Ancestral Beliefs and Fertility in Sub-Saharan Africa

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Ancestral Beliefs and Fertility in Sub-Saharan Africa*

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Abstract

This paper contributes to the explanation of the puzzle of persistently high fertility in sub-Saharan Africa. I focus on the impact of a belief system that emphasizes the role of ancestors, who influence people's lives and have a strong interest in the continuation of their lineage into which they may be reincarnated. I combine first-hand data with original ethnographic information and both historical and contemporary surveys to show: 1) a strong, positive relationship between ancestral beliefs and fertility in different contexts and time periods; and 2) that this relationship is specifically driven by the motive to continue one's lineage. I test the specific predictions of a simple model of fertility in which children are a public good for a family with ancestral beliefs because they continue the family line. However, whether one's children continue one's lineage depends on the kinship system: while this is the case in a patrilineal system, children only continue the mother's lineage in matrilineal societies. The model predicts that 1) ancestral beliefs have a stronger positive influence on fertility in patrilineal societies; and 2) in groups with ancestral beliefs, very specific free-riding behaviors emerge: in patrilineal societies, male fertility decreases with the number of brothers, whereas in matrilineal societies, female fertility decreases with the number of sisters (but not brothers). These predictions are supported by the data.

Keywords: Fertility, Sub-Saharan Africa, Culture, Supernatural Beliefs, Kinship

JEL Classification: O12, J13, Z12, Z13

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1. Introduction

The fertility transition in sub-Saharan Africa (hereafter SSA) has been described as different from that of other low- and middle-income countries. It started later, from higher fertility levels, and has occurred at a slower pace (Bongaarts and Casterline, 2013; Bongaarts, 2017; Shapiro and Hinde, 2017; Schoumaker and Sánchez-Páez, 2024). However, there is no consensus as to why (Casterline, 2017). Conventional demographic transition theory, which focuses almost exclusively on the importance of material conditions and individual choices, fails to predict Africa's fertility trends, and supply-side interventions aimed at curbing fertility have often been disappointing (Dupas et al., 2024).[1]

The limitations of conventional demographic theory in understanding the factors that contribute to the stalling of fertility decline suggest room for alternative explanations that consider the importance and evolution of cultural norms, values and practices, often rooted in traditional beliefs, to better understand the observed patterns of reproductive variation (Caldwell and Caldwell, 1987, 1988, 1990; Casterline, 2017). In particular, the influence of religious and cultural beliefs has been overlooked in economics, despite its prevalence and importance for human behavior (Butinda et al., 2023).

This paper contributes to the explanation of the "puzzle" of persistently high fertility in SSA. I examine the importance of a belief system that emphasizes the role of ancestors (the spirits of the dead), who are believed to influence people's lives and have a strong interest in the continuation of their lineage into which they may be reincarnated (Radcliffe-Brown, 1922; Fortes, 1965; Caldwell and Caldwell, 1987). In these societies, the living are only a fraction of a lineage composed of both alive members and ancestors, and their common goal is the reproduction of the lineage. To this end, the ancestors bless the fertility of their descendants, bring wealth, health, and children, and reincarnate. The resulting belief system works to maintain high fertility by placing great emphasis on the continuation of the family line, and has shaped societies to reward high fertility (both socially and spiritually). Most of the powers attributed to the ancestors are therefore related to family survival, and high fertility is morally associated with right living, joy,

[1] Much of the literature has focused on the role of factors related to the region's (low) economic development: low income, high infant mortality, low education, high participation in agriculture, low urbanization, and low access to health and family planning services (World Bank, 1986; National Reseach Council, 1993). Yet, conditional on these factors, fertility rates remain about one birth higher in SSA (Zipfel, 2022).

and ancestral approval, while low fertility, miscarriage, or infertility is associated with sin and misfortune, showing ancestral disapproval and punishment.

I proceed in two steps. First, I build on a rich demographic and anthropological literature and combine first-hand data with novel ethnographic information and historical and contemporary surveys to examine the relationship between beliefs in the influence of ancestors and fertility in SSA. I find a strong and positive relationship between ancestral beliefs and fertility rates, of about one additional child in the most accurate specification. This relationship holds for different samples, econometric specifications, and time periods. First, I examine a sample of rural farmers in contemporary Benin, where I accurately measure beliefs in ancestors using first-hand data. Second, I focus on colonial Democratic Republic of Congo, where I measure the practice of ancestor worship[2] at the ethnic group level before European colonization, and where I compare migrants with origin-destination fixed effects but with different beliefs. Finally, I show that these results generalize to the wider context of sub-Saharan Africa by using individual-level information on contemporary supernatural beliefs from 25,000 respondents distributed across 19 SSA countries, and that the link between beliefs in ancestors and fertility exists as well in the oral traditions of preindustrial societies.

In the second part of the paper, I show that the positive influence of ancestral beliefs on fertility is specifically due to the motive to continue one's lineage. I develop a simple model of fertility decisions that incorporates the total number of children in the lineage as a public good because they continue the family line. However, whether one's children belong to one's lineage depends on whether the kinship system is patrilineal or matrilineal, due to the asymmetry in marital allegiances (Fox, 1983).[3] The model makes

[2]I will use the term "*ancestor worship*" as a synonym of beliefs in ancestors throughout the paper. However, there is controversy over the suitability of the term ancestor worship in the African context. For example, Kenyatta (1965) prefers the term "*communion with the ancestors*", as he mentions that communing with the ancestors is an aspect of the everyday life of the African (ancestors are still members of the community), and their attitude towards ancestors is very different from their attitude towards the deity (who is truly worshiped). Similarly, Grande (2024) notes that "Ancestorism is not always a matter of ancestor worship. It is most often a matter of ancestral spirits helping sustain the living family while being sustained by it in return (through rituals)."

[3]In patrilineal societies, lineage is traced through male members, while in matrilineal societies lineage is traced through female members. From the men's perspective, the lineage is continued by one's children and by the children of one's brothers in patrilineal societies, and by the children of one's sisters in matrilineal societies. This is because the husband does not belong to the lineage of his wife in matrilineal societies. From the women's perspective, the lineage is continued by one's children and by the children of the husband's brothers in patrilineal societies, and by one's children and the children of one's sisters in matrilineal societies. The asymmetry comes from the fact that women in patrilineal societies do belong

two main predictions. First, the influence of ancestral beliefs on fertility is quantitatively stronger in patrilineal societies, where both spouses and children belong to the same lineage, than in matrilineal societies, where the husband does not belong to his wife's lineage and the children belong exclusively to their mother's lineage. Second, there is a very specific free-rider behavior among siblings. In patrilineal societies with a strong belief in ancestors, the number of the husband's brothers contributes negatively to fertility, since their children also continue the husband's lineage (but the husband's sisters and their children belong to a different lineage, that of their husbands). In contrast, female fertility is negatively related to the number of sisters (but not brothers) in matrilineal societies, because the children of the wife's sisters belong to the wife's lineage (but the children of the wife's brothers belong to the lineage of their wives).

I test these predictions and find that: 1) the positive influence of ancestor worship on fertility is driven by ethnic groups where patrilineality is the main type of descent; [4] And 2) I find that there is negative relationship between one's fertility and the number of family members capable of continue one's lineage with their own children. I show that there is a negative relationship between women's fertility and the number of sisters they have (but not with the number of brothers), but only in matrilineal societies with strong beliefs in ancestors. Following the same logic, I show that there is a negative relationship between male fertility and the number of men aged 15-49 living in the household, but only in patrilineal societies with strong ancestral beliefs.[5]

To further validate the theory at hand, I examine some additional implications. First, I examine the relationship between belief in ancestors and contraceptive use. In particular, this analysis allows me to confirm the importance of demand factors. Focusing on the context of Benin, where I compare people living in the same places but with dif-

to their husbands' lineage. Therefore, one's children always continue one's lineage in patrilineal societies, while children only continue the mother's line in matrilineal societies. See Appendix L for a simple introduction to kinship systems.

[4]Similarly, I show that the positive effect of patrilineality on fertility is only present when ancestor worship is practiced, which helps to better understand the positive relationship between patrilineality and fertility suggested in different contexts (BenYishay et al., 2017; Okafor et al., 2021; Fontenay et al., 2024). I provide supportive evidence that group membership (parents and children belonging to the same lineage or not) is a key mechanism for understanding the relationship between kinship structure and fertility.

[5]Unfortunately, the DHS does not include information on siblings for men, so I use the number of men in the household aged 15-59 as a proxy for the number of men able to continue the respondent's lineage by having children.

ferent beliefs (and therefore facing the same supply-side constraints related to access to contraceptives), I show that traditional beliefs are associated with lower contraceptive use and higher fear of side effects (infertility), providing additional evidence for the importance of demand rather than supply factors in explaining low contraceptive uptake in sub-Saharan Africa (Bau et al., 2024; Dupas et al., 2024). Second, I examine how the relationship between ancestral beliefs and fertility depends on two different types of social organization. Because ancestral beliefs are closely linked to kinship and lineage structures (they represent the extension of the core elements of many African societies – ancestry, kinship, and descent relations – into the supernatural sphere and emphasize the importance of extending one's lineage), I examine whether ancestral beliefs disappear as the lineage-based structure of societies becomes less salient. I make use of the distinction between lineage or kin-based societies and age-based societies (Moscona and Seck, 2024). In the latter, the main social groupings are formed by people from the same age group, rather than by people from the same kin group or lineage. I show that the relationship between ancestor worship and fertility is stronger in lineage-based societies than in age-based societies, where social units are organized "horizontally" rather than "vertically.

Overall, these results are consistent with a setting where the motive to continue the family line drives fertility upwards. I highlight the importance of taking into account how belief systems interact with important elements of the social structure in shaping economic behavior. Furthermore, this analysis suggests that future fertility decline will probably be accelerated by factors that contribute to the dissolution of clan-based institutions centered on the lineage and the extended family (e.g., increases in population density and the emergence of private property rights), which in turn impact the persistence of traditional belief systems that sustain high fertility.

This paper contributes to several strands of the literature. First, I contribute to existing analyses of the determinants of high fertility in SSA (see Church et al. (2023) for a recent review), and in particular to the literature on the relationship between cultural norms, social organization and fertility. More than 70 years ago, Lorimer (1954) noted the relationship between high and stable fertility and unilineal descent groups. Three decades later, a growing literature complemented Lorimer's analysis by linking the importance of descent in many African societies to their belief systems and certain aspects of their

social organization, which focused on maintaining the family line and reverence for ancestors (Caldwell and Caldwell, 1985, 1987, 1988, 1990; Lesthaeghe, 1989; Caldwell et al., 1992). However, although the relationship between religious and cultural beliefs and fertility behavior has been extensively studied in evolutionary demography and cultural anthropology, it has been overlooked in economics. To the extent of my knowledge, I am the first to quantify the influence on fertility of one of the most prevalent belief systems in the context of sub-Saharan Africa. These findings, in addition to highligh the importance of beliefs quantitatively, provide theoretical insights that contribute to better understand the mechanisms through which kinship structure affects socioeconomic outcomes, as well as the determinants of children's demand, which may in turn be valuable to draw policy recommendations (e.g., to increase contraceptive uptake).

My findings also contribute to the growing literature in economics that examines whether today's fertility preferences and behaviors may be shaped by some features of social systems and institutions, including clan linkages (Bauer et al., 2006), inheritance rules (Fontenay et al., 2024; Sage, 2023), need for old-age security due to the lack of social pensions (Chen and Roth, 2023; Rossi and Godard, 2022), the occupational structure of SSA societies (Zipfel, 2022), perception of social norms (Dupas et al., 2024) or by responses in family institutions to disruptions in traditional practices and modes of production triggered by colonial institutions such as Christian missions (Guirkinger and Villar, 2022) or forced labor migration (Dupas et al., 2023). I contribute to this literature by highlighting the importance of considering the role and evolution of cultural and religious beliefs, norms and practices. Moreover, my findings emphasize the importance of taking into account the nature of the kinship and political organization of societies to better understand how religious and cultural beliefs influence behavior and impact socieconomic outcomes, which goes in line with a long tradition in anthropology (Fortes, 1953). Finally, my findings highlight the role of men's beliefs and motivations to understand reproductive patterns. In fact, it is surprising that, although it is well recognized that men in sub-Saharan Africa have higher bargaining power than their spouses and are in many cases the sole decision-makers regarding fertility, most papers examining fertility outcomes focus exclusively on the role of women's characteristics. I show in this paper that men's incentives, for example in the form of differences in the strength of the motive to continue one's lineage depending on the kinship system, are key to

understand high fertility.

This paper also contributes to the scarce but growing literature on the relationship between religion and fertility in Sub-Sahara Africa (e.g., Ishak and Gradstein (2022), Berger and Dasré (2024), or Götmark and Turner (2023) for a review). Most often, these papers compare the fertility trajectories of major religious groups, mainly Christians and Muslims, relying on the Demographic and Health Surveys. The general consensus is that Muslims have higher fertility than Christians, while followers of African Traditional Religions and Islam have similar fertility levels. This differential fertility is largely explained by the position of women within households. However, these papers have important limitations. First, conventional demographic surveys such as the DHS are very problematic to study these questions since they under-report the importance and the coverage of African traditional religions and beliefs (which, although more common among followers of African Traditional Religions, are transversal to religious affiliations and to socieconomic conditions). The under-reporting of African traditional religions is mainly a consequence of the influence of missionaries, who promoted monotheistic religions as the only socially acceptable choice (Neill, 1991; Le Rossignol et al., 2022). Therefore, people usually report being a follower of a "missionary" religion (Christianism or Islam) while holding strong traditional beliefs, which is not captured in these surveys. I circumvent these limitations by focusing on the influence of specific beliefs rather than on declared religion.[6]

Finally, I contribute to the broad literature on the importance of cultural characteristics for socioeconomic outcomes (e.g., Luttmer and Singhal 2011; Alesina et al. 2013; Alesina and Giuliano 2015). Regarding fertility, Fernández and Fogli (2009) study how fertility rates in the country of ancestry of second-generation American women have a positive and significant effect on their number of children. In particular, this paper adds to a growing literature on the effects and consequences of traditional supernatural beliefs in Africa (Gershman, 2016, 2022; Stoop et al., 2019; Alidou and Verpoorten, 2019; Stoop and Verpoorten, 2020; Sievert, 2023; Nunn and Sanchez de la Sierra, 2017; Igboin, 2022;

[6]The under-reporting of African traditional religion varies by context. For example, Stoop et al. (2019) focus on Benin to examine the relationship between African traditional religion (Voodoo) and the demand for conventional healthcare. In this setting, adherence to Voodoo suffers less from the caveats presented above, since Voodoo is awarded the same status as monotheistic religions (it is mentioned explicitly in the constitution as an official religion), so traditional religion adherence is a better proxy for traditional religious beliefs.

Butinda et al., 2023). However, most of the papers related to aspects of African Traditional Religions have focused on the consequences and nature of "witchcraft", while other prevalent belief systems have received little attention, such as ancestor worship. Most of the effort dedicated to the recent study of ancestor worship comes from cultural anthropology. Indeed, no paper has examined the economic and social consequences and implications of beliefs in ancestors in the context of sub-Saharan Africa from a quantitative perspective, despite being recognized that these beliefs are prevalent and relevant to economic behavior.[7]

The remainder of the paper is organized as follows. Section 2 introduces the context and describes why there exists a close relationship between beliefs in ancestors and fertility. Section 3 presents the different datasets and variables used in the empirical analysis. Section 4 describes the different specifications and depicts the main results. Section 5 proposes a simple theoretical framework to better understand the empirical regularities. Finally, Section 6 tests some of the theoretical predictions and shows that the motive to continue one's lineage is key to explain the empirical results. Section 7 concludes.

2. Traditional religion and ancestorism in Africa

The belief in the ancestors is usually identified as one of the main components of African Traditional Religions (Idowu, 1973).[8]

According to Asante (2009), "ancestors are those who once lived in human society and,

[7]There are studies investigating the role of ancestor worship practices and fertility in other contexts, such as China. For instance, Zhang (2024) exploits a natural experiment, the Kuomingtangs Retreat to Taiwan, which resettled approximately one million Chinese in Taiwan between 1945 and 1954, to show that ancestor worship (a cultural feature of the Chinese population) contributed to the transmission of son preference and high fertility rates. Hu and Tian (2018) examine the case of contemporary China. They find a positive correlation between current ancestor worship practices and childbearing and marriage outcomes. In the same context, Yang and Spencer (2022) find that the number of male siblings have a negative influence on fertility decisions, especially when individuals attribute high importance to family continuity. As the authors suggest, these findings are consistent with a free-rider behaviour in the context of a patrilineal kinship system where fertility is at least partially driven by the motive to continue a family line.

[8]An exhaustive description of African Traditional Religions (ATR) is beyond the scope of this paper (see Idowu (1973), Mbiti (1975), Opoku (1993) or, more recently, Olupona (2014) for detailed descriptions. According to Idowu (1973), five elements go into the making of ATR: belief in God, belief in the divinities, belief in spirits, belief in the ancestors, and the practice of magic and traditional medicine. Of course, the weight of each of these components varies from society to society, ranging from very prominent in some areas to virtually absent in others.

having fulfilled certain conditions, are now in the realm of the spirits".[9] The belief in ancestors has often been considered a crucial element of the traditional belief system of many African societies (Fortes, 1965). In contrast to cults of the dead, anthropologists have observed that the key characteristic of ancestors is the belief that the dead person continues to influence society (Radcliffe-Brown, 1922). This view can be summarized as follows:

> "Ancestors are vested with mystical powers and authority. They retain a functional role in the world of the living, specifically in the life of their living kinsmen [...]. African kin-groups are often described as communities of both the living and the dead [...]. The African emphasis is clearly not on how the dead live but on the manner in which they affect the living (Kopytoff (1971), p.129)".

Therefore, ancestors, or the living dead, are seen as dispensers of both favor and misfortune, and their powers are most often used to ensure the survival of the lineage, for example, by contributing to the unification of families and people, or by protecting them from disease, evil, or enemies. However, ancestors are also believed to be the source of illness, misfortune, or disruption in the lives of their descendants, with their ultimate power being the curse that brings sterility and child death (Fortes, 1965; Caldwell and Caldwell, 1987; Ezenweke, 2008).

A final aspect relates to the prevalence of the belief in ancestors in sub-Saharan Africa as compared to other parts of the world. Some authors (e.g.,Kenyatta (1965)) prefer the term "*communion with the ancestors*" rather than ancestor worship to distinguish between the belief system of many African societies and the cult of the ancestors that exists in other regions, particularly Southeast Asia.[10] In Appendix A, I discuss other reasons why this belief system is more important in the context of sub-Saharan Africa than in any other region.

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[9]The question of who established these criteria is not entirely clear (Igboin, 2022). However, some of these conditions, often of a moral and social nature, are common to different societies. For example, one must have lived an exemplary life by the standards of the community, respected the elders, married, and had children. In addition to having children, an additional criterion often mentioned is to have at least one son who will worship him, while having only female children may not be enough to become an ancestor. On the other hand, death should be natural and at a mature age, and proper burial rites must have taken place.

[10]Similarly, Grande (2024) notes that "Ancestorism" is not always a matter of ancestor worship. It is most often a matter of ancestral spirits helping sustain the living family while being sustained by it in return (through rituals).

2.1. *Implications of Ancestor Worship on Fertility in SSA*

Why are beliefs in the ancestors closely related to fertility behavior in SSA? To answer this question, it is important to emphasize that ancestor worship belongs to the realm of kinship and lineage structures (Fortes, 1965; Gong et al., 2021). As Fortes (1965) notes, ancestor worship is a lineage cult in many African societies – that is, a cult of the basic politico-jural unit of many African societies, rather than of the domestic sphere.[11] Similarly, Turaki (2000) mentions that "the ancestors are the most powerful, basic and primary component of the *kinship system* of an African community". In fact, ancestor worship is the extension of the core elements of many African societies – ancestry, kinship and descent relations – to the supernatural sphere (Fortes, 1965; Caldwell and Caldwell, 1985).

The belief in the intervention of ancestral spirits in everyday life and the need for descendants to ensure the survival of the lineage is continuous with the social structure. The lineage is thus understood as "a group of descent stretching back infinitely and with an enormous spiritual investment in reaching indefinitely into the future" (Caldwell and Caldwell, 1987). Only a portion of the entire lineage is alive at any one time, and its extension into the future is the central concern of both living lineage members and ancestors. Ancestors maintain their connection to the lineage after death, and each new birth into the lineage is a way for an ancestor to return through reincarnation (Mbiti, 1975).[12] In fact, some authors argue that an African community consists of the unborn living (those who are about to be reincarnated), the living, and the living dead (those who are deceased but still influence the living) (Turaki, 2000). Qualitative evidence from

[11] This is easily seen in matrilineal societies, where it is the mother's brother who becomes an ancestor, rather than the father himself.

[12] For example, among the Fon of Benin, the Yoruba of Nigeria or the Beng people of Côte d'Ivoire, new children born into the family are believed to be reincarnated when an old person has recently died, and children are often named to identify the ancestors reborn in their form (Caldwell and Caldwell, 1987; Osanyìnbí and Falana, 2016). Ancestors may return in more than one child in a family. For example, (Idowu, 1973) notes for the Yoruba that "it is believed that [ancestors] reincarnate not only in one grandchild or great-grandchild, but also in several contemporary grandchildren and great-grandchildren who are brothers and sisters and cousins, aunts and nephews, uncles and nieces, *ad infinitum*". Similarly, in the context of urban South Africa, Anderson (1993), p.27, reports: "One respondent said that in 1986 she had a dream in which she saw she was pregnant. Someone took her to a big stone (probably a gravestone) on which was written the name "Isaac." The following day she enquired from an older family member, who said that Isaac was a grandfather who had died many years previously. A month later the respondent fell pregnant and a baby boy was born, whom she had to call Isaac. She then prayed and thanked the ancestors for their gift of the child. The child thereby, following traditional custom, received the "ancestor spirit" of the deceased ancestor Isaac."

first-hand data collected in Benin confirms the close link between ancestors and the importance of lineage extension: 95% of those who believe in ancestors ($n = 1788$) also believe that their ancestors are deeply concerned about the continuation of their lineage. This is all the more important because in societies organized hierarchically by age, where ancestors usually have even greater authority than elders.

The emphasis on ancestry and descent and the consolidation of lineage - that is, the succession of generations - as a key element of these societies have important demographic consequences. Molnos (1973), who mentions that continuing the lineage and commemorating ancestral spirits is one of the precise reasons for wanting "as many children as possible" among societies in East Africa, states:

> "The paramount objective of having children was that there should always be a living descendant to remember and honor the departed. Children meant the continuation of the lineage and the perpetuation of the family name and spirit. Descendants were needed to perform funeral ceremonies, to ensure that the parents, unlike childless people, be buried, and that the ancestral spirits be commemorated by erecting shrines, pouring out libations and offering food [...]. Among the Chaga of the north-eastern section of the United Republic of Tanzania, for instance, children were seen as a sign of approval of the parents' marriage by their forebears, and *lineages competed by producing numerous offspring for the favor of ancestors on whom their welfare was deemed to depend* (Molnos (1973), p.129)".[13]

These factors point at the importance of the *quantity* rather than the *quality* of children and emphasize the importance attached to the continuation of the family line. In this regard, the qualitative literature on ancestor worship does not highlight the emergence of any specific quantity-quality (QQ) trade-off in these societies (one could think, for example, that parents would invest more in those children who are believed to be reincarnated ancestors), which goes in line with the quantitative literature on the absence of a QQ trade-off in SSA (Alidou and Verpoorten, 2019).

The argument presented above can be interpreted as an extension of the well-known "old-age security motive", whereby people's needs for old-age support raise the demand for children.[14] In vertical systems of transmission where the continuation of the family

[13]Similarly, Kuper (1961) notes that "the existence of the ancestors depends, in Swazi dogma, on the continuation of the family, and their well-being depends on family prosperity". She cites two examples of men who, "after recovering from serious illnesses, stated that they had actually returned from the dead to take wives and produce children and leave the family name on earth".

[14]See Lambert and Rossi (2016), Rossi and Godard (2022), or Sage (2023) for evidence of the old-age security motive for fertility in the African context.

line is of central importance due to the influence of ancestors, the question of "security" has two different facets (Goody, 1973). In addition to the standard security in old age, there is the security in the after-life which drives the demand for children in the same way as the former, and which can be obtained by making provision for the continuity of the family estate.[15]

Maintaining the lineage remains one's responsibility, whether in the human world or in the ancestral world. To this end, ancestors bless their progeny's fertility, provide wealth, health and children to the family, and undergo reincarnation (Grande, 2024; Olupona, 2014). It is therefore not surprising that the most common use of ancestral powers is related to lineage survival and the well-being of the kinship group. Crucially, high fertility is morally associated with joy, recognition, right living, and shows the approval of ancestors. On the contrary, low fertility or infertility are associated with misfortune, sin, mistreatment, marginalization, and shows the disapproval of ancestors.[16] Rituals or other reparations are usually performed to reverse these situations (Caldwell and Caldwell, 1987).[17]

3. Data

I study the role of traditional religious and cultural beliefs in the influence of ancestors on fertility. To study this question, I rely on several datasets from different contexts and time periods, some of which have never been used in economics. These datasets, which span more than a century, allow me to test the relationship between ancestral beliefs and fertility in different contexts, at different levels of aggregation, and with different levels of precision and representativeness. I first present the most specific setting, rural Benin, where I can measure ancestral beliefs very accurately. I then present different data sets

[15]In this regard, Olupona (2014) notes that a proverb about the Yoruba says "If the land of the ancestors is full of gold and diamonds, they will not return to the human community to solicit gifts", and, importantly, he recognizes that it emphasizes that the ancestors need their descendants to sustain themselves in the afterlife as much as the living need them in old age.

