	174	171	171	174	171
	Intensive margin					
Slave exports (total)	0.046**	0.040**	0.035**	0.034**	0.034***	0.035***
	(0.019)	(0.018)	(0.014)	(0.014)	(0.009)	(0.010)
Observations	13149	12549	11218	11218	13149	11218
Adjusted R^2	0.17	0.19	0.21	0.21	0.22	0.26
Ethnic clusters	163	162	150	150	163	150
Regional clusters	165	164	158	158	165	158
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	Yes	No	Yes
Additional ethnic controls	No	No	Yes	Yes	No	Yes
Regional controls	No	No	No	Yes	No	No
Region FE	No	No	No	No	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	No	No

Notes. a) In the top panel specifications, the dependent variable is an indicator equal to 1 for individuals representing ethnic groups with a positive value of historical slave exports and 0, otherwise. b) In the bottom panel specifications, the dependent variable is the baseline slave exports measure, but the sample is restricted to individuals representing ethnic groups with positive values of historical slave exports. c) Apart from the above details, the setup in all columns is identical to that in Table 1 of the main text.

Table B.3: Disaggregating slave exports by century

	(1)	(2)	(3)	(4)	(5)	(6)
	1800s			1700s		
Slave exports (Atlantic)	0.086***	0.086***	0.082***	0.050*	0.033	0.044***
	(0.022)	(0.026)	(0.023)	(0.028)	(0.026)	(0.015)
	1600s			1400–1500s		
Slave exports (Atlantic)	0.052**	0.050**	0.056***	0.006	0.017***	0.015***
	(0.025)	(0.022)	(0.011)	(0.010)	(0.006)	(0.005)
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Additional ethnic controls	No	Yes	Yes	No	Yes	Yes
Regional controls	No	Yes	No	No	Yes	No
Region FE	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	No	Yes	Yes	No
Observations	19305	16768	16768	19305	16768	16768
Ethnic clusters	309	285	285	309	285	285
Regional clusters	174	171	171	174	171	171

Notes. a) OLS estimates in all specifications. b) Standard errors shown in parentheses are clustered at both ethnic and regional levels. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Groups of control variables are identical to those in Table 1. e) In each of the four panels, the dependent variable measures slave exports restricted to respective century. f) Standardized coefficients reported for each specification.

Table B.4: First-stage regressions for IV specifications in Table 6

	(1)	(2)	(3)	(4)	(5)	(6)
	IV: Distance to the coast			IV: Distance to the port		
Distance to the coast/port	-1.095^{***}	-1.037^{***}	-0.898^{***}	-1.022^{***}	-0.999^{***}	-0.829^{***}
	(0.289)	(0.261)	(0.240)	(0.238)	(0.213)	(0.198)
Adjusted R^2	0.59	0.62	0.75	0.61	0.64	0.75
Shea's partial R^2	0.16	0.13	0.09	0.19	0.17	0.11
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Additional ethnic controls	No	Yes	Yes	No	Yes	Yes
Regional controls	No	Yes	No	No	Yes	No
Region FE	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	No	Yes	Yes	No
Observations	19305	16768	16768	19305	16768	16768
Ethnic clusters	309	285	285	309	285	285
Regional clusters	174	171	171	174	171	171

Notes. a) OLS estimates in all columns. b) Standard errors shown in parentheses are clustered at both ethnic and regional levels. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) Dependent variable in all specifications is the Atlantic slave trade exports. e) The sets of control variables are identical to those in Table 6; Indian Ocean slave exports are controlled for in all specifications. f) Shea's partial R^2 reflects the explanatory power of the respective instrument for the slave exports variable, after partialling out the influence of other included covariates. g) Distance variables are rescaled to be expressed in thousands of kilometers.