[16]There is no consensus about ancestral punishment. As Mekoa (2019) notes: "Although childlessness is sometimes blamed on angry ancestors, it is usually called the work of the witches because ancestors are generally interested in the growth of their own clan".

[17]Fear to infertility has been shown to be an important barrier to modern contraceptive methods uptake in SSA (Ochako et al., 2015), and therefore informing about the real risks and consequences of contraceptives rather than focusing on supply side frictions may be important to address the low contraceptive take-up. However, beliefs are difficult to change, and more research is needed in this area (Dupas et al., 2024).

where ancestral beliefs are not measured as precisely, but where the external validity is higher.

3.1. First-hand data from Benin

I start by examining first-hand data that I collected in southern Benin. The sample consists of 943 households living in rural areas. The respondents were randomly selected, subject to inclusion criteria (e.g., having more than 0.5 hectares of land), as part of a large project to support women in pineapple production.[18] The main survey was conducted in 2024 in a standard face-to-face setting. Respondents were also randomly assigned to enumerators to minimize enumerator bias. Along with a comprehensive set of socioeconomic characteristics and fertility outcomes, I directly asked about traditional beliefs in ancestors. The main variable I use to measure ancestral beliefs use the answer to the question "*do you believe that the spirits of your ancestors have an influence on the events of your life?*"[19][20]

3.2. Zaïre and contemporary Democratic Republic of Congo

West Zaire Surveys (1975-77) and Jan Vansina's Congo's Ethnography.– I use original information from two demographic surveys conducted in the western part of the DRC between 1975 and 1977 (see Appendix F for details of these surveys).[21] The first contains individual-level information on 250,000 individuals in 43,000 households living in seven major cities in the DRC (in tables I refer to this survey as the urban sample). The second includes individual-level information on almost 50,000 individuals in 11,000 households

[18] Both husband and wife were supposed to be interviewed in each household. However, because the project focused on women, some households only included the woman (71/943) because she is not married or because the husband was not present at the time of the survey (29/872).

[19] An example was provided after each question to clarify its meaning. Regarding the first question: "For example, do you think that if you are lucky in your income-generating activities, it is because your ancestors are behind you? Regarding the second question: "For example, do your ancestors influence the health of your children or protect them from bad events?".

[20] This variable is rather a measure of the *strength* of individuals' traditional beliefs in ancestors. In fact, qualitative interviews revealed that it is possible to answer negatively to this questions while still believe in the *existence* (rather than influence) of ancestors. The estimates are likely to represent a lower bound of the true effect.

[21] Although these surveys have been used by demographers to create statistics at an aggregate level (see, for example, Tabutin (1982) or Shapiro (1996)), the use of the microdata is rather unique (they have only been used in Alvarez-Aragon et al. (2023) and Guirkinger and Villar (2022)).

distributed across four regions, and covers both rural and urban areas, excluding the large cities included in the urban survey (in tables I refer to this survey as EDOZA). Moreover, each woman over the age of 13 reported her birth calendar, including the exact dates of birth, the sex of the children, and the dates of death where applicable. Moreover, respondents' ethnicity[22] was also recorded and coded according to the classification of Vansina (1966), which allows me to match these surveys to the ethnicity-level information on beliefs in ancestors present in Vansina (1966)'s book.[23]

Vansina (1966) is the main ethnographic source that I use to measure the prevalence of beliefs in ancestors at the ethnicity-level in the DRC. From this book I have digitized original ethnic-level information on the practice of ancestor worship. I constructed a dummy variable that equals one if it is explicitly mentioned that an ethnic group practices ancestor worship. For example, this variable will take the value of one for the ethnic groups of the Balese-Komo region, as Vansina (1966) says:

> "The Creator was often equated with the first ancestor. But a cult of the Creator is only mentioned among the Balese [...]. Ancestor worship was present everywhere. Chickens were sacrificed and offerings made [...]. A few protective charms, which ensured human fertility, were common (Vansina (1966), p.100)".

This ethnographic source has two clear advantages. First, it contains explicit information on the main variable of interest so no proxy is needed. Second, it provides a much more detailed description of the ethnographic landscape of the DRC than traditional datasets such as the Ethnographic Atlas. For example, while the EA records 60 ethnic groups in the territory of the present-day DRC, and about 400 for the entire SSA, this number increases to about 250 tribes in Vansina (1966). Of these, 66% practice ancestor worship. The matching procedure used here has also the advantage of taking migration into account, compared to matching techniques using purely geographical characteristics, and will allow me to exploit variations in ethnicity-level beliefs in ancestors among

[22]Rather than ethnic groups, ethnicity here should be understood as "tribe". In Vansina's book, several tribes may form an ethnic group, and ethnicities are grouped together in cultural regions. However, for the purpose of this paper, where I use the characteristics of these "tribes", I use the most granular information possible, and will use ethnic group instead of tribe for the sake of expôsition clarity (as I will use as well information from the Ethnographic Atlas (Murdock, 1967) and Barezkin's Folklore and Mythology Catalog (Berezkin, 2015), which use ethnic groups as their unit of analysis).

[23]Cogneau and Dupraz (2015) wonder to what extent the classifications of ethnic groups made by anthropologists have influenced the classifications used by the surveys. In the case of the demographic surveys used here, their codebook explicitly mentions that they adapted the questionnaires to record ethnicity as classified by Vansina (1966).

migrants of the same origin and destination, thus isolating beliefs from local economic conditions and institutions. Overall, I am able to match about 60,000 women over the age of 13 with the information provided by Vansina (1966).[24]

DRC Demographic and Health Surveys (DHS).– Finally, I complement the analysis with the two available rounds of the Demographic and Health Surveys available for the Democratic Republic of the Congo (2007-2013), a nationally representative survey that provides detailed information on education, literacy, occupation, religion, fertility preferences, and contraceptive methods. I use data from both the men's and women's questionnaires. In total, there is information on about 40,000 individuals living in 785 clusters. I follow the methodology of previous studies (i.e., Lowes, 2022) and use location to match the DHS data with the ethnographic information.[25] To do this, I combine the location of each DHS cluster with a digitized version of the map of ethnicities from Vansina (1966). The matching procedure is shown in Appendix C.

3.3. Sub-Saharan Africa: Pew Research Center's Forum on Religion and Public Life

In an attempt to examine the external validity of the previous analysis performed in two specific contexts, I use individual-level information on contemporary supernatural beliefs from 25.000 respondents in 19 SSA countries. This information comes from a survey conducted between December 2008 and April 2009 by the Pew Research Center's Forum on Religion and Public Life (Pew Research Center, 2009). It includes individual-level information on religious beliefs, practices, knowledge, and attitudes toward other faiths for about 25,000 respondents in 19 sub-Saharan African countries. I measure the strength of ancestral beliefs by using the responses to the following question: "*Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?*".[26] Finally, this survey also contains information on socio-demographic

[24]This figure represents about 70% of the total number of women over the age of 13 included in the demographic surveys. Of the non-compliant subsample, 30% are individuals born in a country other than the DRC.

[25]Using self-reported ethnicity to match the DHS data with Vansina's information on ancestor worship is less satisfactory because the information on ethnicity in the DHS for the DRC is very limited, and the match of the DRC ethnicities with the Ethnographic Atlas is quite difficult. In fact, only 7 different ethnicities (or groups of ethnicities) are recorded in the DHS (compared to about 130 after matching with Vansina).

[26]I show that my results do not change when using different measures of ancestral beliefs. For example, I construct a dummy variable that equals one if the respondent answers "*yes*" to the question "*Do you*

characteristics such as age, gender, education, marital status, religion, number of children, region of residence within the country, or self-reported income status.[27] Appendix D.1 shows the spatial distribution of the main explanatory variables.

3.4. Berezkin's Folklore and Mythology Catalogue and Ethnographic Atlas

Beliefs in ancestral influence may have been widespread in preindustrial societies. To show that this relationship is not driven by other factors affecting the post-independence fertility trajectories of societies, I explore whether the relationship between beliefs in ancestors and fertility exists in the oral traditions of pre-industrial societies across the globe, when ancestral beliefs were likely prevalent worldwide. The most widely used data set in economics for the study of pre-industrial societies is the Ethnographic Atlas (EA), which collects detailed ethnographic information on 1,265 ethnic groups spread across the globe (Murdock, 1967). However, the EA does not include information on fertility or ancestor worship. Therefore, I supplement the EA with data on more than 2,500 folkloric motifs in 958 oral traditions from Berezkin's Folklore and Mythology Catalogue (Berezkin, 2015). Michalopoulos and Xue (2021) digitized the information in Berezkin's catalog and created a comprehensive dataset that includes the proportion of folkloric motifs in the oral tradition of ethnic groups related to different concepts.[28] These motifs are considered to be the building blocks of oral traditions, representing their characteristics, important experiences, events and images (Galor et al., 2023). This information can be particularly valuable because culture is transmitted from generation to generation through oral traditions such as myths, folklore, stories, or proverbs.[29] I measure ancestral beliefs in pre-industrial societies by looking at the proportion of folkloric motifs in an ethnic group's oral tradition related to the word *ancestor*. Similarly,

believe that sacrificing to spirits or ancestors can protect you from bad things happening?". Another alternative is to construct a dummy variable equal to one if the respondent answers "*yes*" to the following question: "*Which, if any, of the following do you believe in? Reincarnation*".

[27] As with the first-hand data from Benin, this survey measures ancestral beliefs at the individual level, and therefore does not consider ethnicity as the only vector of cultural transmission, since the analysis here does not rely on ancestral ethnic group's characteristics.

[28] They also validate the content of the catalog and link the groups in Berezkin's collection to the EA.

[29] Even in recent times, the presence of ancestors in the culture of many African societies is widespread (not only in their oral and written traditions, but also in their art). For example, Appendix B shows a poem written by the Senegalese writer Birago Diop (1906-1989) in 1960. Appendix B.3 shows the statue of an ancestor from Katanga province. Interestingly, it is a male statue who is pregnant male, highlghting the central importance of the succession of generations.

I proxy the importance of fertility in pre-industrial societies by looking at the proportion of motifs related to the word *birth* in an ethnic group's oral tradition.[30]

4. The influence of ancestral beliefs on fertility

4.1. Evidence from Contemporary Benin

I start by examining the relationship between beliefs in ancestors and fertility using first-hand data collected among a sample of (mostly married) rural households ($n = 943$) in southern Benin. This is a valuable context that allows me to disentangle alternative mechanisms: almost everyone's main activity is agriculture (98% of men and 90% of women have agricultural fields), fertility is still very high (the average number of children ever born is close to 8 for men and above 5 for women, and 42% of married households are polygamous), and the clan-based structure of the society is pervasive (45% of men and 41% of women have received pressure from their extended family or clan to increase their number of children). Moreover, I can accurately measure ancestral beliefs, which are widespread: 43% (31%) of men (women) believe that ancestors have an influence on their lives (out of which 96% think that their ancestors are deeply concerned about the survival of their extended family and the continuation of their lineage).

The baseline specification, estimated through ordinary least squares, takes the following form:

$$Y_i = \alpha + \beta_1 AncestralBeliefs_i + X_i'\Phi + \epsilon_i \quad (1)$$

Where Y_i is the total number of children ever born and $AncestralBeliefs_i$ is a dummmy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. The vector X_i' includes an extensive set of control variables. As baseline controls, I always include age, age squared, education, and whether the household has access to electricity. Second, I add additional control variables that help me to disentangle alternative mechanisms: total number of agricultural fields, whether the household has a TV, and a dummy variable that takes the value 1 if respondent have experienced pressure from their extended family or clan

[30] I also use alternative measures. For example, I show that my results remain unchanged if I use the word *ancestral*, the combination of the words *ancestor* and *worship*, or the word *fertility* instead of *birth*.

to increase their number of children. Finally, I always include religion fixed effects (five main categories: Catholic, Celestial Church of Christ, Evangelical, Vodoun, and Other).

Qualitative evidence suggests that men are the main decision-makers regarding the number of children in this context. Therefore, I focus on two samples. First, I estimate equation 1 for men. Second, I focus on women and examine the effect of both husband and wife's beliefs. [31]

Table 1 presents the estimates for men while sequentially including different vectors of control variables. Columns (1)-(3) do not include religion fixed effects, while column (4)-(6) do. Columns (1) and (4) do not include control variables, while columns (2) and (5) include baseline controls (age, education, and access to electricity), and columns (3) and (6) include the full list of controls. Robust standard errors are reported in parenthesis. Across all specifications, I find a positive, stable and statistically significant relationship between beliefs in ancestors and fertility: holding strong traditional beliefs in the influence of ancestors is associated with more than one additional child. These effects are quantitatively large. The coefficient is similar to the effect of having attended school, or to the difference in the total fertility rate of SSA and other low-income regions.

Table 1: Beliefs in ancestors and male fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	1.848***	1.667***	1.188***	1.460***	1.267***	1.152***
	(0.379)	(0.345)	(0.298)	(0.388)	(0.350)	(0.355)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	7.995	8.016	8.016	8.012	8.029	8.029
N	846	832	832	841	830	830

Note. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

[31] Appendix G.4 replicates these results using information from women only, as well as looking at men but using the beliefs of both spouses as explanatory variable. Interestingly, the size of the coefficients is even higher when both spouses hold strong beliefs in the influence of ancestors, rather than the husband alone. These effects suggest some degree of complementarity between spouses and room for non-negligible importance of women's decision making.

Table 2 presents the estimates for women. Now, the explanatory variable of interest is a dummy that equals one if both husband and wife hold strong beliefs in ancestors. The same set of control variables as in Table 1 are included. Overall, these results strongly suggest that traditional beliefs in ancestors are still an important factor determining fertility outcomes.

Table 2: Beliefs in ancestors and female fertility in Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Men + Women beliefs	0.750***	0.641***	0.614***	0.825***	0.696***	0.704***
	(0.178)	(0.161)	(0.160)	(0.198)	(0.180)	(0.178)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	5.365	5.352	5.352	5.365	5.352	5.352
N	846	840	840	846	840	840

NOTE. Data: First-hand data collected in southern Benin. The sample is restricted to women. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Men + Women beliefs" is a dummy variable that equals one if both the husband and the wife answer *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Robustness.- Appendix G provides several robustness tests of the relationship between beliefs in ancestors and fertility. First, I show that the results do not change when I estimate an exponential regression model using a pseudo-Poisson maximum likelihood estimator, or when I use alternative definitions of the explanatory and dependent variables.[32] Second, I show in specification curves that these results are robust to the inclusion of additional control variables, such as polygamy, overall religiosity (measured as an indicator if the respondent donates money to the church when COVID happened), household size, or having livestock. I also show that the results are not driven by similar dynamics in fertility and ancestral beliefs over the life cycle or over time (same results when including age fixed effects). Third, I show that the results are robust to the use of the total number of *alive* children as dependent variable, to reduce concerns about

[32]Alternative measures of beliefs in ancestors are: dummy variable that equals one if the respondent answers *yes* to the question *Do you think that your ancestors' spirits care about your extended family and the continuation of the family line?*, or when I combine both measures and generate a third variable that equals one when at least one of the two variables takes the value one.

differential mortality. I also rule out that the effects are driven by differences in the inheritance rules of ethnic groups (Fontenay et al., 2024), or by differences in old-age security that could be correlated with ancestral beliefs (Rossi and Rouanet, 2015; Rossi and Godard, 2022; Sage, 2023).[33] Finally, I show that my results are extremely unlikely to be fully explained by unobservables, following Oster (2019)'s methodology. In fact, we would need that a 300%-2000% of the observed sorting on observables applied to unobservables to make the coefficient of ancestral beliefs equal to 0. Since observables include variables that are considered as highly important to explain fertility (i.e., age, education, religion, wealth...), this situation seems extremely unlikely.

4.2. Epidemiological approach: urban migrants in postcolonial D.R. Congo

I then examine the same relationship using unique individual-level data from women born during the colonial period in the Democratic Republic of the Congo (DRC). Examining these data is interesting for several reasons. First, because the digitization of Vansina (1966) allows me to directly identify the existence of ancestor worship at a granular ethnic group level. Second, because the DRC is one of the most prominent examples of delay in the fertility transition in Tropical Africa. In fact, fertility in the DRC increased during the second half of the 20^{th} century (Romaniuk, 2011). Third, the nature of the 1970s Demographic Urban sample, composed mainly of post-independence migrants from rural areas to seven major cities of the DRC, allows me to replicate the epidemiological approach introduced by Fernández and Fogli (2009). I exploit the heterogeneity in ancestral beliefs while holding constant the environment in which individuals grew up by comparing migrants who were born in the same territory and who live in the same city at the time of the survey, but whose beliefs in ancestors differ. This strategy is useful to rule out confounding factors related to the environment of individuals (either economic conditions or institutions).

The equation I estimate now takes the following form (with small variations depend-

[33] An additional concern in this setting could be reverse causality. In fact, having more kids could reinforce people's thinking about lineage and heritage, and make people feel blessed and thankful to ancestors. However, I think that this is unlikely to explain my results for several reasons. First, beliefs in ancestors are deeply-rooted cultural beliefs, whose origin is uncertain, and unlikely to emerge at the individual level. Second, the results with the historical data from the DRC alleviate this concern (see Section 4.2), since ancestral beliefs are measured at the ethnic group level, using information on the practice of ancestor worship before colonization from Vansina (1966).

ing on the specification). Let i denote individuals, e denote ethnicity, c denote city of residence, and r denote territory (or city) of birth.[34]

$$Y_{iect} = \beta_0 + \beta_1 AncestralBeliefs_e + X_i'\Phi + \alpha_{cr} + \epsilon_{iect} \quad (2)$$

Where Y_{iect} is a fertility outcome, $AncestralBeliefs_e$ is a dummy variable that equals one if the respondent belongs to an ethnic group that traditionally practiced ancestor worship. The vector X_i' includes an extensive set of individual-level control variables, such as age, age squared, whether the place of birth was rural or urban, education, whether the respondent is a migrant, whether respondent's father is alive at the time of the survey, employment status, whether the respondent works in agriculture (only available for the urban sample), and year of installation in the current city. Finally, α_{cr} denotes city of residence $\times$ territory of birth fixed effects. ϵ is an error term, and standard errors are clustered at the ethnic group level, since the treatment is constructed at that level. The presence of city of residency $\times$ territory of birth fixed effects means that, when estimating equation 2, the effect of ancestor worship is identified by comparing respondents from different ethnicities with different reliance on ancestor worship, living in the same city at the time of the survey and born in the same territory.[35]

The key underlying assumption when including origin-destination fixed effects is that culture is easier to carry across space than local institutions and economic conditions.[36] The empirical strategy employed here differs in several aspects from the seminal paper of Fernández and Fogli (2009). First, it is more demanding since it uses within-country variation in cultural beliefs. I compare individuals born close to each other (but from different ethnicity and with different beliefs in ancestors) instead of in different countries, holding constant both economic conditions and institutions also at the place of origin.

[34]The territory is the second administrative unit in the Democratic Republic of the Congo, smaller than the province. The 25 provinces of DR Congo are divided into 145 territories and 32 cities.

[35]The variation in the number of ethnicities by territory of birth is surprisingly high: on average, people from about 27 different ethic groups (tribes) are born in a territory (out of 220 in my sample). This ranges from only one ethnicity in 17% of territories, to 119 ethnicities in Kinshasa. See appendix H.1 for details.

[36]This strategy builds on the work of Fernández and Fogli (2009), who study how culture influences fertility by examining the behaviour of second-generation American women. They use past values of total fertility rates in their country of ancestry to proxy for cultural beliefs, and show that they still have a significant explanatory power for their number of children. Then, by comparing second-generation American women, they hold market and institutions constant while they may differ culturally as their parents' country of origin is different.

Third, I carefully control for the year of installation in the city of residence at the time of the survey, which allows me to eliminate concerns related to a potential correlation between time since migration and the prevalence of ancestral beliefs, which could confound identification and is often ignored in the literature (Bertoli et al., 2024). Finally, I contribute to the existing discussion by bringing a new explanation for the origin of different fertility preferences across individuals and social groups.

For each survey, I report the results for the total number of women over the age of 13 (columns 1, 3, 5, and 7) and restrict them to those over the age of 30 (columns 2, 4, 6, and 8), since most childless women are really young (75% of women under 20 are childless). First, belonging to an ethnic group with ancestor worship is associated with an increase in the number of children of about 20% in the full sample. The difference between urban and rural areas is not very large: the effect of ancestor worship on fertility in EDOZA (rural) sample of women over 30 is 22% of the mean, while it is 16% in the urban sample (note that when using the urban sample, I use the city of residence FE instead of the region of residence FE).[37] The urban sample allows me to include city of residence $\times$ territory of birth fixed effects (columns 7 and 8). The results remain robust and highly significant, although the magnitude of the coefficient is reduced, from about 19% of the urban sample mean when using city of residence fixed effects to about 8% when including the interaction with territory of birth. The difference in the magnitude of the coefficients is consistent with anthropological accounts that emphasize the close link between the social structure of a group and the customary norms, beliefs, and activities of that same group. Belief systems, customs, and activities that are tied to a coherent social structure are likely to become less important as individuals move away from that social structure, as migration implies. However, as Fortes (1953) notes, there are important factors of autonomy in custom, and custom cannot be reduced simply to a manifestation of social structure. The inclusion of origin-destination fixed effects here captures the autonomous effect of ancestral beliefs as a factor independent of the social structure in which they may have emerged, and it is therefore expected that their intensity will be reduced.

[37]Interestingly, the fertility rates of women over 30 are higher in the urban sample than in EDOZA. This is consistent with previous work examining fertility rates in large cities such as Kinshasa (Shapiro, 1996).

Table 3: Ancestor worship and fertility in the DRC

	Number of children ever born							
	Full sample		EDOZA		Urban sample			
	All	+30	All	+30	All	+30	All	+30
Ancestral beliefs	0.433***	0.861***	0.564**	1.052***	0.363***	0.833***	0.125**	0.349***
	(0.0967)	(0.205)	(0.246)	(0.387)	(0.0559)	(0.173)	(0.0480)	(0.128)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City x Territory FE	No	No	No	No	No	No	Yes	Yes
Mean Y	2.883	5.322	3.546	4.866	2.703	5.542	2.700	5.537
R-squared	0.528	0.246	0.407	0.267	0.576	0.252	0.587	0.281
N	60064	23194	12825	7551	47239	15643	47055	15491

NOTE. Data: Demographic Survey of 1970s and EDOZA. Columns 1 and 2 combine both the Urban Demographic survey and EDOZA. Columns 3 and 4 use only the EDOZA sample. Columns 5-8 use only the urban sample. In columns 2, 4, 6 and 8, the sample is restricted to women older than 30 years old. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestor worship" is a dummy variable that equals one if the ethnic group e practice ancestor worship. Controls include age, age squared, whether the place of birth was urban or rural, whether the respondent has primary education, dummy equal to one if migrant, dummy equal to one if the father's respondent is alive, dummy equal to one if the respondent is working, dummy equal to one if the respondent is a farmer (only available in the urban sample), number of household members, and year of installation in the current city. City/region fixed effects include city of residence in the case of the urban sample and region of residence in the case of EDOZA. Standard errors clustered at the Vansina's ethnic group-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Robustness.- Although these results are robust both to the inclusion of origin and destination fixed effects and to the inclusion of an extensive set of control variables, the main remaining concern is that of omitted variables. In this setting, as noted by Fernández and Fogli (2009), unobserved differences in human capital (once woman's education is controlled for) may bias the results if the unobserved component that depends on parental human capital varies with ethnicity in a way that is correlated with ancestor worship. For example, societies in which ancestor worship is important may have been less receptive to missionaries, which could have lowered the human capital of the ethnic network, broadly defined, relative to neighboring groups, affecting the probability of marriage or obtaining a job. To address this concern, I examine whether ancestor worship is related to wages. Indeed, if unobserved human capital accounts for part of the results, it should be reflected in wages. To do this, I resort to an expenditure survey which includes 1/50 of the total number of households identified in the same seven cities of the 1970s Urban Demographic Survey.[38] Table H4 in Appendix H reports the results from the regression of wages on ancestor worship and a vector of control variables, including education. An-

[38]See Appendix F for details about this survey.

cestor worship remains insignificant in every specification, suggesting that unobserved human capital is not responsible for the results.

An important limitation of the 1970s datasets is that they do not contain any information on religious beliefs. More importantly, the rapid expansion of Christianity in the context of the DRC took place hand in hand with missionaries' activities, which may have weakened family and ethnic lineages, and emphasized universal over family/ethnicity-centered moral values (Platteau, 2009; Reybrouck, 2014; Bergeron, 2023).[39] At the same time, exposure to missionary presence in colonial Congo had important effects on education (Alvarez-Aragon et al., 2023) and fertility outcomes (Guirkinger and Villar, 2022). In Appendix H, I construct a measure of exposure to missionary presence at birth for all individuals born before 1948 in the DRC using both the EDOZA sample and the urban demographic survey, and show that the positive influence of ancestor worship on fertility is not affected when I control for exposure to Christian missions.

Finally, I show that my results hold when I use age-specific fertility rates instead of total number of children ever born (Table H1), and when looking at both the extensive and the intensive margin, and are robust to the use of a pseudo-poisson maximum-likelihood estimator (see subsection H.3). This is important, as the dependent variable contains a large proportion of zeros (37% of women over the age of 13 in my sample). This is a well know fact in certain areas of Central Africa, known as the "infertility belt", specially before the 1990s (Bongaarts et al., 1984; Larsen, 2003), where infertility rates among married women could reach 25%.

4.3. Evidence from contemporary sub-Saharan Africa

Next, I zoom out and study the wider context of sub-Saharan Africa. Using data from the PEW research center, which collected detailed information of different types of contemporary supernatural beliefs, I estimate the follwing equation:

$$Y_{ic} = \alpha + \beta AncestralBeliefs_i + X_i'\Phi + \phi_c + \epsilon_{ic} \tag{3}$$

[39]The relationship between missionaries and the practice of ancestor worship is controversial. While some authors suggest that Christian and Islamic doctrines prohibited ancestor worship, other authors suggest that ancestor worship is often allowed to continue because it is considered a cultural rather than a religious practice (Caldwell and Caldwell, 1990; Olupona, 2014). In fact, this is what I observe in Benin: there is no correlation between being Catholic and beliefs in the influence of ancestors.

Let i denote individuals and c denote countries. Then Y_{ic} is the fertility outcome of individual i living in country c, defined either as the total number of children ever born or as a dummy variable equal to one if the respondent has more than 4 children. $AncestralBeliefs_i$ is the main explanatory variable and is constructed as a binary variable equal to one if the respondent answers "*Yes*" to the question "*Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?*". The vector X_i' contains a set of individual-level covariates that vary according to the specification, and may include age, age squared, gender, whether the respondent lives in a urban or rural area, whether the respondent is Christian/Muslim or from another religion, a dummy variable that equals one if the respondent has completed primary education, a dummy variable that equals one if the respondent is married, and a dummy variable that equals one if the respondent finds himself/herself in a good economic situation. Finally, the analysis exploits within-country variation by including ϕ_c, which represents country fixed effects, to account for any country-level time-invariant characteristics that may be correlated with both fertility levels and traditional beliefs. Robust standard errors are included in parenthesis.

The results are shown in Table 4. I find a positive and robust relationship between ancestral beliefs and fertility outcomes. In terms of magnitude, the coefficient ranges from 0.5 (25% of the outcome mean) more children in column (1) to about 0.2 more children (8% of the outcome mean) in column (4), once we include the full set of control variables. This effect is similar to the coefficient associated with living in a rural area (0.2) and almost the same as the influence of having less than primary education (0.3). Interestingly, ancestral beliefs are also associated with an increase in the probability of having more than four children of about one percentage point (10% of the outcome mean).

Table 4: Ancestor worship and fertility in sub-Saharan Africa

	Number of children				P(≥ 5 children)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.507***	0.248***	0.233***	0.172***	0.0364***	0.0157***	0.0139***	0.0101**
	(0.0378)	(0.0302)	(0.0301)	(0.0292)	(0.00493)	(0.00456)	(0.00452)	(0.00459)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Extended Controls 1	No	No	Yes	Yes	No	No	Yes	Yes
Extended Controls 2	No	No	No	Yes	No	No	No	Yes
Mean Y	2.092	2.086	2.086	2.096	0.0978	0.0975	0.0975	0.0975
R-squared	0.0635	0.417	0.424	0.480	0.0418	0.174	0.179	0.187
N	22926	22791	22791	21997	22926	22791	22791	21997

NOTE. Data: PEW research forum 2008-2009 Survey. The outcome variables are defined as follows: in columns (1)-(4), it is the total number of children, and in columns (5)-(8) it is the probability of having at least 5 children. The explanatory variable is an indicator equal to one if the respondent answers "yes" to the question "Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?". Basic controls include age, age^2 and sex. Extended controls 1 also include whether the individual lives in a urban or rural area and whether he/she is christian/muslim or from other religion. Finally, extended controls 2 also include a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Robustness.- In Appendix I, I show that these results are robust to alternative definitions of the explanatory variable, to the inclusion of region (instead of country) fixed effects, or to altertative clustering of the standard errors.[40]

However, the main concern here is that the measures of beliefs in ancestors may be capturing something related to traditional religious beliefs that may not be necessarily related to ancestors. I show that my results are not driven by potential confounders such as overall religiosity or the importance of alternative traditional magico-religious beliefs. Indeed, religiosity has been shown to be positively related to fertility (Hayford and Morgan, 2008; Herzer, 2019). Therefore, even though religion is controlled for in all specifications, the results would still be biased if the measure of ancestral beliefs is correlated with residual religiosity (not captured by religious affiliation). Table I6 in Appendix I shows that the coefficient on ancestor worship remains unchanged after controlling for the frequency of religious service attendance (Herzer, 2019) and the importance of religion in respondents' lives (Hayford and Morgan, 2008), which are the two most common ways to measure religiosity in the literature. A second potential

[40]Since the sample design in Pew Research Center (2009)'s survey was a stratified random sample at the regional level (province, region or district depending on the country), an alternative is to cluster the standard errors at the regional level. Table I5 in Appendix I shows that this choice does not matter for my results, even if clustered standard errors at this level may be inflated, since the number of clusters in the sample equals the number of clusters in the population (Abadie et al., 2022).

confounder relates to the importance of alternative traditional magical-religious beliefs, which have been shown to have an important influence on economic life (Platteau, 2014; Le Rossignol et al., 2022). Table I7 in Appendix I shows that alternative measures of traditional supernatural beliefs, such as the use of traditional religious healers, belief in miracles, participation in initiation rituals, beliefs in witchcraft, or knowledge about ancestral, tribal, animist or other traditional African religions, do not affect the results, suggesting that my proxies effectively capture something related specifically to the belief in ancestors.

4.4. Traditional ancestral beliefs: scope and relevance

Ancestral beliefs have possibly been widespread before the spread of modern religions and alternative belief systems.[41] In this section I draw on information from the oral tradition of ethnic groups (Berezkin, 2015; Michalopoulos and Xue, 2021), which likely represents a period well before the European colonization of Africa, to examine the extent and importance of ancestor worship at both continental and global scales.[42]

To understand the scope and importance of ancestral beliefs at a large scale, I explore the relationship between the share of motifs related to fertility or birth and the share of motifs related to ancestors in a regression framework.[43] In their paper analyzing the

[41]Figure D2 in Appendix D.2 plots the distribution of the share of motifs in an ethnic group's oral tradition related to ancestors. As it is clearly visible, the presence of ancestors in the folklore of ethnic groups is not specific of sub-Saharan Africa. We find extensive presence of ancestors in the oral tradition of societies in America and South Asia and the Pacific.

[42]The term "precolonial" used in many empirical papers that rely on data from the Ethnographic Atlas is sometimes confusing. In fact, the EA is based on ethnographic data collected mostly in the early 20^{th} century, although anthropologists have tried to represent the situation as it was before European influence (i.e., for SSA, only 5% of ethnic groups have information collected before 1890, while 73% of ethnicities have information collected between 1900 and 1930, and 20% of ethnicities have information collected between 1930 and 1960). Thus, the EA approximates 19^{th} century institutions, and the results of analyses using ethnographic information at any other point in time would likely be different. It is therefore important not to consider these variables as time-invariant, "deep-rooted" factors, thus neglecting the massive process of cultural change that has always occurred in Africa across time and space. In contrast, Michalopoulos and Xue (2021) argue that the data from Berezkin's catalog likely represent a period long before that recorded in the EA.

[43]One concern may be related to whether oral traditions are a good proxy of the actual relevance of these concepts. Here, I assume that, if the share of motifs related to ancestors in an ethnic group's oral tradition is large, then the beliefs in ancestors are likely to be strong. Although beliefs in ancestors and fertility change over time and therefore these measures are difficult to validate, Michalopoulos and Xue (2021) show that episodes in folklore accurately reflect the physical environment of ethnic groups (i.e., proximity to earthquake zones or the intensity of lightning strikes), which increases my confidence in using the motifs as proxies for the importance of fertility and ancestor worship.

Folklore data, Michalopoulos and Xue (2021) transform their dependent variables using log(0.01+Y) to account for the skewed nature of concept intensity across oral traditions. However, these "log-like" transformations have well known problems (Chen and Roth, 2023). Instead, I follow the seminal paper of Silva and Tenreyro (2006) and use a pseudo-poisson maximum-likelihood estimator, which is well behaved when the proportion of zeros in the dependent variable is large (Gourieroux et al., 1984a,b; Santos Silva and Tenreyro, 2011).[44] I estimate the following model:

$$Y_e = \exp\left(\alpha + \beta AncestralBeliefs_e + X_e'\Phi\right)\epsilon_e \tag{4}$$

Table 5 shows the conditional correlations. The vector X_e' includes ethnicity-level controls divided in three categories. The folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources used to identify those motifs, and the earliest year of publication in the group's oral tradition. The vector of ethnographic controls includes domestic organization around extended families and the presence of segmented communities and localized clans (according to Enke (2019), these are two key characteristics that reflect strong extended family networks, and therefore help me to disentangle the influence of an extended supportive kinship network from the importance of ancestral beliefs), whether patrilineality is the main descent type, whether the group has partible or impartible inheritance, political complexity, the prevalence of monogamy, the importance of pastoralism, the use of the plow, and the proportion of motifs related to the word "supernatural" (to disentangle the influence of ancestor worship from the importance of alternative supernatural beliefs). Finally, I also control for a number of geographic covariates, including tropical climate, precipitation, ruggedness, land quality (population-weighted), and agricultural suitability. Continent fixed effects are always included when I focus on the global sample. The appendix E provides a detailed description of how the variables were constructed.

I find a positive relationship between the share of motifs related to ancestors and the share of motifs related to birth at both the global and African levels, suggesting that ancestral beliefs may have contributed to historically high fertility levels worldwide (Caldwell and Caldwell, 1987). One percentage point increase in the share of motifs

[44]Table K4 in Appendix K shows that the results do not change when I estimate a linear regression model by ordinary least squares.

related to ancestors increase the share of motifs related to birth by about 5%. These results are robust to the inclusion of an extensive set of control variables and to alternative measures of both fertility and ancestral beliefs (see Appendix K).

Table 5: Ancestor worship and fertility in Folklore

	Share of motifs related to *birth*							
	SSA Sample				Global Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.0517***	0.0484***	0.0389***	0.0376***	0.0499***	0.0472***	0.0472***	0.0460***
	(0.00324)	(0.0109)	(0.0136)	(0.0124)	(0.00360)	(0.00468)	(0.00625)	(0.00655)
SSA Sample	Yes	Yes	Yes	Yes	No	No	No	No
Folklore controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ethnographic controls	No	No	Yes	Yes	No	No	Yes	Yes
Geographic controls	No	No	No	Yes	No	No	No	Yes
Mean Y	4.177	4.177	3.895	3.908	4.086	4.086	3.877	3.848
N	407	407	307	306	1245	1245	951	862

Note. Data: Ethnographic Atlas and Folklore. In columns (1)-(4), the sample is restricted to SSA. The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. The outcome variable is the share of motifs related to "birth" in the oral tradition of an ethnic group. "Ancestor worship" is the share of motifs related to "ancestors" in an ethnic group's oral tradition. Folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources in the group's oral tradition, and the earliest year of publication in the group's oral tradition. Ethnographic controls include whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, whether the ethnic group is patrilineal, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, and the share of motifs in an ethnic group related to "supernatural". Geographic controls include tropical climate, precipitations, ruggedness, land quality (population weighted), and agricultural suitability. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

5. Conceptual Framework: Implications

In the previous section I have shown that ancestral beliefs contribute to higher fertility rates in sub-Saharan Africa. I have argued that, because of the central role of descent and lineage in societies with strong beliefs in ancestors, where both living and dead lineage members work together to extend the lineage into the future, the motive to continue the family line becomes pivotal. In this section, I provide suggestive evidence that the motive to continue the family line is what drives the positive relationship between ancestral beliefs and fertility, rather than alternative explanations. I develop a simple model of fertility where the total number of children belonging to one's lineage is a public good. This model provides specific predictions on the relationship between ancestral beliefs and fertility that I will test in the data. These predictions are consistent with the motive to continue one's lineage driving fertility upwards in societies with strong beliefs in ancestors, and would be difficult to explain by other competing hypothesis.

In the model, the agent derives utility from three components: consumption (c_i), the net monetary benefit of having children (n_i), and the total number of children belonging to the lineage (N)[45]. Additive separability is assumed to represent preferences:

$$U_i = u(c_i) + b(n_i) + \beta\ell(N)$$

Where the functions $u(.)$, $b(.)$, and $\ell(.)$ satisfy the standard assumptions that $u' > 0$, $b' > 0$, $\ell' > 0$, $u'' < 0$, $b'' < 0$, $\ell'' < 0$. The extra term (ℓ) represents the utility that the individual derives from extending his/her lineage into the future, or in other words, it represents the motive to continue the family line. The parameter β takes the value 0 if ancestral beliefs are absent in the society and 1 if ancestral beliefs are prevalent.[46]

The composition of the total number of children belonging to the lineage (N) depends on the individual's gender and on the structure of the kinship system.[47] In patrilineal societies, both spouses and their children belong to the husband's lineage, as do the children of the husband's male siblings. On the other hand, in matrilineal societies, the husband does not belong to the lineage of his wife, and the children belong exclusively to the mother's line. Moreover, the children of one's sisters always continue one's lineage. Therefore, the total number of children belonging to the individual's lineage is different depending on the individual's gender and kinship system:

$$\text{For men: } N = \begin{cases} n_i + \sum_{j \neq i} n_j & \text{if patrilineal, j indexes husband's brothers} \\ \sum_{k \neq i} n_k & \text{if matrilineal, k indexes own sisters} \end{cases}$$

$$\text{For women: } N = \begin{cases} n_i + \sum_{j \neq i} n_j & \text{if patrilineal, j indexes husband's brothers} \\ n_i + \sum_{k \neq i} n_k & \text{if matrilineal, k indexes own sisters} \end{cases}$$

As we can see from above, the maximization problem is the same for both spouses in patrilineal societies, while it differs in matrilineal societies. In other words, preferences

[45]Note that I do not need to assume the existence of a patriarchal household where the couple head has the final say in fertility decisions, as it is sometimes assumed in the context of SSA (Dupas et al., 2023).

[46]The parameter β could take values between 0 and 1 and be interpreted as a factor representing the intensity of ancestral beliefs. For example, it could be the subjective probability that the ancestors will be reincarnated in each of the new children belonging to the lineage.

[47]See Appendix L for a simple introduction to kinship systems.

are aligned in patrilineal societies, where both spouses belong to the same lineage. In contrast, the motive to continue the family line diverges in matrilineal societies, since the husband does not belong to his wife's lineage and his family line cannot be continued by having children. I start by describing the problem faced by the agent in the patrilineal case, that it is the same for both spouses, and then will compare it to the problem in the matrilineal case, distinguishing between the husband and the wife perspectives.

5.1. Patrilineal case

I first study the solution under patrilineality. In this case, the individual's lineage is expanded through his/her own children as well as through the children of the husband's brothers. Both spouses therefore face the same maximization problem:

$$\max_{c_i, n_i} \; U_{\text{i}} = u(c_i) + b(n_i) + \beta \ell(n_i + \sum_{j \neq i} n_j)$$

$$\text{s.t.} \;\; c_i + n_i \leq y_i$$

The first-order conditions for an interior solution gives the following optimality condition:

$$u'(c_i) = b'(n_i) + \beta \ell'(n_i + \sum_{j \neq i} n_j) \tag{5}$$

Note that since the term $\beta \ell'(n_i + \sum_{j \neq i} n_j)$ is always positive, the optimal number of children is higher than in the absence of ancestral beliefs. Condition 5 tells us that an individual's utility depends not only on one's number of children, but also on the total number of children of the husband's brothers (i.e., the number of newborns who continue the lineage). Therefore, we need to better understand the interaction between the two. We can define the best response function as:

$$r_i(n_j) = \text{argmax}_{n_i} \, U_i \left(c_i, n_i, N\right)$$

Substituting it in the optimality condition of equation 5, we have that for interior solutions:

$$F = u'(c_i) - b'(r_i(n_j)) - \beta \ell'(r_i(n_j) + \sum_{j \neq i} n_j) = 0$$

Using the implicit function theorem:

$$\frac{dr_i\left(n_j\right)}{dn_j} = -\frac{\frac{\partial F}{\partial n_j}}{\frac{\partial F}{\partial r_i(n_j)}} = -\frac{\frac{\partial^2 U_i(c_i, n_i, ni+\sum n_j)}{\partial ni \partial n_j}}{\frac{\partial^2 U_i(c_i, n_i, ni+\sum n_j)}{\partial n_i^2}} < 0 \tag{6}$$

The expression 6 means that if n_i and n_j are both positive, each time one increases, the other will decrease to maintain the equilibrium between the marginal utility of consumption and children. In other words, there is a negative relationship between the number of children of the husband's brothers and the agent's own number of children. This is because the two are strategic substitutes: when the number of children of the husband's brothers is high, the individual does not "need" to have children to continue the family line. On the contrary, when the number of children of the husband's brothers is very low, the individual increases her number of children to extend the lineage. This result mirrors the standard free-rider problem, where each consumer has an incentive to enjoy the benefits of the public good provided by others while providing an inadequate amount of it herself.[48]

5.2. Matrilineal case

Let's turn now to the matrilineal case. In matrilineal societies, spouses have different incentives, since children only belong to their mother's family line.

5.2.1. Men

In matrilineal societies, the man's lineage is only continued by the children of his sisters, and therefore the maximization problem becomes:

$$\max_{c_i, n_i} \; U_{\text{i}} = u(c_i) + b(n_i) + \beta \ell(\sum_{k \neq i} n_k)$$

$$\text{s.t.} \;\; c_i + n_i \leq y_i$$

[48]Note that this result cannot be fully explained from an evolutionary perspective. In evolutionary terms, inclusive fitness (the ability of an individual to pass on its genes-both through its offspring and through the offspring of close relatives with whom it shares genes) is increased when siblings have children, and thus the pressure to do so from one's own offspring is reduced. The difference with an evolutionary explanation is that it is not just the total number of siblings that matters, but also their sex composition. In patrilineal societies with ancestor worship, we expect a negative relationship between the number of *male* siblings and one's own fertility.

The first-order conditions for an interior solution gives the following optimality condition:

$$\frac{\partial U_i(c_i, n_i, N)}{\partial c_i} = u'(c_i) = b'(n_i) = \frac{\partial U_i(c_i, n_i, N)}{\partial n_i} \tag{7}$$

This condition says that the marginal utility of private consumption must be equal to the marginal utility of having children. Note that since men cannot continue their family line with their own children, the third term of the utility function disappears, and we are back to the case where the motive to continue the family line does not play a role in fertility behavior. We can see that, if we compare condition 7 with the patrilineal case (condition 5), the average fertility of men will be lower in the matrilineal case.

5.2.2. Women

From the woman's point of view, the optimization problem is slightly different than the man's. Now, the total number of children belonging to the woman's lineage is composed of both her own children and her sisters' children.

$$\begin{aligned} \max_{c_i, n_i} \quad & U_{\mathrm{i}} = u\left(c_i\right) + b\left(n_i\right) + \beta \ell(n_i + \textstyle\sum_{k \neq i} n_k) \\ \text{s.t.} \quad & c_i + n_i \leq y_i \end{aligned}$$

From the first order conditions follow that:

$$u'(c_i) = b'(n_i) + \beta \ell'(n_i + \sum_{j \neq i} n_k)$$

As in the patrilineal case, the study of the interaction between n_i and n_k gives us the following free-riding condition:

$$\frac{dr_i\left(n_k\right)}{dn_k} = -\frac{\frac{\partial F}{\partial n_k}}{\frac{\partial F}{\partial r_i(n_k)}} = -\frac{\frac{\partial^2 U_i(c_i, n_i, ni + \sum n_k)}{\partial ni \partial n_k}}{\frac{\partial^2 U_i(c_i, n_i, ni + \sum n_k)}{\partial n_i^2}} < 0 \tag{8}$$

Condition 8 tells us that, in the case of matrilineal societies, there is a negative relationship between *female* fertility and the number of children of the woman's sisters, since they are strategic substitutes as both continue the woman's family line. Interestingly, when we compare the woman's optimality condition in the matrilineal case with the optimality condition in the patrilineal case, we do not observe important differences, as it was the case for men.

The model therefore suggests that, in societies with ancestral beliefs, female fertility levels should not be very different across kinship systems, whereas men want more children in patrilineal as compared to matrilineal societies. Note that this conclusion holds without imposing any particular bargaining weights between spouses, simply because preferences are aligned in patrilineal societies, but diverge in matrilineal societies. The same conclusions will therefore be reached if we assume that the male household head is the (almost) sole decision-maker than if we assume that both spouses have equal decision-making power. This simple model is therefore consistent with the following predictions:

- *Proposition 1*: On average, fertility is higher in societies with ancestral beliefs.
- *Proposition 2*: The positive influence of ancestral beliefs on fertility is driven by patrilineal ethnic groups, where both parents and the children belong to the same lineage.
- *Proposition 3*: In patrilineal societies with beliefs in ancestors, there is a negative relationship between one's own fertility and the number of male siblings' children.
- *Proposition 4*: In matrilineal societies with beliefs in ancestors, there is a negative relationship between female fertility and the number of women sisters' children.

In the next section, I provide empirical evidence to support these predictions.

6. Test of the theory: Implications

I have shown that ancestral beliefs contribute to higher fertility rates in sub-Saharan Africa. I have argued that because of the central role of descent and lineage in societies with strong beliefs in ancestors, where both living and dead lineage members work together to extend the lineage into the future, the motive to continue the family line plays an important role in these societies. Moreover, high fertility is socially rewarded and morally associated with joy, recognition, and right living, while low fertility is associated with misfortune and sin. However, although the results shown in Section 4 hold in different samples and time periods, and are robust to the inclusion of many different control variables, the positive association between ancestral beliefs and fertility could still be capturing unobserved confounders.

In this section, I show that these results are specifically due to the motive to continue one's lineage. To do this, I test the very specific predictions provided by the simple model of fertility decisions of Section 5. The validation of these predictions in the data is consistent with a setting where the motive to continue the family line drives fertility upwards, and are difficult to explain by alternative hypothesis.

6.1. Kinship structure, ancestral beliefs and fertility behavior

I start by investigating the relationship between ancestral beliefs and fertility by kinship system. I test the second prediction of the model, namely that the positive influence of ancestral beliefs on fertility is driven by patrilineal ethnic groups, in two different settings. First, focusing on the Democratic Republic of Congo, I combine the ethnicity-level information on the practice of ancestor worship from Vansina (1966) with the type of kinship system from Murdock (1967), and match this information to the DRC DHS clusters using ethnic group boundaries.[49] About half of the sample lives in a DHS cluster belonging to the ancestral territory of a patrilineal ethnic group, and 13% live in clusters belonging to the ancestral territory of an ethnic group that did not practice ancestor worship. In all specifications, I include a vector of individual-level control variables such as age, age squared, gender, whether the respondent is Catholic, single years of education, whether the respondent lives in a urban or rural area, whether the respondent belongs to the top 40% of the wealth distribution, and dummies for provinces. Finally, since the variable measuring ancestral beliefs is defined at the DHS cluster level, I cluster the standard errors at that level. Second, I use ethnicity-level information at a global scale from Berezkin (2015)s catalog and the Ethnographic Atlas (Murdock, 1967).

Tables 6 and 7 reports the results. Consistent with the theoretical framework, I find that, in both cases, the positive influence of ancestral beliefs on fertility is driven by patrilineal ethnic groups, even at the global level during precolonial times. In the DRC, individuals from ethnic groups who practiced ancestor worship have higher fertility levels, larger ideal family sizes, and want more children in the future, but only if they belong to a patrilineal ethnic group. Interestingly, spouses' preferences are substantially affected (column 4 in table 6). In patrilineal societies with strong beliefs in ancestors,

[49]The matching procedure between DHS clusters and Vansina (1966)' information is described in Section 3.

husbands want more children than their wives. However, in matrilineal societies with beliefs in ancestors, this relationship is reversed, and now wives want more children than their husbands. This is because in matrilineal societies children only belong to their mother's line, and therefore the motive to continue one's lineage is absent for men. Overall, these results go in line with the first prediction of the simple framework depicted in Section 5 – that is, the relationship between ancestral beliefs and fertility is stronger in patrilineal societies, where both parents and the children belong to the same lineage.