C Mediation analysis

One of the primary goals of the analysis in section 3 is to establish the *direct* relationship between historical slave trade and contemporary witchcraft beliefs (that is, operating through mechanisms pinpointed in section 2 plus intergenerational cultural transmission) after ruling out alternative mediating channels. In that baseline analysis, potential mediators were included as control variables, which, although common practice, may lead to inconsistent estimates due to intermediate-variable bias (Acharya et al., 2016a). Hence, we undertake a mediation analysis for several candidate channels based on the sequential g-estimation method of Acharya et al. (2016a) which accounts for the role of intermediate confounders and under certain conditions yields an unbiased estimate of the average controlled direct effect, or ACDE, of slave exports on witchcraft beliefs. The general method proceeds in two steps. In the first step, the outcome of interest is regressed on treatment and pre-treatment variables, mediators, and intermediate confounders and is then transformed (demediated) by subtracting the effect of the mediators. In the second step, demediated outcome is regressed on the treatment variable and pre-treatment controls. The estimated coefficient on the treatment variable represents the ACDE.

Since it is not obvious how to categorize the variables from our baseline analysis into relevant groups (namely, mediators, intermediate confounders, and pre-treatment controls), we examine various scenarios, four in total, for robustness purposes. In the first and second scenarios, poverty and education, respectively, are sole mediators. The third scenario considers both poverty indicator and education as mediators. The fourth scenario examines poverty, education, and three European colonial presence variables (that is, indicators for explorer route and colonial railways plus the density of Christian missions) as mediators. Each scenario is estimated for three model specifications: 1) intermediate confounders include all individual-level controls from the baseline analysis, with the exception of mediators; 2) the set of intermediate confounders is further expanded to include all additional ethnicity-level controls from the baseline analysis, with the exception of mediators in the fourth scenario; 3) same as previous specification but with regional rather than country fixed effects. In all cases, the set of pre-treatment controls consists of the same three ethnicity-level variables as in the baseline analysis. We calculate bootsrapped standard errors clustered by ethnicity based on 1000 replications.

The results of our mediation analysis are presented in Table C.1, the four panels of which correspond to the four scenarios outlined above. Overall, the estimated ACDEs of total slave exports on witchcraft beliefs are similar in magnitude across specifications and are also close to the baseline estimate in Table 1 when only pre-treatment controls are

Table C.1: Witchcraft beliefs and total slave exports: a mediation analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Poverty			Education		
Slave exports (total)	0.043**	0.044**	0.041***	0.044**	0.046**	0.042***
	(0.019)	(0.021)	(0.014)	(0.019)	(0.021)	(0.014)
	Poverty and education			Poverty, education, and Europeans		
Slave exports (total)	0.044**	0.046**	0.042***	0.042**	0.043**	0.041***
	(0.019)	(0.021)	(0.014)	(0.020)	(0.021)	(0.015)
Pre-treatment controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. interm. confounders	Yes	Yes	Yes	Yes	Yes	Yes
Eth. interm. confounders	No	Yes	Yes	No	Yes	Yes
Region FE	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	No	Yes	Yes	No
Observations	18238	16768	16768	18238	16768	16768
Ethnic clusters	307	285	285	307	285	285

Notes. a) In all specifications, coefficient estimates represent average controlled direct effects based on the sequential g-estimation method of Acharya et al. (2016a). b) Bootstrapped standard errors clustered at the ethnic level (1000 replications) are shown in parentheses. c) ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively. d) The subtitle of each of the four panels lists the variables treated as mediators. In the last panel, "Europeans" stands for three ethnicity-level variables capturing European colonial presence: indicators for European explorer route and colonial railways plus the density of Christian missions. e) All individual-level controls from the baseline analysis that are not mediators enter the estimation procedure as intermediate confounders. f) All additional ethnicity-level controls from the baseline analysis enter the estimation procedure as intermediate confounders, except in the bottom-right-panel specifications, where three European colonial presence variables are treated as mediators.

included. Note also that the coefficients in columns 1 and 4 for the cases of poverty and education as sole mediators are almost identical to those in Table B.1 where respective factors are simply being directly controlled for in a standard manner. Overall, it does not appear that the candidate mediators (poverty, education, and European colonial presence) represent very important channels through which the slave trade affected witchcraft beliefs, lending further credence to the direct historical relationship between the two persisting to this day due to intergenerational cultural transmission.

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