Table 6: Ancestor worship, fertility, and kinship structures

	(1) Nb of children	(2) Ideal Nb of children	(3) Want more children	(4) Husband > wife
Ancestor worship	-0.165	-0.0988	-0.0346	-0.102**
	(0.104)	(0.228)	(0.0268)	(0.0503)
Ancestor worship x Patrilineal	0.263**	0.422*	0.0593**	0.144**
	(0.126)	(0.254)	(0.0293)	(0.0561)
Province FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	3.086	6.445	0.760	0.474
R-squared	0.622	0.241	0.221	0.0631
N	35891	33188	29568	10793

Note. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The sample is restricted to women in column 4. The outcome variable in column (1) is the total number of children ever born. In column (2), it is the ideal number of children. In column (3) it is a dummy variable that equals one if the respondent wants to have an additional child. Finally, in column (4), a dummy variable that equals one if the husband wants more children than his wife. "Ancestor Worship" is a dummy variable that equals one if the DHS cluster c of individual i belongs to the ethnic homeland of an ethnic group that traditionally practice ancestor worship as reported in Vansina (1966). "Patrilineality " is a dummy variable that equals one if the DHS cluster c of individual i belongs to the ethnic homeland of a patrilineal ethnic group as reported in Murdock (1967). Both interaction terms are included as controls. Controls also include age, age squared, gender, a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table 7: Ancestor worship, fertility and kinship in Folklore

	Share of motifs related to *birth*				Share of motifs related to *fertility*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.00983	0.00648	0.00182	-0.0143	0.0160	-0.00549	-0.00815	-0.00188
	(0.0150)	(0.0160)	(0.0204)	(0.0265)	(0.0318)	(0.0311)	(0.0349)	(0.0400)
Ancestral beliefs x Patrilineal	0.0430***	0.0441***	0.0498**	0.0649**	0.124***	0.131***	0.124***	0.121***
	(0.0151)	(0.0153)	(0.0200)	(0.0259)	(0.0320)	(0.0315)	(0.0355)	(0.0406)
Folklore controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ethnographic controls	No	No	Yes	Yes	No	No	Yes	Yes
Geographic controls	No	No	No	Yes	No	No	No	Yes
Mean Y	4.102	4.102	3.877	3.848	0.736	0.736	0.687	0.660
N	1228	1228	951	862	1228	1228	951	862

Note. Data: Ethnographic Atlas and Folklore. In columns (1)-(4), the outcome variable is the share of motifs related to "birth" in the oral tradition of an ethnic group, while in columns (5)-(9), it is the share of motifs related to "fertility". The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. "Ancestor worship" is the share of motifs related to "ancestors" in an ethnic group's oral tradition. "Patrilineality" equals one if the major descent type of the ethnic group is patrilineal descent. Both interaction terms are included as controls. Folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources in the group's oral tradition, and the earliest year of publication in the group's oral tradition. Ethnographic controls include whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, whether the ethnic group is patrilineal, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, and the share of motifs in an ethnic group related to "supernatural". Geographic controls include tropical climate, precipitations, ruggedness, land quality (population weighted), and agricultural suitability. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

I show in Appendix M that the relationship between patrilineality and fertility only holds when ancestral beliefs are prevalent, highlighting the importance of kin membership in explaining these fertility differences, and therefore suggesting that these results are not driven by inherent differences between patrilineal and matrilineal societies different than beliefs in ancestors, such as differences in women's decision-making and empowerment in favor of women in matrilineal societies (Tene, 2020; Lowes, 2022), or to higher economic returns of children and the need of having sons for old age support (Rossi and Godard, 2022).[50]

[50]Moreover, although some papers suggest that womens decision-making and material conditions are better in matrilineal societies, it is incorrect to compare matrilineality to matriarchy or to a utopian feminist society. For example, Sage (2023) shows that the old-age security motive for fertility is well present in matrilineal societies. In another example, Coontz and Henderson (1986) argues that it is patrilocality – that is, the system in which women move to their husband's kin group upon marriage – that has enabled men to use and appropriate women's labor and products. Because of the emphasis on the importance of residence rules over unilineal descent, it is argued that matrilineal societies without matrilocality – that is, societies in which the wife must still live with her husband's kin group – are just as restrictive for women as patrilineal and patrilocal societies, despite the fact that inheritance and kinship membership are traced through female lines. In my sample, none of the matrilineal ethnic groups are matrilocal. In this regard, Sage (2023) shows that, in matrilineal (and patrilocal) societies, the old-age security motive also drives fertility upwards. Finally, as Mizinga (2000) notes for the matrilineal Tonga society in southern Zambia, authority is still concentrated in men who exercise control over marriage. What is changing is the composition of those who concentrate power. Instead of the husband and his lineage, power is concentrated in the men of the matrikin, especially the maternal uncle. Moreover, marriage is virilocal

Kinship systems and fertility behavior.- A promising avenue for future research concerns the systematic study of the relationship between patrilineality and fertility. Although the influence of kinship systems on developmental outcomes has received considerable attention in economics in recent years (e.g., Moscona et al., 2020; Lowes, 2021, 2022; Bau and Fernández, 2021), the influence of descent structure on fertility has not been extensively studied, despite Lorimer (1954)'s efforts to link resistance to fertility decline to unilineal descent groups as early as 70 years ago. The results I have presented above contribute to our understanding of how kinship systems influence the behavior of individuals by highlighting the different incentives that people in patrilineal as opposed to matrilineal societies face when they care about the continuation of their lineage. Although beyond the scope of this paper, I explore the general relationship between patrilineal descent and fertility preferences in the Appendix M. I show a positive relationship between patrilineality and fertility, but only in societies with ancestral beliefs, highlighting the importance attached to continuing one's lineage. Moreover, and consistent with the model, the difference in fertility between patrilineal and matrilineal societies with ancestral beliefs is more pronounced for men, as children in patrilineal societies only continue the father's line. On the contrary, children always continue the mother's lineage (as she becomes a member of her husband's lineage in patrilineal societies), and therefore there is no difference in the motive to continue the woman's lineage across kinship systems.

6.2. Free-rider behavior

The second set of predictions generated by the model states that there could be a negative relationship between one's own fertility and the number of family members able to continue one's lineage with their own children.[51]

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and bridewealth is practiced, so women are not entrusted with control of property as they leave their households upon marriage.

[51]This result helps to rationalize some empirical findings in other contexts where ancestor worship still exists to some degree, such as China. For example, Yang and Spencer (2022) find that "while the number of siblings of husbands and wives is of little or no consequence, the number of brothers of husbands matters: couples in which husbands have more brothers have fewer children. This is consistent with free-riding in a patrilineal kinship system, where fertility is at least partly driven by the motive to continue a family line.

I use data from the DRC Demographic and Health Surveys to explore this question in two steps. First, I examine whether there exists a negative relationship between fertility and the number of husband's brothers in patrilineal societies with strong beliefs in ancestors for both men and women. Unfortunately, the DHS does not include information on siblings' gender for men. However, I have some information on the composition of the household. For example, I know the total number of eligible men (those aged 15-59) in the household. I use this measure as a proxy for the presence of family members capable of extending the family line.[52] Second, I focus on women and examine the relationship between female fertility and the number of sisters. For women, the DHS provides information of the gender and number of siblings, so I can accurately test the model's prediction.

Tables 8 shows the results regarding the relationship between one's fertility and the number of family male members able to continue one's lineage. Consistent with the intuition in section 5, I find that the number of eligible men in the household is associated with lower fertility, but only in patrilineal ethnic groups. Moreover, the negative effect of the number of eligible men on fertility is driven by ethnic groups with strong ancestral beliefs, since the trade-off between one's own fertility and the number of brothers is particularly salient when the motive to continue the family line plays an important role in fertility behavior.

[52]There are similar proportions of eligible men in the household by kinship system (52% of male respondents live in a household with at least one other eligible man in patrilineal societies, versus 45% in matrilineal societies). The main limitation of this analysis is that I only have information on the type of relationship to the household head for respondents, not for other household members, and therefore there may be compositional differences. For example, the probability that the other eligible male is a brother may be higher in patrilineal (and patrilocal) ethnic groups, and therefore my measure of eligible men in the household may be a better proxy for the number of male siblings in patrilineal ethnic groups.

Table 8: Kinship network, ancestor worship and fertility

	Total number of children even born			
			Ancestral beliefs=1	Ancestral beliefs=0
	(1)	(2)	(3)	(4)
Number of eligible men	0.0136	0.0362	0.0326	0.0133
	(0.0270)	(0.0268)	(0.0270)	(0.169)
Patrilineal x N Eligible men	-0.114***	-0.0932**	-0.111***	-0.0319
	(0.0376)	(0.0376)	(0.0417)	(0.172)
Province FE	Yes	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes	Yes
All controls	No	Yes	Yes	Yes
Mean Y	3.111	3.099	3.054	3.432
R-squared	0.635	0.641	0.655	0.578
N	12233	12049	9706	1515

Note. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The outcome variable is the total number of children even born. The sample is restricted to men. The sample is restricted to ethnic groups with ancestor worship in column (3) and to ethnic groups without ancestor worship in column (4). "Patrilineal" is a dummy variable that equals one if the ethnic group e has patrilineal descent. "Nb of eligible men" is the number of men aged 15-59 in the household. Basic controls include age, age squared and gender. All controls also include a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Finally, Table 9 shows the results on the relationship between women's fertility and the number of sisters. I find that there is a negative relationship between the number of sisters and women's fertility in matrilineal societies, but only if beliefs in ancestors are widespread. Moreover, I do not find any negative relationship between the number of brothers and women's fertility in matrilineal societies with strong beliefs in ancestors, since the brothers' children belong to the lineage of their wives, and therefore do not continue one's family line. Overall, the combination of these results are consistent with the hypothesis that the motive to continue the family line is strong in societies where beliefs in the influence of ancestors are important, which contributes to sustain high fertility.

Table 9: Kinship network, ancestor worship and fertility

	Total number of children even born			
		Ancestral beliefs=1	Ancestral beliefs=0	Ancestral beliefsp=1
	(1)	(2)	(3)	(4)
Number of sisters	0.0520***	0.0454***	0.0595**	
	(0.00898)	(0.0102)	(0.0230)	
Matrilineal x N Sisters	-0.0310**	-0.0270*	-0.00360	
	(0.0142)	(0.0155)	(0.0534)	
Number of brothers				0.0380***
				(0.0109)
Matrilineal x N Brothers				-0.00581
				(0.0155)
Province FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	3.074	3.048	3.277	3.048
R-squared	0.614	0.627	0.549	0.627
N	26445	21437	3233	21437

NOTE. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The outcome variable is the total number of children even born. The sample is restricted to women. The sample is restricted to ethnic groups with ancestor worship in columns (2) and (4) and to ethnic groups without ancestor worship in column (3). "Matrilineal" is a dummy variable that equals one if the ethnic group e has matrilineal descent. "Nb sisters" is the number of sisters that the respondent has ever had. "Nb brothers" is the number of brothers that the respondent has ever had. Basic controls include age, age squared and gender. All controls also include a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

6.3. Additional results: ancestral beliefs and social organization

Underlying the relationship between patrilineality, ancestors, and fertility, there is the more fundamental institution of lineage playing a pivotal role in these societies. In fact, ancestor worship belongs to the realm of kinship and lineage structures, since the whole system of beliefs, rituals and practices is centered around the clan or the extended family, and ultimately represents the extension of these aspects of the social organization to the supernatural sphere (Fortes, 1965). One interesting question then arises: will the traditional belief system of African societies, with a primary emphasis on the influence of ancestors on the everyday life of people, erode as the clan-based structure of societies dilutes?

To provide some evidence on this question, I make use of the distinction between lineage-based and age-based societies to examine whether the effect of beliefs in ancestors on fertility is stronger in lineage-based societies (Moscona and Seck, 2024). In

kin-based or lineage-based societies, the main social group is the extended family, and social loyalty is within the kin group. In age-based societies, on the other hand, the main social group is the age group, i.e., a group of individuals of similar age who enter adulthood at the same time.[53] As one of the primary goals of both of living members and ancestors is the extension of the lineage into the future, I expect ancestor worship to play little role in age-based societies (where "horizontal" organization is key) as compared to lineage-based societies (where "vertical" organization is key). I follow the classification of Moscona and Seck (2024) to identify in the contemporary PEW data which ethnic groups are organized along age lines and which ethnic groups are dominated by lineage organization. Although they focus on both Kenya and Uganda, I focus only on respondents from Kenya because I have almost no variation in Uganda (96% of respondents from Uganda belong to an ethnic group where lineage structure dominates, versus 27% in Kenya). Table 10 shows the results. Although the estimates are less precise due to the reduced sample size, I find a positive relationship between ancestral beliefs and fertility in kinship-based societies, while this relationship is weaker in age-based societies and becomes null when the full set of controls is included in the specifications (columns 2, 4, and 6).

[53]One question that follows from the description of age-set societies and the earlier interpretation of the role of ancestors and their direct connection to kinship structure is whether ancestor spirits should exist at all in societies that are not organized around kinship. First, it is important to note that, as Moscona and Seck (2024) mention, it is possible for an ethnic group to have both kinship and age-set structures. Although many groups have either a strong lineage structure or a strong age structure, there is a continuum of possibilities in between. From this perspective, it is not inconceivable to have variations in the strength of beliefs in ancestors within both lineage and age-based societies. Second, there may be different sets of ancestral spirits. For example, Kenyatta (1965) notes for the Gukuyu (an age-based society from central Kenya) that in addition to the spirits of the father and mother and the clan spirits, there are age-group spirits. The key argument here is that these spirits will play a different role in the society, and the motive of lineage continuation for fertility will be less important.

Table 10: Ancestor worship, fertility and age-based social organization

	Number of children					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.741**	0.328	0.861**	0.720**	0.895***	0.538*
	(0.354)	(0.248)	(0.389)	(0.330)	(0.306)	(0.308)
Ancestral beliefs x Age-based	-0.113	-0.243	-0.341	-0.674*	-0.792**	-0.505
	(0.404)	(0.283)	(0.455)	(0.379)	(0.370)	(0.355)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Mean Y	1.654	1.667	2.379	2.378	2.963	2.964
R-squared	0.0146	0.565	0.0120	0.462	0.0105	0.326
N	1198	1177	775	767	669	662

NOTE. Data: PEW research forum 2008-2009 Survey (Kenya). The sample is restricted to women over the age of 25 in columns 3 and 4, and to women with at least one children in columns 5 and 6. The outcome variable is the total number of children. *Age-based* is an indicator equal to one if the respondent belongs to an aged-based society. The explanatory variable is an indicator equal to one if the respondent answers "yes" to the question "Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?". Controls include age, age^2, sex, urban/rural place of residence, religion, education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

6.4. Family planning and contraceptive use

A critical issue that is directly related to the analysis presented above concerns the effectiveness of family planning policies and contraceptive uptake. If the motive to continue the family line is very strong due to the prevalence of beliefs in ancestors, the demand for contraceptives may be very low. In this regard, supply-side constrains are sometimes not relevant in explaining high fertility rates in SSA, pointing at the importance of demand-side factors. For example, Dupas et al. (2024) conducted a large-scale randomized controlled trial in Burkina Faso offering free contraceptives to women, and found no significant effect on fertility, suggesting that financial constraints or limited access to contraceptives were not important drivers of high fertility rates.[54]

Traditional beliefs centered on the influence of ancestors on everyday life can be closely linked to contraceptive uptake for several reasons. In addition to higher demand for children in societies with ancestral beliefs, low fertility in these societies is associated with sin, misfortune and the disapproval of ancestors, who care for the fate of the lineage,

[54]In fact, the little effect of contraception on fertility is probably because contraception is not employed to restrict fertility, but rather as a substitute for traditional mechanisms to avoid pregnancy, such as sexual abstinence (Caldwell and Caldwell, 1985).

while men and women who continue to parent children are persons in good moral and social standing, who get their ancestors' approval. Thus, the fear of sterilization is easily understood (Caldwell and Caldwell, 1988). In fact, fear to infertility has been shown to be an important barrier to modern contraceptive methods uptake in SSA (Ochako et al., 2015; Bertrand, 2023; Bau et al., 2024). On the other hand, if bearing children is influenced by the desire and concerns of ancestors, people may think that effective methods to act on the number of children should include contact with the spiritual world through divination or rituals, rather than using modern contraceptives.

I provide below suggestive evidence that holding traditional beliefs prevents contraceptive use. I use data from all available rounds of the DHS for Benin.[55] I mainly rely on Benin DHS because of several reasons. First, there is detailed information on women's contraceptive use (and on the reasons for not using), as well as information on the place of residence of respondents. This information will allow me to look at contraceptive use while holding supply factors constant, as I will be able to compare people living in the same villages or neighbourhoods within cities.[56] Second, Benin is a unique context where adherence to African traditional religion is arguably a good proxy for traditional beliefs, and Benin's main traditional religion (Voodoo) is well known to have strong beliefs in ancestral spirits.[57] Finally, history provides plausibly exogenous variation in adherence to traditional religion that helps with identification.[58]

Table 11 shows the results. I find that, once supply-side factors and other important determinants of contraceptive uptake (including age, education, wealth, employment, marital status, or polygamy) are accounted for, traditional beliefs are associated with lower contraceptive use and intention to use (columns 1-4 and 5, respectively). Note that these results are likely to be a lower bound, as self-reported African traditional religion adherence in Benin is not a perfect proxy for ancestral beliefs, and the control

[55]In Appendix N.1, I show the same results for the DRC, using the merged information from the DHS, Vansina, and the Ethnographic Atlas.

[56]The merged data of the DRC DHS, Vansina, and Murdock do not allow me to implement this strategy, since all people within a cluster are assigned to the same ethnic group in Vansina's map.

[57]Voodoo is explicitly mentioned in the constitution as an official religion, acquiring the same status as "missionary religions". Since Voodoo is not socially nor politically marginalized, concerns about underereporting of traditional religion in this contexts are limited.

[58]In Appendix N.2, I verify that there is a relationship between demand for children and traditional beliefs in these data as well. I show a positive relationship that holds with DHS cluster fixed effects, and is robust to the same instrumental variable strategy that I will implement below.

group likely includes respondents with ancestral beliefs. Moreover, this relationship seems to be specific to fertility-related outcomes, suggesting that the belief in ancestral spirits may be important to understand these findings. For example, I do not find any relationship between traditional beliefs and the belief in witchcraft (column 7, measured as a dummy variable that equals one if the respondent thinks that HIV/AIDS can be caused by witchcraft). Overall, these results suggest that the demand for contraception is lower among followers of African traditional religions, where the influence of ancestors on people's life and fertility is central.

Table 11: Traditional beliefs and contraceptive use

	(1) Currently	(2) Traditional	(3) Modern	(4) Ever	(5) Intention	(6) Side-effects	(7) AIDS witchcraft
Traditional beliefs	-0.0268***	-0.00366	-0.0218***	-0.0261***	-0.0342***	-0.0268*	0.0205
	(0.00760)	(0.00378)	(0.00676)	(0.00976)	(0.0120)	(0.0138)	(0.0156)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	0.166	0.0592	0.104	0.562	0.382	0.158	0.472
N	43662	43662	43662	43662	36399	14508	27237

Note. Data: Demographic and Health Surveys of Benin (1996, 2001, 2006, 2011 and 2017). The table reports OLS estimates. The sample is restricted to women. The outcome variable in column (1) is a dummy that equals one if the respondent was using contraceptives at the time of the survey. In column (2) a dummy that equals one if the respondent was using traditional methods. In column (3) a dummy that equals one if the respondent was using modern methods. In column (4) a dummy that equals one if the respondent has ever used contraceptives. In column (5) a dummy that equals one if the respondent intends to use contraceptives in the future. In column (6) a dummy that equals one if the respondent does not use contraceptive because of fear to side effects. In column (7) a dummy that equals one if the respondent thinks that aids may be caused by witchcraft. "Traditional beliefs" is a dummy variable that equals one if the respondent declares African traditional religion as his/her main religion. Controls also include age, education, whether the respondent works, marital status, polygamy, and wealth quintiles. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Instrumental variable.- I follow the strategy developed by Stoop et al. (2019) and instrument traditional religion with a dummy variable that equals one if the respondent's ethnicity is Adja and lives within the historical boundaries of the ancient Dahomey Kingdom. This instrument exploits the fact that religious affiliation is, to some extent, determined by history and tradition. The Adja people were the founders of the Dahomey Kingdom, birth place of the Voodoo religion, whose followers believe in the influence of ancestors on everyday life, and who showed fierce resistance against evangelization. The exclusion restriction implies that, conditional on observables, being Adja influences contraceptive use only through its influence on traditional beliefs. As I show in Table O4, socioeconomic characteristics are fairly similar across ethnic groups, while there are stark differences in their belief systems (and, in turn, in the number of children). These

differences are likely to persist due to different historical and institutional paths.

The results and details on the choice of the instrument can be found in N.3. The results point in the same direction, and are larger in terms of magnitude.[59] In particular, holding strong traditional beliefs is closely associated to fear to side-effects, which is code for fear of jeopardizing one's future fertility (Bertrand, 2023; Bau et al., 2024).

Overall, these results suggest informing about the real risks and consequences of contraceptives rather than focusing on supply side frictions may be important to address the low contraceptive take-up. However, beliefs rooted in deep cultural practices and social organization are difficult to change, and more research is needed in this area (Dupas et al., 2024).

6.5. Heterogeneity and dynamics

In this section, I discuss the correlates of ancestral beliefs as well as the factors that contribute to reduce its influence on fertility. The main results are shown in Appendix J. Identifying when and where the influence of ancestor worship is stronger may help us to better understand the dynamics of this belief system, which in turn would increase our understanding of current and future trends in fertility rates. I begin by examining which variables are correlated with ancestral beliefs in the first-hand data from Benin (see subsection J.1), where I can accurately measure ancestral beliefs. Second, I test for heterogeneous effects along different socioeconomic dimensions using the multi-country data from the PEW surveys (see subsection J.2).

Two main conclusions arise from this analysis. First, holding beliefs in ancestors is weakly correlated with socioeconomic characteristics, such as education, age, having a TV at home, polygyny, the number of fields for agriculture, or having livestock. Interestingly, a sharp distinction emerges between "missionary" religions and "New" Christian churches: while being a member of a "missionary religion" (i.e., Catholic) is not correlated with holding beliefs in ancestors, being a member of an Evangelic church is the strongest negative correlate of ancestral beliefs.[60] This raises the question of the demo-

[59] This is not surprising, since the OLS estimates were likely a lower bound (although Voodoo is a better proxy of traditional religion than in other countries or regions, it is by no means a perfect proxy, and people who report other religion as their main religion may still hold traditional beliefs).

[60] This result is consistent with historical accounts highlighting the strong opposition of new Christian churches to African traditional beliefs. For example, Caldwell and Caldwell (1987) note: "Increasingly, the

graphic consequences associated with the massive conversion movement towards new Christian churches that sub-Saharan Africa is undergoing since a few decades.

Second, distance to Cotonou (the economic capital of the country) is positively associated with ancestral beliefs, suggesting that urbanization may contribute to the dissolution of this belief system. The cross-country analysis with the PEW data confirms that urbanization is the strongest factor reducing the influence of ancestral beliefs on fertility, and that other socioeconomic characteristics may not contribute to attenuate this influence.[61] These results are not surprising if we take into account that ancestor worship is closely linked to lineage and kinship structures, and that urbanization (and the associated process of land scarcity and privatization of property rates) contribute to undermining strong kinship ties and the lineage-based structure of societies

There are conflicting views in the literature about the impact of urbanization on traditional practices. For example, Hunter (1961) argues that urbanization contributes to the decline of ancestor worship by eroding traditional practices and clan structures. On the contrary, Theron (1996) and Coertze (2004) state that African traditional religions and worldviews still have a strong influence on people's lives despite urbanization. In a more recent paper, Bae (2007) asserts that in the South African context, the importance of ancestor worship has not diminished in urban areas. In fact, beliefs in ancestors play a role in maintaining local identities in the face of colonization, westernization, and urbanization. This hypothesis is consistent with the economic theory of cultural persistence among minority groups advanced by Bisin and Verdier (2000), in which the sense of identity is an important component of the individual's utility, so that brides and grooms prefer to be matched with a person of the same culture because this gives them a better chance of transmitting their culture to their children. Finally, in the specific context of the Democratic Republic of the Congo and with a specific mention of ancestor worship,

cutting edge of change in African Christianity has been not the imported, mainstream missionary churches but the locally generated sects known as African or Ethiopian Churches [...]. The fact that they are very much a grass-roots phenomenon and do not share the apprehension of African cultural manifestations that has often marked the missionary churches has tended to hide theior greater willingness to challenge those aspects of the traditional belief system that they consider unacceptable".

[61] Particularly interesting is the null effect of education on the importance of ancestor worship. In fact, if ancestor worship contributes to the stalls in fertility observed in many sub-Saharan African countries, these results suggest that education alone may have a limited impact on the reduction of fertility. These results are compatible with recent papers suggesting that slow education progress is not among the predominant factors in explaining fertility stalls in SSA (Schoumaker and Sánchez-Páez, 2024).

Romaniuk (2011), p.15, asserts that "ethnicity still plays a role in interpersonal networks of socialization and in the wheeling and dealing of political patronage, but many of the customs associated with ethnicity tend to disappear [...]. Ancestral memory, which has traditionally supported high fertility in African societies, is waning as people are increasingly cut off from their ancestral lands," and Shapiro (2010), p. 14, argues for contemporary Kinshasa that "ethnicity, once the most important factor associated with differential fertility, has become largely irrelevant to fertility. Here, I provide evidence that urbanization may contribute to the decline in fertility rates by reducing the importance of kinship and the centrality of extended families and clan-based organization, in addition to its effects through increased education, better access to services such as healthcare or contraceptives, or better infrastructure (de la Croix and Gobbi, 2017).

7. Conclusion

The fertility decline associated with the demographic transition has been a key factor in moving from stagnation to sustained economic growth (Galor et al., 2023). Moreover, high fertility rates combined with reductions in infant mortality lead to high child dependency ratios, are detrimental to maternal and child health, and are associated with low educational attainment and poor living standards (Stover and Ross, 2010; African Union, 2007). Understanding the origins of the demographic transition is therefore critical for development.

This paper revisits the literature that stressed the importance of deep-seated cultural norms, rooted in traditional beliefs, in explaining resistance to fertility decline in sub-Saharan Africa (Lesthaeghe, 1989; Caldwell and Caldwell, 1987; Caldwell et al., 1992). In particular, I examine the role played by the belief in the influence of ancestors, one of the (historically) most prominent belief systems, both globally and within sub-Saharan Africa. I document and test the hypothesis that ancestral beliefs, which stresses the importance of ancestry and descent, and therefore attaches great importance to the continuation of the family line, contributes to sustain high fertility rates. I find a positive association between beliefs in ancestors and fertility in different context and time periods, that holds across ethnic groups, individuals within countries and regions, and across migrants who live in the same city and were born in similar places, but differ in the practice of ancestor worship.

Second, I test whether the relationship between ancestral beliefs and fertility is specifically due to the importance attributed to the continuation of one's lineage. First, I show that the influence of ancestral beliefs on fertility depends on the kinship system, since the motive to continue one's lineage differs. I find that the positive effect of ancestral beliefs on fertility is driven by patrilineal societies, where both parents and children belong to the same lineage, and thus having children is always a way to continue one's family line. On the contrary, the father does not belong to his wife's lineage in matrilineal societies, and children belong exclusively to the wife's lineage, and thus the motive to continue the family line with ones own offspring is absent for men. Second, consistent with free-rider behavior in a setting where the motive to continue one's lineage is a public good, I find a negative relationship between fertility and the number of family members able to continue one's lineage.

Overall, these findings reinforce the conclusions of Casterline (2017), particularly the hypothesis that an important basis for resistance to fertility decline is both cultural and social, in part because beliefs and social norms have proven difficult to change even in experimental settings (Dupas et al., 2024). Moreover, I show some of the demographic implications of the existing traditional belief system (e.g., lower use of modern contraceptives due to high fear of infertility) and highlight the importance of demand (e.g., information campaigns about contraceptive side effects) rather than supply factors in influencing reproductive decisions. Finally, I provide suggestive evidence that the process of urbanization (through its effect on the erosion of lineage institutions and the belief system that operates through them) may be an important factor in the potential future decline of fertility levels. An important avenue for future research suggested by some of these findings is to understand the causes and the social, economic, and demographic consequences of the emergence of endogenous African Christian churches that strongly oppose traditional beliefs (such as the evangelical churches in the case of southern Benin).

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Online Appendix

Ancestral Beliefs and Fertility in Sub-Saharan Africa

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A. Prevalence of ancestral beliefs in SSA

In this section, I discuss why the belief in ancestors is more influential in sub-Saharan Africa than in any other region of the world. In fact, ancestor worship is not historically unique to SSA. For example, Caldwell and Caldwell (1987) hypothesized that ancestor worship may have been the original religion – understood here as a set of beliefs that structure the interaction between a community and the supernatural forces it perceives in the world – in many parts of the world, including Eurasia and the Americas.[62] Perhaps the most prominent and studied example outside SSA is South Asia, especially China, where it has been shown to influence fertility and son preference historically and even today (Ahern, 1973; Hu, 2016; Hu and Tian, 2018; Zhang, 2024).[63]

There are several factors that may explain the higher prevalence of beliefs in ancestors in sub-Saharan Africa compared to other regions of the world. First, the geographic isolation of SSA beyond the Sahara and the presence of several diseases prevented foreigners from gaining political power in the interior until the end of the 19^{th} century, limiting their presence to coastal trading posts and thus preventing the spread of alternative belief systems that emphasized the relationship between individuals and external gods and undermined kinship ties (Caldwell and Caldwell, 1987; Schulz et al., 2019; Schulz, 2022).[64] Only the generalized use of quinine around 1850, which significantly reduced European mortality rates (Curtin, 1961), and the construction of railroads and roads facilitated the expansion of European powers into the interior of the continent, although this happened much later than in other regions (Jedwab et al., 2022).

Second, the long tradition of high land-to-man ratios in SSA has prevented the erosion of lineage and clan structures in which ancestor worship is embedded (Boserup,

[62]This hypothesis may be traced back to Victorian anthropologist Herbert Spencer, who believed ancestorism to be the root of every religion (Grande, 2024).

[63]Other ancient societies, such as the Greeks, did not develop ancestor worship but rather a cult of the dead. This distinction is important. For example, Catholic societies have a cult of the saints and organize masses for the dead, but they are not considered to be ancestor worshippers either (Fortes, 1965). As already emphasized, the main difference between ancestor worship and the worship of the dead is the strong belief of the former in the influence of the ancestors in the affairs of the living. Death is a necessary but not a sufficient condition for becoming an ancestor.

[64]One example is the spread of Islam. As Michalopoulos et al. (2018) show, proximity to the pre-600 CE trade network is a robust predictor of Muslim adherence today, but in the case of sub-Saharan Africa these trade routes are virtually absent, and even if we look at pre-1800 CE trade networks, their development in most of SSA is also very precarious.

1965, 1985; Platteau, 2000). In fact, ancestor worship is the extension of these relations to the supernatural sphere (Fortes, 1965; Caldwell and Caldwell, 1985). Collective farms in land-abundant societies based on production activities such as shifting cultivation are efficiently managed by extended families or lineages. As population density increases and land abundance decreases, private property rights tend to emerge and family structures shift towards the conjugal family (Platteau, 2000; Guirkinger and Platteau, 2014). Thus, agrarian societies in SSA are characterized by the presence of free peasants, free land, and the absence of non-working landowners, which reinforces lineage-based organization. For this reason, the *de facto* influence of beliefs in ancestors nowadays is stronger in sub-Saharan Africa than in regions where ancestor worship was traditionally widespread (e.g., Southeast Asia). As Platteau (2000) notes: "Asian societies have a strong tradition of settled agriculture, and property rights on arable lands have long been established with significant class differentiation or stratification in terms of land and other assets. Contrary to African societies which are centered around the lineage and are therefore permeated by values of extended solidarity, Asian societies, like all peasant societies (including European societies), have evolved over centuries social and family patters based on the conjugal family".

As a result of low population density and the prevalence of lineage-based systems of social organization, the intensity of kinship ties and the emphasis on descent are higher in SSA than in any other region of the world, which has hindered the dissolution of ancestral beliefs, since ancestors often symbolize the continuation of a social structure centered on lineage and descent, and therefore organized hierarchically by age, with the oldest person often occupying the position of authority (Alidou and Verpoorten, 2019).[65]

Finally, historical and institutional factors specific to SSA have traditionally favored the reproduction and persistence of cultural traits over time (Platteau, 2009). In particular, the existence of strong kinship ties, in which ancestral beliefs are embedded, was facilitated by the existence of weak states and the need for protection against raids dur-

[65]In fact, age (and gender) are the two main dimensions along which African societies are stratified. Again, this is closely related to the high land-to-man ratios in SSA. In contrast, Asian village communities have well-established property rights, and (scarce) land is more subject to market exchange, which tends to concentrate ownership in the hands of a class of landowners. Moreover, lineage organization and ancestral beliefs reinforce each other because elders are often considered closest to the ancestors, as in the case of the Bakongo in the DRC or the Kaguru in Tanzania. In addition, because the hierarchy does not end with death, ancestors acquire greater authority than any living person and thus the power to intervene in the lives and affairs of their descendants.

ing the Arab slave trade (c. 950-1950), and reinforced by the impact of colonialism and indirect rule on the social and political structure of African societies. In fact, due to the colonial administration's interest in increasing the power of local authorities, the system of indirect rule reinforced the clan-based structure of societies and increased ethnic consciousness by benefiting from the creation of uniform groups composed of individuals identified as members of a particular ethnic group and placed under the control of an African official regarded as a tribal or village chief (Ekeh, 2004; Ellis and Ter Haar, 2004; Platteau, 2009).

Because of these contextual barriers, the new religions that spread rapidly in the 20^{th} century have had only a limited impact on African traditional supernatural beliefs (Platteau, 2009; Igboin, 2022). Instead, modern religions have adapted to coexist with traditional supernatural beliefs, combining faith in a High God with supernatural beliefs (Platteau, 2014).[66] The prevalence of traditional supernatural beliefs have been noted in several recent studies, although the focus has often been put on witchcraft beliefs (van de Grijspaarde et al., 2013; Leistner, 2014; Stoop and Verpoorten, 2020). With respect to beliefs in ancestors, Igboin (2022) and McCall (1995) highlight that, although ancestors remain a central feature of many (mainly rural) communities in Africa, there is little attention paid to ancestors and ancestor-related practices by scholars of African society and culture, in part due to the dominance of Western scholarship in this area of research.

For instance, data from the 2009 Pew data collection project on spiritual life (Pew Research Center, 2009), that contains information on traditional beliefs for around 25.000 respondents from 19 sub-Saharan African countries, confirms this intuition and shows that 45.6% of respondents believed in witchcraft, while 41% believed in reincarnation, and about 30% believed in ancestors.[67] In the case of my sample in Southern Benin, 50% of men think that their ancestors care about the continuation of the lineage (43% among those who do not report traditional religion as their main religion) or, in the same vein,

[66]The success of the Pentecostal church in SSA may be due in part to its ability to adapt to pre-existing belief systems (Auriol et al., 2020). For example, "the descent of the Holy Spirit in the Pentecostal doctrine is described as a trance, and the believers continue to think that witchcraft is powerful but are persuaded that they are now protected by a superior, divine power (Platteau (2009), p.679)".

[67]Beliefs were recorded as yes or no answers to the question Which, if any, of the following do you believe in? and assigned to various categories such as witchcraft, the evil eye, evil spirits, heaven, or reincarnation. Ancestral beliefs were recorded as a yes or no answer to the question Do you believe that sacrifices to spirits or ancestors can protect you from bad things happening?.

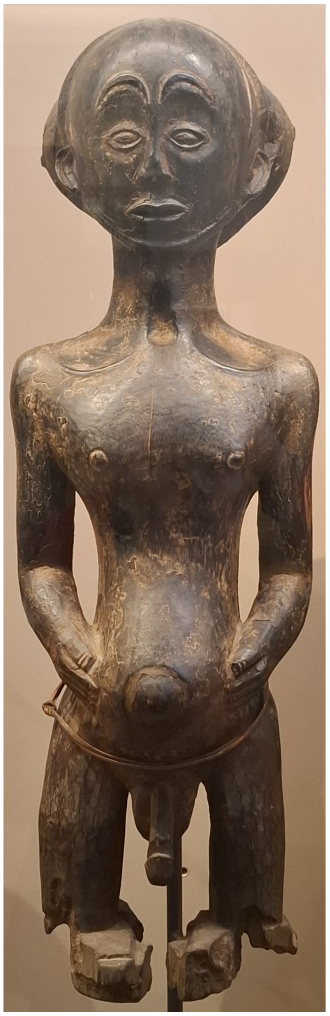
Le Rossignol et al. (2022) find that in the northwestern DRC, 92% of their sample report believing either "strongly" or "very strongly" in Christianity, and at the same time, 75% of them also report believing "strongly" or "very strongly" in witchcraft.

B. Ancestors in the folklore and symbolism of communities

B.1. (Extract of) The Breath of the Ancestors (Birago Diop, 1960)

B.2. English	*B.2. Original*
Listen more often	Écoute plus souvent
to things than to beings	les choses que les êtres
the voice of the fire	La voix du feu sétend
the water that speaks	entends la voix de leau
the voice of the wind	Écoute dans le vent
the bush that weeps	le buisson en sanglot
this is the ancestors breathing	Cest le souffle des ancêtres
The breath of the ancestors	Le souffle des ancêtres morts
who are not gone	qui ne sont pas partis
who are not underground	Qui ne sont pas sous terre
who are not dead	qui ne sont pas morts
those who have passed are not gone	Ceux qui sont morts ne sont jamais partis
they are in a womans breast	Ils sont dans le sein de la femme
in a childs wailing song	Ils sont dans lenfant qui vagit
in the coals that wont rest	Et dans le tison qui senflamme

B.3. Ancestral statue, former Katanga province, RD Congo (20th century)



Source: Photo taken by the author. The statue is in the Royal Museum for Central Africa in Tervuren (Belgium).

From the description of the Royal Museum for Central Africa: This statue is the work of a Hemba artist. The hand on the stomach indicate the succession of generations.

C. Matching procedure: Vansina and DRC DHS

Figure C1: Ethnic groups in Vansina (1966) and DHS clusters

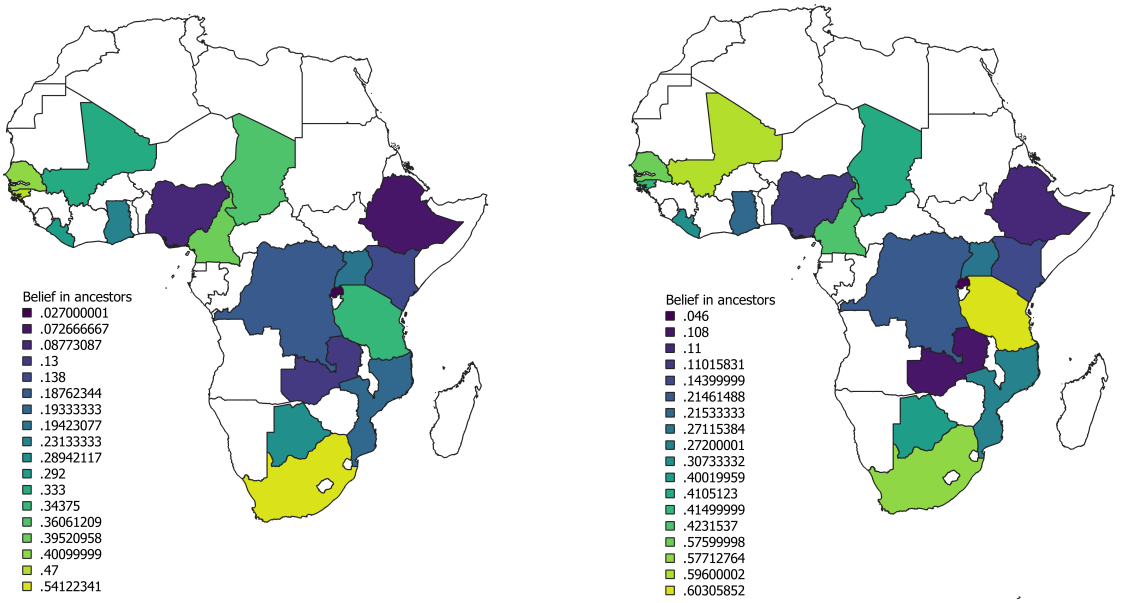
(a) Digitized version of Vansina (1966) (b) Ancestor worship and DHS clusters

Notes: Panel C1a displays ethnic group boundaries for the DRC digitized from Vansina (1966). Panel C1b assigns to each DHS cluster the value taken by the variable ancestor worship in the ethnic homeland where the DHS cluster is located.

D. Geographical distribution of variables: PEW and Folklore

D.1. PEW Variables

Figure D1: Share of respondent believing in Ancestors

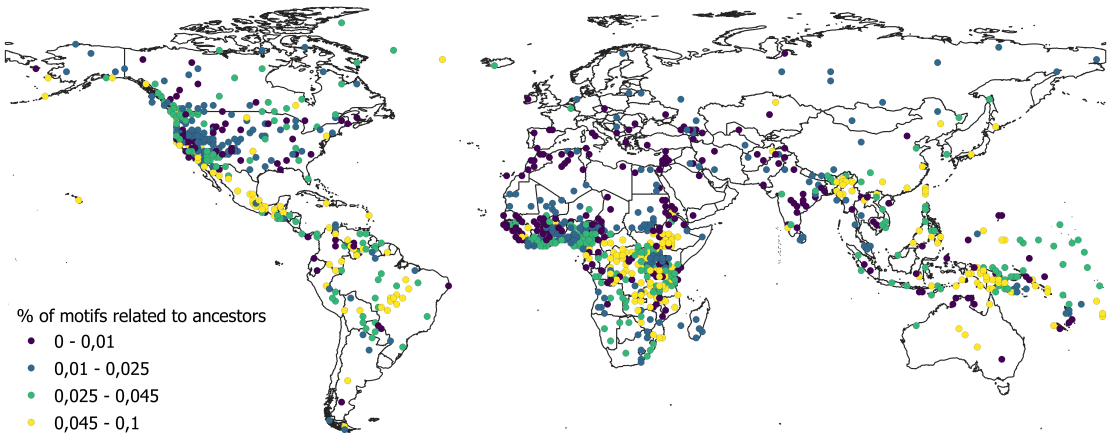


(a) Rituals to ancestors (b) Believe in sacrifices to ancestors

Notes: The figure displays the share of individuals in each country of the PEW sample believing in ancestors. Panel D1a shows the geographic distribution of the share of respondents that answered "yes" to the question "*Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?*". Panel D1b shows the geographic distribution of the share of respondents that answered "yes" to the question "*Do you believe that sacrificing to spirits or ancestors can protect you from bad things happening?*".

D.2. Distribution of motifs related to ancestors

Figure D2: Share of Motifs related to ancestors in the oral tradition of EA's ethnic groups



Note: The figure displays the location of the 1.265 groups in the Ethnographic Atlas (Murdock, 1967), and the distribution of the share of motifs related to the word "ancestor".

E. Variable definitions

E.1. Ethnicity-level variables

E.1.1. Folklore:

Number of motifs: Total number of motifs recorded in each Berezkin's group. Data comes from Michalopoulos and Xue (2021).

Number of publishers: Total number of publishers of the sources in the group's oral tradition. Data comes from Michalopoulos and Xue (2021).

Earliest year of publication: Earliest year of publication in the group's oral tradition. Data comes from Michalopoulos and Xue (2021).

Motifs related to "supernatural": Share of motifs tagged by supernatural related terms in the oral tradition of an ethnic group. Data comes from Michalopoulos and Xue (2021).

E.1.2. Ethnographic Atlas:

Domestic organization around extended families: is based on varible V8 of the Ethnographic Atlas (domestic organization). It is constructed as a dummy variable that is zero if domestic organization is "Independent polyandrous families", "Polygynous: unusual

co-wives pattern", "Polygynous: usual co-wives pattern", "Minimal (stem) extended families", "Small extended families", and "Large extended families". It equals one if domestic organization is "Independent nuclear family, monogamous" or "Independent nuclear family, occasional polygyny". This measure is based on Enke (2019).

Segmented communities and localized clans: is based on variable V15 of the Ethnographic Atlas (community marriage organization). It is constructed as a dummy variable that is zero if community organization is "Demes, not segregated into clan barrios", "Agamous communities", "Exogamous communities, not clans". It takes on a value of one if community organization is "Segmented communities without local exogamy", "Segmented communities, localized clans, local exogamy", or "Clan communities, or clan barrios". This measure is based on Enke (2019).

Patrilineal: is based on variable V43 of the Ethnographic Atlas (descent: major type). It is a dummy variable that takes the value one if a groups major mode of descent is patrilineal as opposed to any other mode of descent.

Political complexity: is based on variable V33 of the Ethnographic Atlas (jurisdictional hierarchy beyond local communities). This is a categorical variable ranging from no levels beyond local community to four levels beyond local community. I use it as it appears in the Ethnographic Atlas (ranging from 0 to 4).

Monogamy: is based on variable V9 of the Ethnographic Atlas (marital composition: monogamy and polygamy). It is constructed as a dummy variable that takes on a value of one if an ethnic group's dominant form of marital composition is monogamous.

Pastoralism: is based on variables V4 (animal husbandry) and V40 (predominant type of animal husbandry) of the Ethnographic Atlas. To construct this variable, I follow Le Rossignol and Lowes (2022). From variable v4, I create a dummy variable that equals one if the predominant type of animal raised is a herding animal such as cattle, sheep, or camelids. Then, pastoralism is measured by multiplying this new dummy variable by variable V40.

Historical use of the plough: is based on variable V39 of the Ethnographic Atlas (animals and plow cultivation). I construct an indicator variable for traditional plough agriculture that equals one if the plough was present (whether aboriginal or not) and zero otherwise. This measure is similar to Alesina et al. (2013).

Historical economic development: is based on variable V30 of the Ethnographic Atlas

(settlement patterns). I use this variable as in Alesina et al. (2013). Each ethnic group is categorized into one of the following categories describing their pattern of settlement: "nomadic or fully migratory", "semi-nomadic", "semi-sedentary", "compact but temporary settlements", "neighborhoods of dispersed family homes", "separated hamlets forming a single community", "compact and relatively permanent", "complex settlements". The variable takes on the values of 1 to 8, with 1 indicating fully nomadic groups and 8 groups with complex settlement.

Practice of intensive agriculture: is based on variable V28 of the Ethnographic Atlas (intensity of agriculture). I follow Alesina et al. (2013) and construct an indicator that equals one if the society belongs to the categories "intensive agriculture" or "intensive irrigated agriculture", and zero otherwise.

E.1.3. Geographic variables:

Tropical climate: is taken from Alesina et al. (2013). It is computed as the proportion of land within a 200 kilometer radius of an ethnic groups centroid that is classified as being either tropical or subtropical. The classification of thermal climates comes from the GAEZ 2002 database.

Precipitation: is taken from Fenske (2013). It is average annual precipitation (mm). The data comes from the International Institute for Applied Systems Analysis.

Ruggedness: is taken from Nunn and Puga (2012). It is constructed as the average across points on a grid 1 kilometer apart within a country of an index of terrain ruggedness. For details about how the index is constructed, see Nunn and Puga (2012).

Land quality: is taken from Fenske (2013). It is measured as a non-additive combination of climate constraints, soil constraints and terrain slope constraints, coming from the Food and Agriculture Organizations Global Agro-Ecological Zones (FAO-GAEZ) project.

Agricultural suitability: is taken from Alesina et al. (2013). Using information on global geo-climatic conditions for crop cultivation from the FAOs Global Agro-Ecological Zones (GAEZ) v3.0 database, they calculate the fraction of this land that is suitable for the cultivation of barley, wheat, rye, sorghum, foxtail millet, or pearl millet. They use this measure to construct the average suitability of the land (within 200 kilometers of the centroid of each ethnic group) historically inhabited by a locations ancestors.

F. West Zaire Surveys (1975-77)

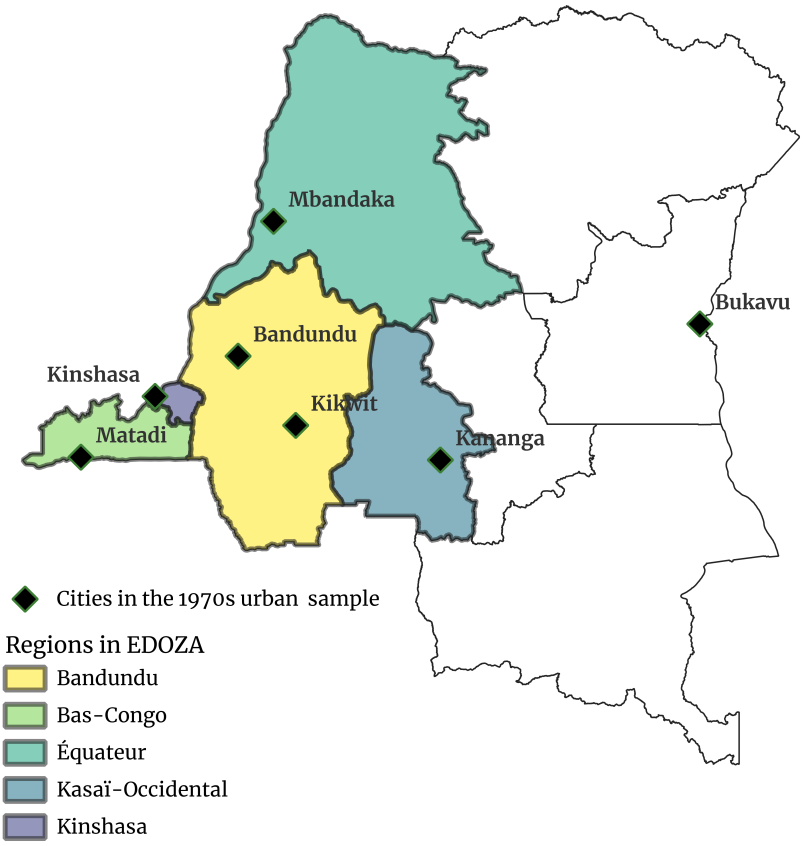
These surveys were part of a large research project led by the Université Catholique de Louvain in collaboration with the Congolese Official Institute of Research and Statistics. The surveys were conducted between 1975 and 1977 and aimed at collecting basic demographic information for the Democratic Republic of the Congo, due to the paucity of this type of data. These surveys are the outcome of two parallel studies (see Figure F1 for the sampled territories):

Urban Demographic and Budgetary Survey.–A demographic and budgetary survey were conducted in the six largest cities of western Zaire: Kinshasa, Matadi, Bandundu, Kikwit, Mbandaka and Kananga. This survey was led by Joseph Houyoux, professr at the Sociology department of the Université Catholique de Louvain, in Belgium. On the one hand, the demographic survey contains individual-level information on about 250,000 individuals in 43,000 households. After a census conducted in each of these cities to count and identify all households, 1/10 of the total number of households was randomly selected to be included in the sample. Demographic information was collected on age, sex, ethnicity, place of birth, and migration status, as well as socioeconomic characteristics such as years of education and occupation. Moreover, for each woman over the age of 13, births calendars are also recorded, including the month and year of each birth, the sex of the children, and the dates of death, if applicable. On the other hand, the budgetary survey contains information on household expenditures and transactions for 1/50 of the households identified in each city (two daily passages during one month).

Enquête Démographique de l'Ouest du Zaïre (EDOZA).–A demographic survey conducted in the rest of urban areas (excluding the large cities included in the previous survey) and in rural areas of four western regions: Bas-Congo, Bandundu, Kasai Occidental and Equateur (only in the Equateur and Tshuapa districts). This survey was led by the Demography deparment of the Université Catholique de Louvain. The original survey includes around 210.000 individuals in about 45.000 households. However, contrary to the Urban Demographic survey where I have the full sample, I have been able to locate 50.000 individuals in 11.000 households so far. To the extent of my knowledge, the rest of the EDOZA sample is lost.

One potential concern relates to the quality of these surveys. Although these surveys were conducted during Mobutu's dictatorship, both the design and implementation of the survey and data collection were managed jointly by a team of demographers based at the Congolese Institute for Research and Statistics and the Université Catholique de Louvain in Belgium. Data cleaning and statistical programming were carried out in Belgium. These data are considered high quality by demographers who rely on them to study demographic dynamics in the Congo in well-published academic papers (Tabutin, 1982; Shapiro, 1996; Shapiro and Tambashe, 2001; Schneidman, 1990). Finally, these surveys used the same methodology to construct variables (i.e., birth calendars) as current benchmark surveys, such as the Demographic and Health Surveys. Although the data from these surveys have been used by demographers, it has only been used in an aggregated way to study fertility and mortality levels and trends across regions and time. Recently, some papers in economics have used the microdata of the Urban Demographic survey (Guirkinger and Villar, 2022; Alvarez-Aragon et al., 2023). To the best of my knowledge, no paper has yet exploited the microdata from EDOZA.

Figure F1: Cities included in the urban survey and regions included in EDOZA



Note: Own elaboration using QGIS.

G. Ancestral beliefs and fertility in southern Benin

G.1. Poisson model

Table G1: Beliefs in ancestors and fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.229***	0.209***	0.191***	0.184***	0.159***	0.146***
	(0.0451)	(0.0407)	(0.0414)	(0.0474)	(0.0422)	(0.0431)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	7.995	8.016	8.016	8.012	8.029	8.029
N	846	832	832	841	830	830

NOTE. Data: First-hand data collected in southern Benin. The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.2. Alternative explanatory variables

Table G2: Beliefs in ancestors and fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	1.905***	1.648***	1.513***	1.590***	1.264***	1.172***
	(0.358)	(0.326)	(0.317)	(0.378)	(0.340)	(0.335)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	7.995	8.016	8.016	8.012	8.029	8.029
N	846	832	832	841	830	830

NOTE. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you think that your ancestors' spirits care about your extended family and the continuation of the family line?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table G3: Beliefs in ancestors and fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	1.818***	1.577***	1.472***	1.503***	1.205***	1.138***
	(0.354)	(0.321)	(0.312)	(0.369)	(0.333)	(0.327)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	7.995	8.016	8.016	8.012	8.029	8.029
N	846	832	832	841	830	830

Note. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?* or to the question *Do you think that your ancestors' spirits care about your extended family and the continuation of the family line?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.3. Number of alive children

Table G4: Beliefs in ancestors and fertility in contemporary Benin

	Number of children alive					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	1.415***	1.285***	0.858***	1.105***	0.953***	0.854***
	(0.331)	(0.306)	(0.261)	(0.341)	(0.313)	(0.315)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	7.147	7.179	7.179	7.165	7.190	7.190
N	842	828	828	837	826	826

Note. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children alive at the time of the survey. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.4. *Effects on women and complementarity between spouses*

Table G5: Beliefs in ancestors and female fertility in Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.570***	0.423***	0.369***	0.630***	0.460***	0.427***
	(0.155)	(0.139)	(0.140)	(0.166)	(0.150)	(0.149)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	5.345	5.333	5.333	5.345	5.333	5.333
N	943	937	937	943	937	937

Note. Data: First-hand data collected in southern Benin. The sample is restricted to women. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table G6: Beliefs in ancestors and fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	2.695***	2.310***	2.066***	2.235***	1.825***	1.626***
	(0.519)	(0.478)	(0.473)	(0.533)	(0.493)	(0.488)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Mean Y	7.995	8.016	8.016	8.012	8.029	8.029
N	846	832	832	841	830	830

Note. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if both the husband and the wife answer *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.5. Specification curves: robustness to additional controls

In this section I show that the results are robust to the inclusion of alternative control variables and their different combinations. In addition to the baseline and extended controls (age, education, access to electricity, TV ownership, quantity of agricultural land, pressure from the extended family to have children and whether the respondent is participating in a program to increase pineapple production), I include:

Polygyny: Since I am focusing on men's ever-born children, polygyny is an important factor to consider. In fact, about 60% of men who report having 10 or more children are polygynous. I have not included this in the main specification because it may be a "bad control" (Angrist and Pischke, 2009). For example, Goody (1973) notes that one can gain security in the afterlife (i.e., continuity of the family line) directly by having children or indirectly by adding wives. Similarly, Kenyatta (1965) mentions in the context of the Gikuyu people of central Kenya that:

> "If a man dies without a male child his family group comes to an end. This is one thing that the Gikuyu fear dreadfully, and it can be said to be one of the factors behind the polygamous system of marriage. There is no doubt that perpetuation of family or kinship group is the main principal of every Gikuyu marriage. For the extinction of a kinship groups means cutting off the ancestral spirits from visiting the earth, because there is no one left to communicate with them (Kenyatta (1965), p.13)".

Father practices Vodoun: To proxy for parental preferences for children and aspects related to the traditional practices of the family, I include a dummy variable that equals one if the father's main religion is Vodoun. This variable is highly correlated to the respondent's religion: when the respondent declares Vodoun as his main religion, his father practices Vodoun in the 85% of cases.

Household size: This variable takes into account the structure of the household. Households with more members can more easily externalize the costs of having children, and more members may be the result of stronger preferences towards children in previous generations.

Money to church to get protection against COVID: I try to account for strong religiosity (beyond the inclusion of religion fixed effects) by looking at whether the respondent has donated some money to his church to get protected against COVID (average is 14%).

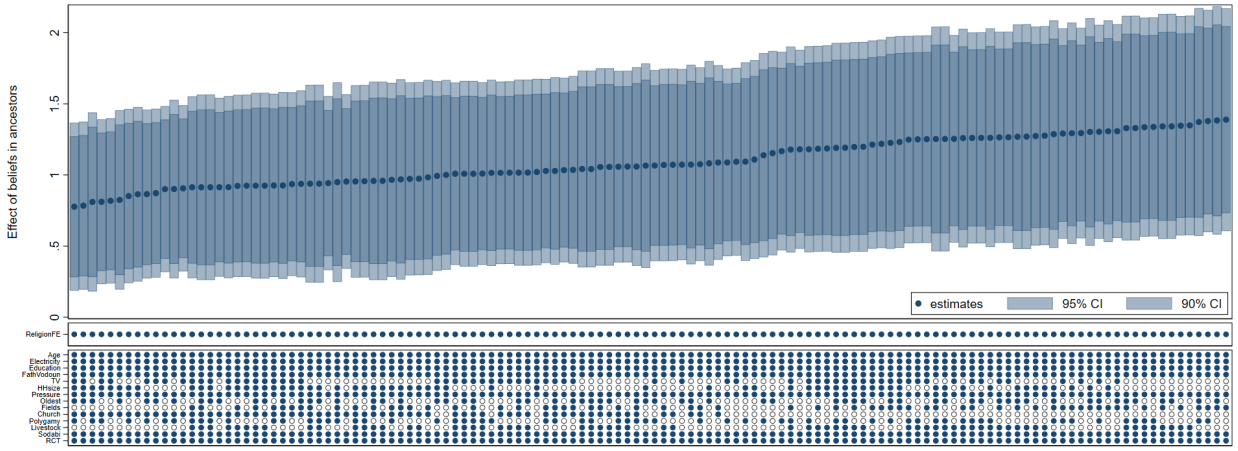
Drinking sodabi to get protection against COVID: I proxy for the strength of other traditional practices (not related to beliefs in supernatural powers) by measuring the subjec-

tive effectiveness of traditional medicine. I include an indicator that equals one if the respondent drunk a traditional alcoholic drink (sodabi) to get protection against COVID.

Livestock ownership: As an additional measure of wealth, I include a dummy variable that takes the value one if the respondent owns livestock.

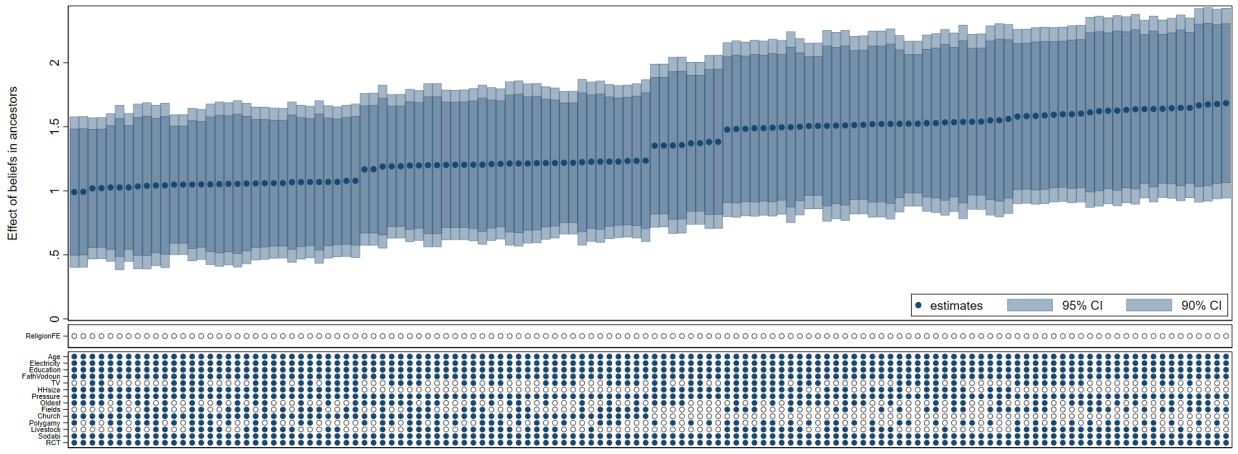
Oldest brother: Finally, since siblings may compete for limited resources in their household and first-born children are often prioritized in accessing resources, or in their marriage prospects, I include an indicator that takes value one if the respondent is the oldest sibling (among those from the same mother).

Figure G1: Specification curve: additional controls and religion fixed effects



Note: The figure shows the specification curves for the effect of beliefs in the influence of ancestors. Each dot is a coefficient from Eq. 1 with a different set of control variables. The vertical bars, from darkest to lightest, denote the 95% and 90% confidence intervals. All specifications include religion fixed effects. *HHsize* is the total number of people living in the household. *FatherVodoun* equals one if the (main) religion of the respondent's father is Vodoun and zero otherwise. *Oldest* takes the value one if the respondent is the oldest brother and zero otherwise. *Church* equals one if the respondent donated to his church to get protected from COVID. *Polygamy* equals one if the respondent is in a polygamous union and zero otherwise. *Livestock* is an indicator that takes the value one if the respondent owns livestock. *Sodabi* takes the value one if the respondent drank sodabi (a traditional alcoholic drink) to get protected against COVID.

Figure G2: Specification curve: additional controls

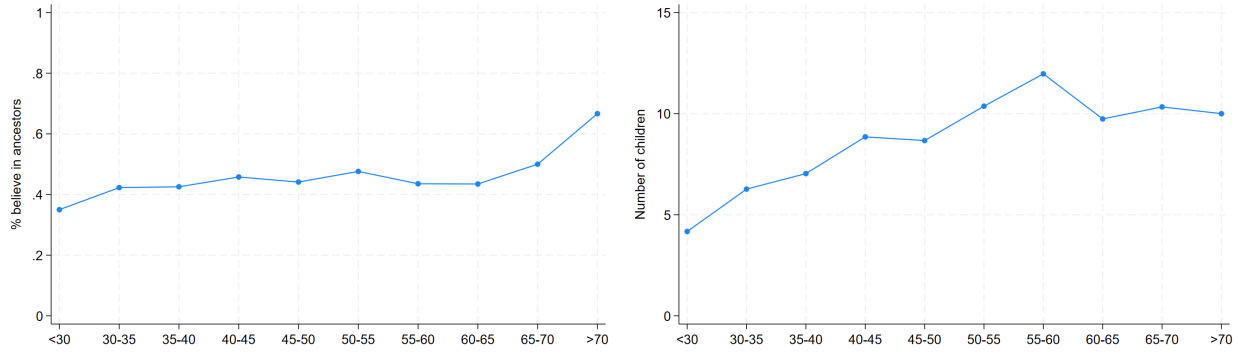


Note: The figure shows the specification curves for the effect of beliefs in the influence of ancestors. Each dot is a coefficient from Eq. 1 with a different set of control variables. The vertical bars, from darkest to lightest, denote the 95% and 90% confidence intervals. Religion fixed effects are not included. *HHsize* is the total number of people living in the household. *FatherVodoun* equals one if the (main) religion of the respondent's father is Vodoun and zero otherwise. *Oldest* takes the value one if the respondent is the oldest brother and zero otherwise. *Church* equals one if the respondent donated to his church to get protected from COVID. *Polygamy* equals one if the respondent is in a polygamous union and zero otherwise. *Livestock* is an indicator that takes the value one if the respondent owns livestock. *Sodabi* takes the value one if the respondent drank sodabi (a traditional alcoholic drink) to get protected against COVID.

G.6. Age dynamics: age fixed effects

One potential confounder could be related to similar dynamics in the evolution of beliefs and the number of children over the life cycle or over time, that are difficult to capture in a lineal model. However, this does not seem to be the case (see Figure G3). Although the number of children is an increasing function of age (although at decreasing pace), the share of people believing in ancestors is rather constant. In Table G7 I show that adding age fixed effects does not change the results.

Figure G3: Dynamics of beliefs in ancestors and children by age group



(a) Beliefs in ancestors

(b) Number of children

Notes: Panel (a) plots the share of people believing in the influence of ancestors on their lives (n=846) by age group. Panel (b) plots the average number of children by age group.

Table G7: Beliefs in ancestors and fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	1.848***	1.743***	1.249***	1.460***	1.369***	1.251***
	(0.379)	(0.358)	(0.311)	(0.388)	(0.365)	(0.371)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	No	No	No	Yes	Yes	Yes
Age FE	No	Yes	Yes	No	Yes	Yes
Mean Y	7.995	8.016	8.016	8.012	8.029	8.029
N	846	832	832	841	830	830

NOTE. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Age fixed effects included. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.7. Partible vs Impartible inheritance

Differences in inheritance rules may have an influence on fertility behavior. For example, impartible inheritance (where a single heir receives the full amount of the family's land) has been shown to increase fertility rates (when comparing with partible inheritance rules) both in Europe (Gay et al., 2023) and in sub-Saharan Africa (Fontenay et al., 2024). In Benin, there are ethnic groups with both partible (Yoruba) and impartible inheritance (Fon and Adja), so it is an interesting setting to test whether the positive relationship between ancestral beliefs and fertility is affected by differences in inheritance rules. In fact, impartible inheritance may be correlated with ancestral beliefs. For example, Chu (1991) has shown that impartible inheritance (e.g., primogeniture) may emerge in traditional societies as the family's head optimal policy when the objective function is the continuation of the family line, which as I have shown is particularly important in societies with strong ancestral beliefs. Therefore, impartible inheritance could be a mediator in the relationship between ancestral beliefs and fertility behaviour.

I conduct two different tests to rule out this possibility. First, as impartible inheritance is defined at the ethnic group level, I show in Table O4 that my results remain unchanged when I include ethnicity fixed effects. Second, I test the correlation between ancestral beliefs, impartible inheritance and fertility (Table G9). I show that there is positive cor-

relation between ancestral beliefs and impartible inheritance (column 1), pointing in the direction of Chu (1991)'s hypothesis, namely that impartible inheritance may emerge in places where the motive to continue the family line plays an central role. However, there is not significant relationship between impartible inheritance and fertility (see column 2 without any control variables and column 3 after including some control variables). Finally, when I include both ancestral beliefs and impartible inheritance, only ancestral beliefs matter for fertility behavior. Overall, these results suggest that, although impartible inheritance and the motive to continue the family line may be related, the positive influence on fertility is mostly due to the later.

Table G8: Beliefs in ancestors and fertility in contemporary Benin

	Number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	1.460***	1.267***	1.152***	1.326***	1.117***	1.043***
	(0.388)	(0.350)	(0.355)	(0.394)	(0.355)	(0.359)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity FE	No	No	No	Yes	Yes	Yes
Mean Y	8.012	8.029	8.029	8.012	8.029	8.029
N	841	830	830	841	830	830

NOTE. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the respondent answers *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Baseline controls include age, age squared, whether the household has electricity and education. Extended controls include the number of agricultural fields, whether the household owns a TV, whether the household has been part of a program to encourage the production of pineapple, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table G9: Beliefs in ancestors, impartible inheritance, and fertility

	Impartible inheritance	Number of children ever born			
	(1)	(2)	(3)	(4)	(5)
Ancestral beliefs	0.0556***			1.811***	1.262***
	(0.0181)			(0.411)	(0.387)
Impartible inheritance		0.911	0.215	0.407	-0.106
		(0.594)	(0.583)	(0.590)	(0.587)
Influence family				1.039***	0.982***
				(0.399)	(0.371)
Controls	No	No	Yes	No	Yes
Mean Y	0.926	8.037	8.072	8.037	8.072
N	767	767	754	767	754

Note. Data: First-hand data collected in southern Benin. The table reports OLS estimates. The outcome variable is whether the ethnic group practiced impartible inheritance in column (1), and the total number of children ever born in columns (2), (3), (4) and (5). "Ancestral beliefs" is a dummy variable that equals one if the respondent believes that the spirits of his ancestors influence his life. "Impartible inheritance" equals one if the respondent's ethnic group practiced impartible inheritance. "Influence family" equals one if the respondent has experienced pressure from his extended family to have children. Controls include age, whether the household has electricity, education, number of agricultural fields, whether the household owns a TV, and whether the household has been part of a program to encourage the production of pineapple. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.8. Old-age security motive for fertility

Ancestor worship could in part be interpreted as an extension of the well-known "old-age security motive", whereby people's needs for old-age support raise the demand for children (Lambert and Rossi, 2016; Rossi and Godard, 2022; Sage, 2023). In fact, in societies where the continuation of the family line is of central importance due to the influence of ancestors, the question of "security" has two different facets (Goody, 1973). In addition to the standard security in old age, there is the security in the after-life which drives the demand for children in the same way as the former. Ancestors would need their descendants to sustain themselves in the afterlife as much as the living need them in old age. It is therefore important to distinguish between security in old age and security in the after-life. I use detailed field-level information on property rights to show that my results are not affected when I control for the quantity of owned (and rented) land by women (both in terms of area in squared meters and of number). Land ownership should be negatively correlated with fertility when the old-age security motive for fertility is important (in my sample, the median number of owned fields by women is one, and the median area of owned fields is 800 squared meters).

Table G10: Ancestors, land ownership and female fertility

	Number of children ever born			
	(1)	(2)	(3)	(4)
Men + Women ancestral beliefs	0.698***	0.694***	0.714***	0.693***
	(0.179)	(0.178)	(0.179)	(0.178)
Controls	Yes	Yes	Yes	Yes
Area fields	No	Yes	No	Yes
Number fields	No	No	Yes	No
Religion FE	Yes	Yes	Yes	Yes
Mean Y	5.352	5.352	5.352	5.352
N	840	840	840	840

NOTE. Data: First-hand data collected in southern Benin. The sample is restricted to women. The table reports OLS estimates. The outcome variable is the total number of children ever born. "Men + Women beliefs" is a dummy variable that equals one if both the husband and the wife answer *yes* to the question *Do you believe that the spirits of your ancestors influence the events of your life?*. Column 1 does not include any control related to land. Control 2 controls for the total area of all owned and rented fields. Column 3 controls for the total number of owned and rented fields. Column 4 control for the total area of all fields. Controls include age, age squared, whether the household has electricity, education, whether the household owns a TV, and whether the respondent has received pressure from the extended family to have children. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

G.9. Using selection on observables to assess the bias from unobservables

I follow Oster (2019)'s methodology to further reduce concerns related to omitted variable bias. This strategy consists in identifying the degree of omitted variable bias by exploring the sensitivity of treatment effects to the inclusion of observed controls, taking into account movements in the R-squared when the controls are introduced. Two assumptions are required. First, a value for the relative degree of selection on observed and unobserved variables is needed (δ). Second, a value for the R-squared from a hypothetical regression of the outcome on treatment and both observed and unobserved controls ($R_{\max}$).

Regarding δ, Oster (2019) suggests equal selection ($\delta = 1$) as an appropriate upper bound on δ. A value of $\delta = 1$ suggests that observables are at least as important as the unobservables. This assumptions seems likely to hold since observed variables are (usually) the factors that are most important.

Regarding $R_{\max}$, different bounds that are a function of the R-squared from the regression with observed controls (R') can be chosen. Based on a sample of randomized articles, Oster (2019) suggests $R_{\max} = 1.3 \times R'$, which would allow about 90% of ran-

domized results to survive (but only 45% of nonrandomized results).[68]

Table G11 shows that the results are extremely unlikely to be fully explained by unobservables. Column 1 shows that, when looking at the impact on men, we would need that a 310% of the observed sorting on observables applied to unobservables to make the coefficient of ancestral beliefs equal to 0. Since observables include variables that are considered as highly important to explain fertility (i.e., age, education, religion, wealth...), this situation seems unlikely. Even more striking are the results in column 2 where we look at female fertility. Now, a 2352% of the observed sorting on observables applied to unobservables would be needed to make the coefficient of ancestral beliefs (in this case, of both husband and wife) equal to 0.

Table G11: Importance of bias from unobserved variables

	β Ancestral Beliefs	
	Men	Women
Ancestral beliefs only (no controls)	1.89	0.72
Ancestral beliefs (Full model)	0.95	0.69
$R_{max} = 1.3 \times R'$ and δ=1	0.65	0.66
Adjusted β set to zero: δ solved for	3.10	23.52

NOTE. The table shows the unadjusted β (coefficient associated with ancestral beliefs) from the model without controls (row 1), from the full model (row 2, controls include age, age squared, electricity, education, TV, number of fields, pressure from extended family to have children, religion, and marital status). Row 3 assumes $R_{max} = 1.3 \times R'$ and δ=1 and shows the adjusted beta after accounting for unobservables. Row 4 indicates that, if 310% (column 1) of the observed sorting on covariates in the full model applied to unobservables there would be no effect of ancestral beliefs i.e., the ancestral beliefs coefficient would be zero. This figure increases to 2352% in column 2.

[68]There are good reasons to use thresholds below 1. For example, there might be measurement error in the dependent variable, as it is probably the case here.

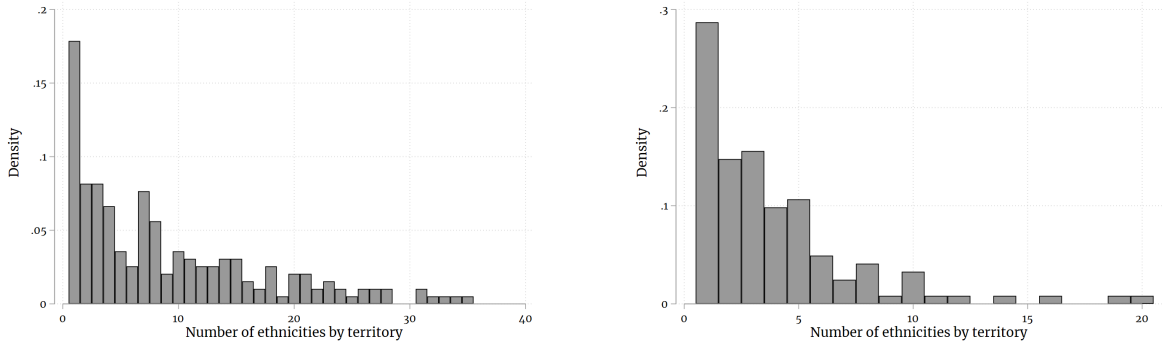
H. Democratic Republic of Congo: Robustness

H.1. Variation: ethnicities by territory

A potential concern with the specification that includes fixed effects for territory of birth and city of residence in the urban sample is that there could be almost no variation in the number of people of different ethnicities born in the same territory, and thus the estimates could be driven by very few observations. First, it is important to note that territories are large administrative units.[69] Second, migration on the eve of and immediately after independence was very important in the DRC, and therefore the number of second generation migrants from different territories (and possibly with a different ethnicity) was potentially very high. In fact, about 90% of the sample was born in a rural area and migrated during the last years of the colonial era or after independence. Third, the classification of ethnicities (or, as defined in Vansina (1966), tribes) that I use in this paper is granular: I have about 220 different ethnicities in the urban sample, and the maps of ethnic boundaries drawn by Vansina (1966) generally depict small polygons that can lie within a single territory (see Figure C1a). Figure H1, panel H1a, shows the distribution of the number of ethnicities by territory of birth: it looks at the ethnicity of each person born in a given territory and counts the number of different ethnicities (it does not look at the number of ancestral ethnic boundaries that lie within a territory). However, there may be many ethnicities because only 1 or 2 people born in the territory are of the same ethnicity. Panel H1b shows the distribution of the number of ethnicities by territory of birth, considering only ethnicities with at least five people.

[69] Territories in the 1970s surveys do not correspond exactly to territories today: while I have about 200 territories (including cities) in my sample, there are 145 territories and 35 large cities today.

Figure H1: Variation in the number of ethnicities by territory of birth



(a) Full sample (b) Only ethnicities with $n > 5$

Notes: Panel H1a, shows the distribution of the number of ethnicities by territory of birth: it looks at the ethnicity of each person born in a given territory and counts the number of different ethnicities. Panel H1b shows the distribution of the number of ethnicities by territory of birth, considering only ethnicities with at least five people.

H.2. Age-specific fertility rates

Using birth calendars, I reconstruct the total number of births women had at ages 35, 40, and 45. The results are reported in Table H1. While fertility is more likely to be completed at older ages, the sample size becomes smaller because there are fewer women in the older age categories. I find a positive effect of ancestor worship on age-specific fertility, ranging from an average effect of 18% of the full sample mean at age 35 to 21% at age 40 and 26% at age 45. Here, I observe an stronger effect on the rural sample (again, note that I include city of residence FE when using the urban sample and region FE when I use the EDOZA sample, which can explain – at least partially – the stronger effect on the rural sample. I find that ancestor worship increases the number of births at age 30 by 27% in the EDOZA sample and by 15% in the urban sample. At age 40, the effect moves up to 31% of the EDOZA sample mean and to 18% in the urban sample. Finally, at age 45, ancestor worship is associated with an increase of 36% of the sample mean in the EDOZA survey and of 23% in the urban sample.

Table H1: Ancestor worship and age-specific fertility in the DRC

	Births at 35			Births at 40			BIrths at 45		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ancestral beliefs	0.767***	1.139***	0.692***	0.984***	1.358***	0.902***	1.193***	1.583***	1.113***
	(0.172)	(0.349)	(0.165)	(0.229)	(0.403)	(0.250)	(0.244)	(0.402)	(0.259)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City x Territory FE	No	No	No	Yes	No	No	No	Yes	Yes
All	Yes	No	No	Yes	No	No	Yes	No	No
Edoza	No	Yes	No	No	Yes	No	No	Yes	No
Urban	No	No	Yes	No	No	Yes	No	No	Yes
Mean Y	4.568	4.243	4.746	4.862	4.580	5.055	4.710	4.489	4.890
R-squared	0.246	0.256	0.274	0.244	0.267	0.267	0.213	0.252	0.226
N	18997	6730	12267	13447	5466	7981	9678	4337	5341

NOTE. Data: Demographic Survey of 1970s and EDOZA. The table reports OLS estimates. The outcome variables are the total number of births a women had before age 35 (columns 1, 2 and 3), 40 (columns 4, 5 and 6) and 45 (columns 7, 8 and 9). "Ancestor worship" is a dummy variable that equals one if the ethnic group e practice ancestor worship. Controls include age, whether the place of birth was urban or rural, whether the respondent has primary education, dummy equal to one if migrant, dummy equal to one if the father's respondent is alive, dummy equal to one if the respondent is working, dummy equal to one if the respondent is a farmer (only available in the urban sample), number of household members, and year of installation in the current city. City/region fixed effects include city of residence in the case of the urban sample and region of residence in the case of EDOZA. Standard errors clustered at the Vansina's ethnic group-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

H.3. Intensive vs. Extensive margin and estimation of Poisson model

Table H2: Ancestor worship and fertility in the DRC

	Number of children ever born							
	Full sample		EDOZA		Urban sample			
	All	+30	All	+30	All	+30	All	+30
Ancestor worship	0.136***	0.188***	0.154**	0.218***	0.135***	0.186***	0.0451**	0.0829***
	(0.0338)	(0.0434)	(0.0654)	(0.0731)	(0.0249)	(0.0358)	(0.0200)	(0.0263)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City x Territory FE	No	No	No	No	No	No	Yes	Yes
Mean Y	2.883	5.322	3.546	4.866	2.703	5.542	2.702	5.538
N	60064	23194	12825	7551	47239	15643	47014	15489

NOTE. Data: Demographic Survey of 1970s and EDOZA. Columns 1 and 2 combine both the Urban Demographic survey and EDOZA. Columns 3 and 4 use only the EDOZA sample. Columns 5-8 use only the urban sample. In columns 2, 4, 6 and 8, the sample is restricted to women older than 30 years old. The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. The outcome variable is the total number of children ever born. "Ancestor worship" is a dummy variable that equals one if the ethnic group e practice ancestor worship. Controls include age, age squared, whether the place of birth was urban or rural, whether the respondent has primary education, dummy equal to one if migrant, dummy equal to one if the father's respondent is alive, dummy equal to one if the respondent is working, dummy equal to one if the respondent is a farmer (only available in the urban sample), number of household members, and year of installation in the current city. City/region fixed effects include city of residence in the case of the urban sample and region of residence in the case of EDOZA. Standard errors clustered at the Vansina's ethnic group-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table H3: Ancestor worship and fertility in the DRC

	Full sample		EDOZA		Urban sample	
	Has children	Number of children	Has children	Number of children	Has children	Number of children
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestors	0.0701***	0.585***	0.0820***	0.771**	0.0766***	0.509***
	(0.0127)	(0.182)	(0.0173)	(0.345)	(0.0146)	(0.133)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
Ext margin	Yes	No	Yes	No	Yes	No
Mean Y	0.882	6.037	0.840	5.793	0.902	6.146
N	23194	20448	7551	6342	15643	14106

Note. Data: Demographic Survey of 1970s and EDOZA. The sample is restricted to women older than 30 years old. Columns 1 and 2 combine both the Urban Demographic survey and EDOZA. Columns 3 and 4 use only the EDOZA sample. Columns 5-6 use only the urban sample. Columns 1, 3, and 5 look at the extensive margin (probability of having children), while columns 2, 4, and 6 look at the intensive margin (total number of children ever born conditioned on having children). The table reports OLS estimates. "Ancestor worship" is a dummy variable that equals one if the ethnic group e practice ancestor worship. Controls include age, age squared, whether the place of birth was urban or rural, whether the respondent has primary education, dummy equal to one if migrant, dummy equal to one if the father's respondent is alive, dummy equal to one if the respondent is working, dummy equal to one if the respondent is a farmer (only available in the urban sample), number of household members, and year of installation in the current city. City/region fixed effects include city of residence in the case of the urban sample and region of residence in the case of EDOZA. Standard errors clustered at the Vansina's ethnic group-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

H.4. Unobserved human capital

Table H4: Ancestor worship and unobserved human capital

	Pseudo-Poisson Maximul Likelihood	OLS estimates	
	Total wage	Log(1+ total wage)	Total wage
	(1)	(2)	(3)
Ancestor Worship	-0.107	0.236	-949.7
	(0.208)	(0.305)	(1315.8)
Years of education	0.161***	0.297***	628.8***
	(0.0144)	(0.0353)	(92.69)
City FE	Yes	Yes	Yes
Territory of birth FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Mean Y	4047.8	5.411	4045.2
R-squared		0.234	0.191
N	15708	15718	15718

Note. Data: Budgetary Survey of the 1970s and Vansina(1966). Column 1 reports Pseudo-Poisson Maximul Likelihood estimates, and the dependent variable is the total wage. Column 2 reports OLS estimates, and the dependent variable has been transformed to Log(1+wage). Finally, column 3 reports OLS estimates using total wage as dependent variable. Ancestor worship is a dummy variable that equals one if the ethnic group e of individual i traditionally practices ancestor worship. Controls include age, age squared, total number of household members, gender, whether respondents were born in urban/rural area, education, dummy equal to one if migrant, year of installation in the current city, dummy equal to one if the father's respondent is alive, and dummy equal to one if the respondent is a farmer. Standard errors () are clustered at the ethnic group level. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

H.5. Exposure to missionary presence

I construct a measure of exposure to all Christian missions opened in the DRC between 1885 and 1948 for all individuals born before 1948 using the West Zaire Demographic surveys and data on missions from Guirkinger and Villar (2022) and Alvarez-Aragon et al. (2023). In the historical individual-level data, information on the territory of birth of each individual is available, so we can construct the exposure to missionary presence of each territory in each year and assign this measure to each respondent according to their year of birth. To do this, I follow Guirkinger and Villar (2022) and Alvarez-Aragon et al. (2023) and construct a continuous measure of proximity at the territory level that controls for mission density. Specifically, I generate 1000 random points within each territory and compute the distance from each random point to its closest mission before averaging over these distances. This process is repeated for each territory, each year between 1885 and 1948, and three types of missions: Catholic, Catholic with nuns, and Protestant. When showing my results, I report negative (log) distances to have an easier interpretation.

As we can observe in Table H5, the coefficients barely move when I control for exposure to missionary presence. The magnitude of the effects remain high. Ancestor worship is associated with an increase of 17% in the number of births at age 35 (using the full sample), of 20% age age 40, and of 25% at age 45. Moreover, I am able to replicate the main findings in Guirkinger and Villar (2022). Exposure at birth to Catholic missions with nuns is associated with higher fertility rates, while exposure to Protestant missionaries generally reduces fertility.

Table H5: Ancestor worship and age-specific fertility in the DRC

	Births at 35			Births at 40			BIrths at 45		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ancestral beliefs	0.736***	1.011***	0.641***	0.943***	1.209***	0.839***	1.133***	1.432***	0.984***
	(0.170)	(0.359)	(0.160)	(0.221)	(0.413)	(0.233)	(0.242)	(0.399)	(0.233)
Exp to Catholics	-0.112	-0.153	0.0199	-0.0308	-0.0971	0.0520	0.0574	-0.151	0.282**
	(0.191)	(0.344)	(0.120)	(0.243)	(0.445)	(0.142)	(0.208)	(0.393)	(0.130)
Exp to Cath nuns	0.234**	0.484**	0.281**	0.254**	0.548***	0.362**	0.271*	0.480**	0.407***
	(0.106)	(0.186)	(0.134)	(0.125)	(0.191)	(0.155)	(0.140)	(0.208)	(0.140)
Exp to Protestants	0.0154	0.230	-0.121**	-0.0489	0.169	-0.202*	-0.0799	0.247	-0.365***
	(0.127)	(0.288)	(0.0587)	(0.164)	(0.371)	(0.103)	(0.212)	(0.433)	(0.115)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City x Territory FE	No	No	No	Yes	No	No	No	Yes	Yes
All	Yes	No	No	Yes	No	No	Yes	No	No
Edoza	No	Yes	No	No	Yes	No	No	Yes	No
Urban	No	No	Yes	No	No	Yes	No	No	Yes
Mean Y	4.575	4.244	4.758	4.871	4.581	5.071	4.723	4.488	4.915
R-squared	0.249	0.262	0.273	0.247	0.274	0.267	0.218	0.259	0.229
N	18852	6698	12154	13328	5435	7893	9579	4306	5273

Note. Data: Demographic Survey of 1970s and EDOZA. The table reports OLS estimates. The outcome variables are the total number of births a women had before age 35 (columns 1, 2 and 3), 40 (columns 4, 5 and 6) and 45 (columns 7, 8 and 9). "Ancestor worship" is a dummy variable that equals one if the ethnic group e practice ancestor worship. Details on how exposure to missions is constructed can be found in Section H.5. Controls include age, whether the place of birth was urban or rural, whether the respondent has primary education, dummy equal to one if migrant, dummy equal to one if the father's respondent is alive, dummy equal to one if the respondent is working, dummy equal to one if the respondent is a farmer (only available in the urban sample), number of household members, and year of installation in the current city. City/region fixed effects include city of residence in the case of the urban sample and region of residence in the case of EDOZA. Standard errors clustered at the Vansina's ethnic group-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

I. Ancestral beliefs and contemporary fertility: robustness

I.1. Alternative definitions of "ancestral beliefs"

Table I1: Ancestor worship and fertility in sub-Saharan Africa

	Number of children				P($\geq$ 5 children)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sacrifices Ancestors	0.332***	0.167***	0.149***	0.102***	0.0265***	0.0117***	0.00875**	0.00563
	(0.0370)	(0.0294)	(0.0294)	(0.0286)	(0.00478)	(0.00442)	(0.00438)	(0.00446)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ext Controls 1	No	No	Yes	Yes	No	No	Yes	Yes
Ext Controls 2	No	No	No	Yes	No	No	No	Yes
Mean Y	2.101	2.095	2.095	2.103	0.0978	0.0974	0.0974	0.0973
R-squared	0.0606	0.418	0.425	0.481	0.0426	0.174	0.180	0.188
N	22243	22115	22115	21361	22243	22115	22115	21361

Note. Data: PEW research forum 2008-2009 Survey. The outcome variables are defined as follows: in columns (1)-(4), it is the total number of children, and in columns (5)-(8) it is the probability of having at least 5 children. The explanatory variable is an indicator equal to one if respondent answers "yes" to the following question: "do you believe that sacrifices to spirits or ancestors can protect you from bad things happening?". Basic controls include age, age^2 and sex. Extended controls 1 also include whether the individual lives in a urban or rural area and whether he/she is christian/muslim or from other religion. Finally, extended controls 2 also include a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table I2: Ancestor worship and fertility in sub-Saharan Africa

	Number of children				P($\geq$ 5 children)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Reincarnation	0.118***	0.0503*	0.0775***	0.0632**	0.00971**	0.00325	0.00649*	0.00577
	(0.0334)	(0.0263)	(0.0262)	(0.0253)	(0.00426)	(0.00395)	(0.00395)	(0.00400)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Extended Controls 1	No	No	Yes	Yes	No	No	Yes	Yes
Extended Controls 2	No	No	No	Yes	No	No	No	Yes
Mean Y	2.087	2.081	2.081	2.087	0.0966	0.0961	0.0961	0.0959
R-squared	0.0560	0.418	0.425	0.482	0.0390	0.173	0.178	0.187
N	21134	21010	21010	20328	21134	21010	21010	20328

Note. Data: PEW research forum 2008-2009 Survey. The outcome variables are defined as follows: in columns (1)-(4), it is the total number of children, and in columns (5)-(8) it is the probability of having at least 5 children. The explanatory variable is an indicator equal to one if respondent answers "yes" to the following question: "Which, if any, of the following do you believe in? Reincarnation.". Basic controls include age, age^2 and sex. Extended controls 1 also include whether the individual lives in a urban or rural area and whether he/she is christian/muslim or from other religion. Finally, extended controls 2 also include a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table I3: Ancestor worship and fertility in sub-Saharan Africa

	Number of children				P($\geq$ 5 children)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Knowledge trad. religion	0.314***	0.102***	0.0965***	0.0748***	0.0293***	0.0128***	0.0123***	0.0107**
	(0.0352)	(0.0281)	(0.0281)	(0.0272)	(0.00452)	(0.00424)	(0.00420)	(0.00426)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ext Controls 1	No	No	Yes	Yes	No	No	Yes	Yes
Ext Controls 2	No	No	No	Yes	No	No	No	Yes
Mean Y	2.078	2.073	2.073	2.079	0.0965	0.0960	0.0960	0.0958
R-squared	0.0597	0.419	0.426	0.483	0.0427	0.173	0.178	0.186
N	21783	21664	21664	20917	21783	21664	21664	20917

Note. Data: PEW research forum 2008-2009 Survey. The outcome variables are defined as follows: in columns (1)-(4), it is the total number of children, and in columns (5)-(8) it is the probability of having at least 5 children. The explanatory variable is an indicator equal to one if the respondent answers "a great deal" or "some" to the question "How much would you say you know about ancestral, tribal, animist, or other traditional African religions?". Basic controls include age, age^2 and sex. Extended controls 1 also include whether the individual lives in a urban or rural area and whether he/she is christian/muslim or from other religion. Finally, extended controls 2 also include a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

I.2. Additional controls: region fixed effects and clustered standard errors

Table I4: Ancestor worship and fertility in sub-Saharan Africa

	Number of children				P($\geq$ 5 children)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.520***	0.211***	0.200***	0.143***	0.0369***	0.0119**	0.0103**	0.00713
	(0.0407)	(0.0324)	(0.0324)	(0.0315)	(0.00534)	(0.00493)	(0.00489)	(0.00497)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Extended Controls 1	No	No	Yes	Yes	No	No	Yes	Yes
Extended Controls 2	No	No	No	Yes	No	No	No	Yes
Mean Y	2.100	2.095	2.095	2.104	0.0997	0.0993	0.0993	0.0993
R-squared	0.0982	0.442	0.445	0.501	0.0684	0.201	0.204	0.212
N	21980	21845	21845	21068	21980	21845	21845	21068

Note. Data: PEW research forum 2008-2009 Survey. The outcome variables are defined as follows: in columns (1)-(4), it is the total number of children, and in columns (5)-(8) it is the probability of having at least 5 children. The explanatory variable is an indicator equal to one if the respondent answers "yes" to the question "Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?". Basic controls include age, age^2 and sex. Extended controls 1 also include whether the individual lives in a urban or rural area and whether he/she is christian/muslim or from other religion. Finally, extended controls 2 also include a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table I5: Ancestor worship and fertility in sub-Saharan Africa

	Number of children				P($\geq$ 5 children)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.517***	0.243***	0.230***	0.162***	0.0369***	0.0146***	0.0133***	0.00918*
	(0.0595)	(0.0379)	(0.0367)	(0.0366)	(0.00697)	(0.00531)	(0.00503)	(0.00515)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Extended Controls 1	No	No	Yes	Yes	No	No	Yes	Yes
Extended Controls 2	No	No	No	Yes	No	No	No	Yes
Mean Y	2.100	2.095	2.095	2.104	0.0997	0.0993	0.0993	0.0993
R-squared	0.0648	0.419	0.425	0.484	0.0421	0.178	0.183	0.192
N	21980	21845	21845	21068	21980	21845	21845	21068

NOTE. Data: PEW research forum 2008-2009 Survey. The outcome variables are defined as follows: in columns (1)-(4), it is the total number of children, and in columns (5)-(8) it is the probability of having at least 5 children. The explanatory variable is an indicator equal to one if the respondent answers "yes" to the question "Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?". Basic controls include age, age^2 and sex. Extended controls 1 also include whether the individual lives in a urban or rural area and whether he/she is christian/muslim or from other religion. Finally, extended controls 2 also include a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Standard errors clustered at the region level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

I.3. Additional controls: religiosity and supernatural beliefs

Table I6: Ancestor worship, fertility, and religiosity

	Number of children ever born		
	(1)	(2)	(3)
Ancestral beliefs	0.184***	0.183***	0.184***
	(0.0292)	(0.0291)	(0.0292)
High religious attendance		0.138***	0.136***
		(0.0459)	(0.0461)
Religion is important			0.0254
			(0.0343)
Country FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Mean Y	2.083	2.083	2.083
R-squared	0.480	0.481	0.481
N	22295	22295	22295

NOTE. Data: PEW research forum 2008-2009 Survey. The outcome variables is the total number of children ever born. The explanatory variable is an indicator equal to one if the respondent answers "a great deal" or "some" to the question "How much would you say you know about ancestral, tribal, animist, or other traditional African religions?". *Attendance is a dummy variable that equals one if the respondent attends more than once a week religious events*. *Importance* is a dummy variable that equals one if the respondent declares than religion is "very important" in his/her life. Controls include age, age^2, gender, whether the individual lives in a urban or rural area, whether he/she is christian/muslim or from other religion, a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table I7: Ancestor worship, fertility and other supernatural beliefs

	Number of children ever born									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ancestral beliefs	0.395***	0.495***	0.370***	0.476***	0.479***	0.143***	0.175***	0.157***	0.163***	0.186***
	(0.0411)	(0.0381)	(0.0431)	(0.0392)	(0.0392)	(0.0318)	(0.0294)	(0.0332)	(0.0301)	(0.0300)
Religious healers	0.261***					0.0766***				
	(0.0356)					(0.0273)				
Experienced miracle		0.131***					0.0580**			
		(0.0315)					(0.0243)			
Initiation ritual			0.282***					0.0380		
			(0.0422)					(0.0322)		
Witchcraft				0.0880**					0.0162	
				(0.0347)					(0.0265)	
Traditional religion					0.221***					0.0447
					(0.0358)					(0.0277)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Mean Y	2.097	2.088	2.091	2.090	2.078	2.099	2.092	2.094	2.093	2.078
R-squared	0.0673	0.0638	0.0660	0.0641	0.0669	0.481	0.482	0.481	0.483	0.486
N	22157	22654	22698	21974	21396	21324	21761	21808	21129	20587

NOTE. Data: PEW research forum 2008-2009 Survey. "Religious healers" equals one if the respondent's family has ever used traditional religious healers when someone is sick. "Experienced miracle" equals one if the respondent has experienced/witnessed a divine healing of an illness or injury. "Initiation ritual" equals one if the respondent has ever participated in an initiation ritual for friends, relatives or neighbors. "Witchcraft" equals one if the respondent declares that he/she believes in witchcraft. "Traditional religion" is a variable that equals one if the respondent answers "*some*" or "*a great deal*" to the question "*How much would you say you know about ancestral, tribal, animist, or other traditional African religions?*. Controls include age, age^2, sex, whether the individual lives in a urban or rural area, whether he/she is christian/muslim or from other religion, a dummy variable that equals one if the respondent has completed primary education, a dummy that equals one if the respondent is married, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

J. Heterogeneity and dynamics

J.1. Correlates of beliefs in ancestors in contemporary Benin

I examine the correlates of believing in the influence of ancestors by plotting the standardized beta coefficients of the following bivariate regression:

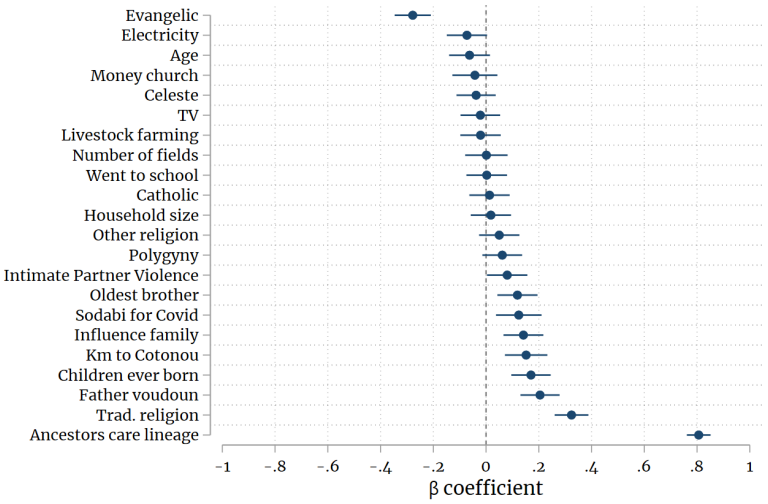
$$Y_i = \alpha + \beta_1 AncestralBeliefs_i + \epsilon_i \tag{9}$$

Where Y_i is each time a different outcome variable (a row in Figure J1) and $AncestralBeliefs_i$ is an indicator variable that equals one if the respondent answers *yes* to the question "*do you believe that the spirits of your ancestors have an influence on the events of your life?*"

Believing in the influence of ancestors is positively associated with practicing a traditional religion as your main religion (mostly Voodoo), having a father (or mother) that practice(d) Voodoo, number of children, having received pressure from the extended family to have children, drinking sodabi (traditional local alcoholic drink) to fight against COVID, distance to Cotonou (economic capital of Benin) or being the oldest brother. As expected, there is a very strong correlation between believing in the influence of ancestors on people's lives and believing that ancestors care about the survival of the extended family and the continuation of the family line, as they are the two main characteristics of this belief system. There is no statistically significant association between traditional beliefs in ancestors and variables such as education, age, being Catholic, having a TV, number of fields used for agriculture, amount donated to the church or having livestock. Interestingly, I find a negative and strong correlation with being evangelic. This is in line with previous accounts highlighting that the endogenous nature of African churches (in opposition to the imported missionary churches – as reflected in the null correlation with Catholicism –) has allowed them to challenge certain important aspects of the traditional belief system. As Caldwell and Caldwell (1987) note:

> The fact that they (African or endogenous churches, such as most evangelical churches in the context of Benin) are very much a grass-roots phenomenon and do not share the apprehension of African cultural manifestations that has often marked the missionary churches has tended to hide their greater willingness to challenge those aspects of the traditional belief system that they consider unacceptable (Caldwell and Caldwell (1987), p.428)".

Figure J1: Correlates of beliefs in ancestors



Note: The figure plots the standardized beta coefficient of regressing beliefs in the influence of ancestors on several explanatory variables. The unit of observation is an individual from the 2024 survey among pineapple producers in southern Benin. Lines around point estimates represent 95% confidence intervals.

J.2. Heterogeneous effects of ancestral beliefs: PEW

Table J1: Ancestor worship and fertility in sub-Saharan Africa

	Number of children						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ancestor Worship	0.184***	0.228***	0.154***	0.204***	0.220***	0.191***	0.198***
	(0.0292)	(0.0369)	(0.0494)	(0.0503)	(0.0333)	(0.0421)	(0.0309)
Ancestor Worship x Urban		-0.110**					
		(0.0561)					
Ancestor Worship x Secondary			0.0632				
			(0.0613)				
Ancestor worship x Post secondary			-0.00534				
			(0.0779)				
Ancestor Worship x Christian				-0.0341			
				(0.0601)			
Ancestor Worship x Muslim					-0.108*		
					(0.0637)		
Ancestor Worship x Good econ sit						-0.0155	
						(0.0553)	
Ancestor Worship x > 40							0.0412
							(0.0752)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	2.083	2.083	2.083	2.083	2.083	2.083	2.083
R-squared	0.480	0.481	0.482	0.480	0.480	0.480	0.423
N	22295	22295	22295	22295	22295	22295	22295

Note. Data: PEW research forum 2008-2009 Survey. The outcome variable is the total number of children. The explanatory variable is an indicator equal to one if the respondent answers "yes" to the question "Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?". In column 3, the reference category is having primary or less than primary education. Controls include age, age^2, sex, whether the individual lives in a urban or rural area, religion, education, marital status, a dummy variable that equals one if the respondent finds himself/herself in a good economic situation, and a dummy equal to one if the respondent did not have money at some point during the last year to buy food for his/her family. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

K. Ancestral beliefs and fertility in folklore: robustness

Table K1: Motifs related to *birth* and to *ancestor worship*

	Share of motifs related to *birth*							
	SSA Sample				Global Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.0273***	0.0276***	0.0232***	0.0229***	0.0272***	0.0261***	0.0262***	0.0255***
	(0.00134)	(0.00423)	(0.00528)	(0.00503)	(0.00137)	(0.00191)	(0.00264)	(0.00300)
SSA Sample	Yes	Yes	Yes	Yes	No	No	No	No
Folklore controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ethnographic controls	No	No	Yes	Yes	No	No	Yes	Yes
Geographic controls	No	No	No	Yes	No	No	No	Yes
Mean Y	4.177	4.177	3.895	3.908	4.086	4.086	3.877	3.848
N	407	407	307	306	1245	1245	951	862

Note. Data: Ethnographic Atlas and Folklore. In columns (1)-(4), the sample is restricted to SSA. The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. The outcome variable is the share of motifs related to "birth" in the oral tradition of an ethnic group. "Ancestor worship" is the share of motifs related to "ancestor worship" in an ethnic group's oral tradition. Folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources in the group's oral tradition, and the earliest year of publication in the group's oral tradition. Ethnographic controls include whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, whether the ethnic group is patrilineal, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, and the share of motifs in an ethnic group related to "supernatural". Geographic controls include tropical climate, precipitations, ruggedness, land quality (population weighted), and agricultural suitability. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table K2: Motifs related to *fertility* and to *ancestor*

	Share of motifs related to *fertility*							
	SSA Sample				Global Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.148***	0.153*	0.203***	0.215***	0.126***	0.112***	0.0992***	0.104***
	(0.00650)	(0.0841)	(0.0658)	(0.0674)	(0.00466)	(0.00621)	(0.00696)	(0.00756)
SSA Sample	Yes	Yes	Yes	Yes	No	No	No	No
Folklore controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ethnographic controls	No	No	Yes	Yes	No	No	Yes	Yes
Geographic controls	No	No	No	Yes	No	No	No	Yes
Mean Y	0.674	0.674	0.562	0.564	0.729	0.729	0.687	0.660
N	407	407	304	303	1245	1245	951	862

Note. Data: Ethnographic Atlas and Folklore. In columns (1)-(4), the sample is restricted to SSA. The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. The outcome variable is the share of motifs related to "fertility" in the oral tradition of an ethnic group. "Ancestor worship" is the share of motifs related to "ancestors" in an ethnic group's oral tradition. Folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources in the group's oral tradition, and the earliest year of publication in the group's oral tradition. Ethnographic controls include whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, whether the ethnic group is patrilineal, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, and the share of motifs in an ethnic group related to "supernatural". Geographic controls include tropical climate, precipitations, ruggedness, land quality (population weighted), and agricultural suitability. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table K3: Motifs related to *fertility* and to *ancestor worship*

	Share of motifs related to *fertility*							
	SSA Sample				Global Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.0745***	0.0746***	0.139***	0.143***	0.0701***	0.0635***	0.0570***	0.0591***
	(0.00305)	(0.0239)	(0.0441)	(0.0479)	(0.00229)	(0.00291)	(0.00369)	(0.00405)
SSA Sample	Yes	Yes	Yes	Yes	No	No	No	No
Folklore controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ethnographic controls	No	No	Yes	Yes	No	No	Yes	Yes
Geographic controls	No	No	No	Yes	No	No	No	Yes
Mean Y	0.674	0.674	0.562	0.564	0.729	0.729	0.687	0.660
N	407	407	304	303	1245	1245	951	862

Note. Data: Ethnographic Atlas and Folklore. In columns (1)-(4), the sample is restricted to SSA. The table reports Pseudo-Poisson Maximum Likelihood (PPML) estimators. The outcome variable is the share of motifs related to "fertility" in the oral tradition of an ethnic group. "Ancestor worship" is the share of motifs related to "ancestor worship" in an ethnic group's oral tradition. Folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources in the group's oral tradition, and the earliest year of publication in the group's oral tradition. Ethnographic controls include whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, whether the ethnic group is patrilineal, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, and the share of motifs in an ethnic group related to "supernatural". Geographic controls include tropical climate, precipitations, ruggedness, land quality (population weighted), and agricultural suitability. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table K4: Ancestor worship and fertility in Folklore

	Share of motifs related to *birth*							
	SSA Sample				Global Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.619***	0.609***	0.541***	0.536***	0.472***	0.461***	0.420***	0.432***
	(0.128)	(0.133)	(0.156)	(0.156)	(0.116)	(0.117)	(0.141)	(0.147)
SSA Sample	Yes	Yes	Yes	Yes	No	No	No	No
Folklore controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Ethnographic controls	No	No	Yes	Yes	No	No	Yes	Yes
Geographic controls	No	No	No	Yes	No	No	No	Yes
Mean Y	4.177	4.177	3.895	3.908	4.086	4.086	3.877	3.848
N	407	407	307	306	1245	1245	951	862

Note. Data: Ethnographic Atlas and Folklore. In columns (1)-(4), the sample is restricted to SSA. The table reports OLS estimates. The outcome variable is the share of motifs related to "birth" in the oral tradition of an ethnic group. "Ancestor worship" is the share of motifs related to "ancestors" in an ethnic group's oral tradition. Folklore controls include the total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources in the group's oral tradition, and the earliest year of publication in the group's oral tradition. Ethnographic controls include whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, whether the ethnic group is patrilineal, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, and the share of motifs in an ethnic group related to "supernatural". Geographic controls include tropical climate, precipitations, ruggedness, land quality (population weighted), and agricultural suitability. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

L. Backgroup on kinship systems

Two persons are kin when one is descended from the other. Kinship results from the recognition of a *social* relationship between parents and children.[70] A system of kinship and marriage can be looked at as an arrangement which enables persons to live together and co-operate with one another in an orderly social life. Kinship systems determine the set of people to whom an individual is considered related and their social obligations to this group (Radcliffe-Brown and Forde, 1950).

A kinship system that is reckoned by each individual with reference to ascendance and descendance, without distinction between male and female lines, is called a *cognatic system*. Persons are cognatic kin or cognates when they are descended from a common ancestor or ancestress counting descent through males and females (Lorimer, 1954). In a cognatic system, the emphasis in kinship relations rests on the nuclear family. In this type of kinship, kin, as defined by dencendance through both the paternal and maternal sides, is not a cohesive kinship group. It includes individuals on maternal and paternal sides, at each ascending and descending juncture, who may not be related to one another [71]

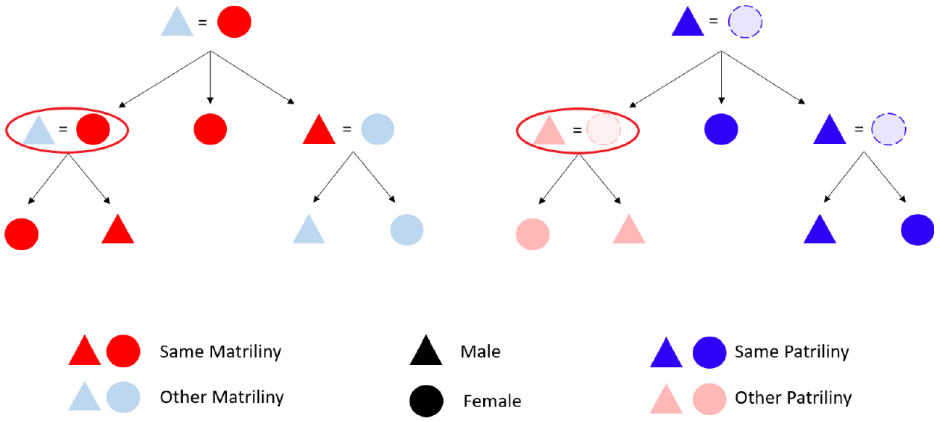
On the other hand, descent groups in which one belongs exclusively to one's father's or mother's line are called *unilieal systems*. In unilineal dencent groups, one's descent is traced either exclusively through male ancestors (patrilineal descent groups), or exclusively through female ancestors (matrilineal descent groups). These groups form a cohesive and continuing kinship structure. In fact, the unity of the sibling group is preserved (especially as regards those who by virtue of their sex are part of a continuing lineage). A group of brothers, or a group of sisters, acquire hereditary rights and transmit them to their descendants of the same sex. There is, however, an important difference between patrilineal and matrilineal descent systems that matters for the analysis in this paper, known as asymmetric marital allegiances (Berggreen and Gokmen, 2023). In pa-

[70] The stress of the word social is key to distinguish kinship from consanguinity (physical relationship). In fact, an illigitimate child has a physical father but may not have a social father (he does not belong to the same kin group as his biological father). Similarly, an adopted child may be part of the same kin group as his adoptive parents while they are not consanguineous.

[71] As Lorimer (1954) notes: "I may feel myself to be related to the children and grandchildren of my paternal grandfathers brothers and sisters, and to those of my paternal grandmother, my maternal grandfather, and my maternal grandmother; but these four sets of relatives have no necessary relationship to one another".

trilineal societies, the children belong to the father's lineage, and a patrilineal daughter who marries becomes part of her husband's lineage. Then, both spouses and children are part of the same kin group in patrilineal societies. In matrilineal societies, children belong exclusively to the mother's kin group, and a patrilineal son who marries maintains his birth lineage (in fact, inheritance often passes from the maternal uncle to his sisters' children). Figure M1 summarizes these differences:

Figure M1: Matrilineal and patrilineal kinship systems, from Berggreen and Gokmen (2023)



Source: Berggreen and Gokmen (2023). The figure shows the kinship structure of both patrilineal and matrilineal societies. The sign = symbolizes marriage, while the bracket over the triangle/circle indicates siblingship.

M. Kinship structure and fertility behavior in the DRC

Although this paper suggests that patrilineality could positively affect fertility through the stronger motive to continue one's lineage in patrilineal societies as compared to matrilineal societies (for a given degree of ancestral beliefs in the society) little is known about the effect of the nature of group membership – either determined by men (patrilineal societies) or by women (matrilineal societies) – on fertility outcomes. Interestingly, those few studies that have examined the influence of lineage or clan on fertility emphasize that this influence is particularly important in patrilineal societies (Okafor et al., 2021; Church et al., 2023), although the mechanism driving these results remained unclear. Although a systematic exploration of the relationship between kinship systems and fertility is beyond the scope of this paper, I slightly advance in this direction and provide hints for future research.

To the extent of my knowledge, there are only two recent papers in economics that mention the potential relationship between kinship structure and fertility. First, BenYishay et al. (2017) show that matrilineal inheritance leads to smaller average household size and total population village, but they do so in the very specific context of the Solomon Islands, and only when exploring the implications of their main research question (whether reef density, their proxy for the quality of the marine environment, systematically predicts the prevalence of female land inheritance). Their explanation is related to inclusive fitness (Holden et al., 2003): "under a patrilineal inheritance system, the additional number of offspring that can result from transmitting an asset to sons needs to outweigh the loss in terms of paternal certainty". Second, Fontenay et al. (2024) include patrilineality as a control in their main regression (they are interested in the effect of impartible inheritance on fertility in SSA), showing a positive and significant coefficient. However, they do not provide any explanation regarding the mechanisms underlying this relationship.

Table N1 shows the relationship between ideal family size and patrilineality. I find that, on average, individuals in patrilineal societies want 0.5 (10%) more children (column 1), although there are no important differences between men and women (column 2). However, this relationship is completely driven by societies with strong beliefs in ancestors (columns 3 and 4).[72]

[72]Note that the difference between columns (3)-(4) and columns (5)-(6) is not only statistical significance. Also point estimates are much closer to zero when the ethnic group does not practice ancestor worship.

Table N1: Ancestor worship and fertility preferences in the DRC

	Ideal Nb of Children					
	Full sample		Ancestor Worship = 1		Ancestor Worship = 0	
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal	0.491***	0.558***	0.637***	0.655***	0.0748	0.138
	(0.117)	(0.130)	(0.163)	(0.174)	(0.266)	(0.336)
Female		-0.443***		-0.421***		-0.725***
		(0.0485)		(0.0499)		(0.206)
Patrilineal x Female		-0.0981		-0.0272		-0.0903
		(0.0717)		(0.0792)		(0.239)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	6.413	6.413	6.428	6.428	6.561	6.561
R-squared	0.238	0.238	0.256	0.256	0.179	0.179
N	35626	35626	28904	28904	4284	4284

Note. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The outcome variable is the ideal number of children. The sample is restricted to ethnic groups with ancestor worship in columns (3) and (4) and to ethnic groups without ancestor worship in columns (5) and (6). "Patrilineal" is a dummy variable that equals one if the ethnic group e has patrilineal descent. Controls include age, age squared, gender, a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

The absence of differences between men and women may be surprising, since, as noted in section 5, the motive to continue the family line for men applies only in patrilineal societies, while for women it applies regardless of kinship structure. The lack of differences between the ideal number of children for women and for men may be due to the important correlation that has been documented between desired and actual numbers of children. This may occur because people adjust their ideal number of children upward as their actual number of children increases. In tables N2 and N3 I examine these results separately for sons and daughters, and the differences between men and women emerge. Moreover, when we look at whether respondents want an additional child (see table N4), we observe that the influence of patrilineality is stronger for men, especially when belief in ancestors is strong. Overall, these results suggest that there is a positive relationship between patrilineality and fertility, that may be driven by a stronger motive to continue one's lineage in patrilineal societies.

Table N2: Ancestor worship and fertility preferences in the DRC

	Ideal Number of Sons					
	Full sample		Ancestor Worship = 1		Ancestor Worship = 0	
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal	0.260***	0.528***	0.311**	0.555***	-0.00435	0.227
	(0.0932)	(0.114)	(0.127)	(0.147)	(0.183)	(0.278)
Female		-0.744***		-0.752***		-0.977***
		(0.0527)		(0.0549)		(0.246)
Patrilineal x Female		-0.397***		-0.362***		-0.333
		(0.0742)		(0.0833)		(0.271)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	2.931	2.931	2.917	2.917	3.114	3.114
R-squared	0.131	0.133	0.135	0.136	0.131	0.132
N	36146	36146	29322	29322	4367	4367

NOTE. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The outcome variable is the ideal number of sons. The sample is restricted to ethnic groups with ancestor worship in columns (3) and (4) and to ethnic groups without ancestor worship in columns (5) and (6). "Patrilineal" is a dummy variable that equals one if the ethnic group e, defined as in Murdock (1967), has patrilineal descent. Controls include age, age squared, gender, a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table N3: Ancestor worship and fertility preferences in the DRC

	Ideal Number of Daughters					
	Full sample		Ancestor Worship = 1		Ancestor Worship = 0	
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal	0.0983	0.300***	0.149	0.342***	-0.0365	0.0816
	(0.0760)	(0.0892)	(0.101)	(0.114)	(0.211)	(0.244)
Female		0.0492		0.0416		-0.128
		(0.0428)		(0.0445)		(0.161)
Patrilineal x Female		-0.298***		-0.288***		-0.170
		(0.0599)		(0.0666)		(0.186)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	2.624	2.624	2.609	2.609	2.799	2.799
R-squared	0.0831	0.0843	0.0870	0.0881	0.0589	0.0591
N	36177	36177	29346	29346	4374	4374

NOTE. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The outcome variable is the ideal number of daughters. The sample is restricted to ethnic groups with ancestor worship in columns (3) and (4) and to ethnic groups without ancestor worship in columns (5) and (6). "Patrilineal" is a dummy variable that equals one if the ethnic group e has patrilineal descent. Controls include age, age squared, gender, a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table N4: Ancestor worship and fertility preferences in the DRC

	Wants another child			
	Full sample		Ancestor Worship = 1	Ancestor Worship = 0
	(1)	(2)	(3)	(4)
Patrilineal	0.0652***	0.0401***	0.0705***	-0.0229
	(0.0170)	(0.0153)	(0.0161)	(0.0587)
Patrilineal x Female	-0.0585***	-0.0262**	-0.0233*	-0.0271
	(0.0134)	(0.0122)	(0.0134)	(0.0426)
Province FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Mean Y	0.755	0.756	0.761	0.750
R-squared	0.0124	0.223	0.229	0.186
N	32120	31665	25576	3992

NOTE. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The outcome variable is a dummy variable that equals one if the respondent wants an additional child. The sample is restricted to ethnic groups with ancestor worship in column (3) and to ethnic groups without ancestor worship in column (4). "Patrilineal" is a dummy variable that equals one if the ethnic group e has patrilineal descent. Controls include age, age squared, gender, a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

N. Ancestral Beliefs and contraceptive use

N.1. Ancestral Beliefs and contraceptive use in the DRC

Table O1: Ancestral beliefs and contraceptive use in the DRC DHS

	Contraceptive use						
	Currently	Traditional	Modern	Children condom	Intention to use	Fear side-effects	Knowledge
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ancestral Beliefs	-0.0242*	-0.0249**	0.000698	-0.0704***	-0.00576	0.0219**	0.00571
	(0.0130)	(0.0109)	(0.00588)	(0.0272)	(0.0207)	(0.00887)	(0.0234)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	0.185	0.105	0.0800	0.523	0.333	0.0574	0.174
R-squared	0.0965	0.0470	0.0514	0.0617	0.0833	0.0410	0.136
N	24674	24674	24674	20640	19961	5031	24674

Note. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates. The sample is restricted to women. The outcome variable in column (1) is a dummy that equals one if the respondent was using contraceptives at the time of the survey. In column (2) a dummy that equals one if the respondent was using traditional methods. In column (3) a dummy that equals one if the respondent was using modern methods. In column (4) a dummy that equals one if the respondent thinks that children should be taught about condoms to avoid aids. In column (5) a dummy that equals one if the respondent intends to use contraceptives in the future. In column (6) a dummy that equals one if the respondent does not use contraceptive because of fear to side effects. In column (7) a dummy that equals one if the respondent does not know about any contraceptive method. "Ancestral beliefs" is a dummy variable that equals one if the DHS cluster c of individual i belongs to the ethnic homeland of an ethnic group that traditionally practice ancestor worship as reported in Vansina (1966). Controls also include age, age squared, a dummy variable that equals one if the respondent is catholic, single years of education, whether the DHS cluster is urban, whether the respondent works, whether the respondent works in agriculture and a dummy variable that equals one if the respondent is in the top 40% of the wealth distribution. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

N.2. Ancestral Beliefs and ideal family size in Benin DHS

As a first stage, I first verity that the main results of the paper – that is, the positive influence of traditional beliefs in ancestors on the demand for children – hold in this context when I use Voodoo religion as a proxy for beliefs in ancestors. Tables O2 and O3 show that followers of the Voodoo religion want more children, either estimating a lineal regression model by ordinary least squares or by 2SLS.

Table O2: Traditional beliefs and ideal family size

	Ideal Number of children					
	All	Men	Women	All	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Traditional beliefs	0.966***	1.550***	0.440***	0.295***	0.675***	0.188***
	(0.0556)	(0.138)	(0.0413)	(0.0598)	(0.146)	(0.0491)
Controls	No	No	No	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.444	6.698	4.997	5.375	6.593	4.937
N	79641	20930	58681	64038	16920	47095

Note. Data: Demographic and Health Surveys of Benin (1996, 2001, 2006, 2011 and 2017). The table reports OLS estimates. The sample is restricted to women. The outcome variable in the ideal number of children. "Traditional beliefs" is a dummy variable that equals one if the respondent declares African traditional religion as his/her main religion. Controls also include age, gender, education, whether the DHS cluster is urban, whether the respondent works, marital status, polygamy, and wealth quintiles. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table O3: Traditional beliefs and ideal number of children

	Ideal Number of children			First stage		
	(1)	(2)	(3)	(4)	(5)	(6)
Traditional beliefs	2.707***	3.191***	2.895***			
	(0.229)	(0.431)	(0.227)			
Adja Dahomey				0.222***	0.387***	0.168***
				(0.00609)	(0.0138)	(0.00640)
Controls	Yes	Yes	Yes			
Round FE	Yes	Yes	Yes			
Mean Y	5.377	6.588	4.938			
N	63321	16831	46490	63321	16831	46490
F-stat				1324.7	785.2	693.9

Note. Data: Demographic and Health Surveys of Benin (1996, 2001, 2006, 2011 and 2017). The table reports OLS estimates. The sample is restricted to women. The outcome variable in the ideal number of children. "Traditional beliefs" is a dummy variable that equals one if the respondent declares African traditional religion as his/her main religion. Controls also include age, gender, education, whether the DHS cluster is urban, whether the respondent works, marital status, polygamy, and wealth quintiles. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

N.3. Benin DHS: Instrumental Variable Strategy

As a first stage to verify whether using the Adja ethnicity as an instrument is valid, I use the first-hand data that I collected in Benin to show that the Adja people effectively hold

much stronger beliefs in the influence of ancestors than other ethnic groups, while other characteristics do not seem to be different. Table O4 reports the results of regressing different outcomes on ethnicity fixed effects (Adja is the reference group). I find that Adja people have significantly more children, have less land (the economic benefit of having children is therefore not likely to explain the higher fertility levels of the Adja), are not less educated, are not less Catholic, are not more polygamous, do not have more electricity at home, and do not own more physical assets than the other ethnic groups. However, they believe much more (up to 38 percentage points, if we compare with the Yoruba) in the influence of their ancestors in their lives (column 9), and have experienced more pressure from their extended family to have children. These simple correlations reinforce the choice of the instrument, and point in the same direction as the main findings of Sections 4 and 6, namely that cultural factors and family structures might be important determinants of differences in fertility levels. The results are shown in Table O4.

Table O4: Ethnicities in Benin and their social, economic and cultural characteristics

	Children (1)	Schooling (2)	Land (3)	Ag.Products (4)	Catholic (5)	Polygyny (6)	Electricity (7)	Assets (8)	Ancestors (9)	Clan (10)
Mean Adja	10.07***	0.776***	2.879***	2.879***	0.209***	0.457***	0.681***	1.310***	0.626***	0.720***
	(0.701)	(0.0388)	(0.182)	(0.196)	(0.0380)	(0.0464)	(0.0434)	(0.116)	(0.0469)	(0.0435)
Fon	-2.293***	-0.0800*	0.749***	-0.0977	0.0405	-0.0806	-0.0543	-0.143	-0.218***	-0.313***
	(0.731)	(0.0428)	(0.212)	(0.214)	(0.0416)	(0.0501)	(0.0473)	(0.128)	(0.0511)	(0.0480)
Yoruba	-2.833***	0.0312	-0.0372	0.121	0.0895	0.0343	0.00318	0.198	-0.376***	-0.398***
	(0.901)	(0.0652)	(0.314)	(0.318)	(0.0716)	(0.0809)	(0.0754)	(0.245)	(0.0746)	(0.0762)
Other	-2.507***	-0.0228	0.837***	-0.515*	0.112*	-0.0495	0.0350	0.245	-0.146**	-0.343***
	(0.834)	(0.0617)	(0.313)	(0.283)	(0.0644)	(0.0717)	(0.0663)	(0.211)	(0.0739)	(0.0704)
Mean Y	8.011	0.718	3.491	2.770	0.254	0.397	0.645	1.242	0.432	0.438
R-squared	0.0228	0.00687	0.0138	0.00492	0.00425	0.00558	0.00417	0.00890	0.0314	0.0494
N	833	905	905	833	903	905	905	905	833	833

NOTE. Data: First-hand data collected in southern Benin. The table reports the OLS estimates of regressing each outcome on ethnicity fixed effects. The sample is restricted to men. "Mean Adja" is the omitted category in the regression. The outcome variable is the total number of children ever born in column 1, whether the respondent attended school in column 2, number of agricultural fields in column 3, number of agricultural products cultivated by the respondent in column 4, whether the respondent is Catholic in column 5, polygamous union in column 6, electricity at home in column 7, a dummy variable that equals one if the respondent owns a speaker or a TV or a DVD or a fridge or a bicycle, a dummy variable that equals one if the respondent believes that his ancestors have an influence on his life, and a dummy variable that equals one if the respondent has experienced pressure from his extended family or clan to have children. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

The results are shown in Table O5. As expected, the instrument is strong (F-statistic always over 100). In the second stage, the results are confirmed, although of higher magnitude. The increase in the coefficients' magnitude is expected as attenuation bias was likely important in this context (high degree of syncretism), and now the treatment effect is identified for those beliefs were shifted by the instrument, who are likely those with the strongest beliefs in ancestors.

Table O5: Traditional beliefs and contraceptive use

	Second stage outcome variables:													
	Contraceptive use							First stage						
	Currently	Traditional	Modern	Ever	Intention	Side-effects	witchcraft							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Trad beliefs	-0.121***	0.0171	-0.123***	-0.0376	-0.0592	0.574***	0.102							
	(0.0385)	(0.0262)	(0.0300)	(0.0383)	(0.0563)	(0.102)	(0.0669)							
Adja x D								0.157***	0.157***	0.157***	0.157***	0.157***	0.134***	0.149***
								(0.00646)	(0.00646)	(0.00646)	(0.00646)	(0.00700)	(0.0106)	(0.00741)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
Round FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
Cluster FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
Mean Y	0.166	0.0589	0.104	0.556	0.381	0.159	0.471							
N	43064	43064	43064	43064	35915	14347	26856	43064	43064	43064	43064	35915	14347	26856
F-stat								588.3	588.3	588.3	588.3	501.4	159.2	405.0

NOTE. Data: Demographic and Health Surveys of Benin (1996, 2001, 2006, 2011 and 2017). The table reports OLS estimates. The sample is restricted to women. The outcome variable in column (1) is a dummy that equals one if the respondent was using contraceptives at the time of the survey. In column (2) a dummy that equals one if the respondent was using traditional methods. In column (3) a dummy that equals one if the respondent was using modern methods. In column (4) a dummy that equals one if the respondent has ever used contraceptives. In column (5) a dummy that equals one if the respondent intends to use contraceptives in the future. In column (6) a dummy that equals one if the respondent does not use contraceptive because of fear to side effects. In column (7) a dummy that equals one if the respondent thinks that aids may be caused by witchcraft. "Trad beliefs" is a dummy variable that equals one if the respondent declares African traditional religion as his/her main religion. "Adja x D" if a dummy variable that equals one if the respondent is Adja and lives within the boundaries of the old Dahomey Kinsgdom. Controls also include age, education, whether the respondent works, marital status, polygamy, and wealth quintiles. Standard errors clustered at the DHS cluster-level in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.