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Paths to the Rainforests: Ancestral Beliefs and Fertility in Sub-Saharan Africa

Pablo Álvarez-Aragón

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Pablo Álvarez-Aragón*

University of Bologna and University of Namur

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Abstract

Conventional demographic models systematically overestimate fertility decline in sub-Saharan Africa. This paper proposes a complementary explanation grounded in a prevalent but understudied belief system: ancestors influence the living and seek the continuation of their lineage, into which they may be reincarnated. In this worldview, having children becomes a moral and collective duty, rooted in the spiritual responsibility to ensure the survival of the lineage. Drawing on first-hand data, novel ethnographic information, and historical and contemporary surveys, I document a strong and quantitatively large positive relationship between ancestral beliefs and fertility across contexts and time periods. A simple model in which children are a public good for the lineage rationalizes the patterns observed in the data: the fertility effect of ancestral beliefs is concentrated in patrilineal societies, and a specific form of free-riding emerges among siblings whose children continue the same family line. These findings suggest that high fertility in sub-Saharan Africa rests on moral foundations that standard, externally designed interventions tend to overlook.

Keywords: Fertility, Sub-Saharan Africa, Culture, Supernatural Beliefs, Kinship
JEL Classification: O12, J13, Z12, Z13

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*P. Álvarez-Aragón is affiliated to the University of Bologna, Italy, and to the University of Namur, Belgium. Email: pablo.alvarezaragon@unibo.it. For useful comments and suggestions, I thank Siwan Anderson, Aristophane Aplogan, Daniel Araújo, Jean-Marie Baland, Augustin Bergeron, Denis Cogneau, Patrick François, Catherine Guirkinger, Anna Jolivet, Sylvie Lambert, Etienne Le Rossignol, Ángela Lülle, Nathan Nunn, Jean-Philippe Platteau, Andréa Renk, Pauline Rossi, Raúl Sanchez de la Sierra, Paola Villar and participants at seminars and conferences at the Paris School of Economics, Namur, AFEPOP2024, ASREC Conference at the University of Macedonia, Aix-Marseille School of Economics, CERDI, the II Spanish Workshop in Development Economics, UCLouvain, Bologna, Oxford University and Belfast. I thank Catherine Guirkinger and Paola Villar for sharing the digitized data of the West Zaire Demographic Surveys, and Boris Gershman for sharing the shapefile of administrative regions in the PEW data. I gratefully acknowledge financial support from an FNRS/FRESH doctoral fellowship and from the European Research Council under the European Union's Horizon Europe research and innovation programme (HARSH Project, Grant Agreement No. 101170376).

Non-technical summary

The world is having far fewer children than it used to, and in most regions fertility has already fallen below the level required to replace the population. In sub-Saharan Africa, however, standard demographic models — built around income, education, child mortality, urbanization, and access to family planning — consistently overpredict the speed of fertility decline. Even after accounting for all of these factors, women in sub-Saharan Africa still have, on average, about one more child than women elsewhere.

This paper proposes a complementary explanation grounded in one of the region's most prevalent yet least studied belief systems: the belief that ancestors — the spirits of the dead — continue to influence the lives of the living and have a deep interest in seeing their lineage extended into the future. In this worldview, the living are only a fraction of a much larger family that also includes those who came before and those who will come after. Ancestors bless their descendants with health, prosperity, and children, and they themselves may return to the family through new births. Within this moral universe, having children is not just a private household decision: it is a duty owed to one's lineage.

I document the empirical relevance of this idea using evidence from very different sources and time periods: first-hand survey data I collected in rural southern Benin, newly digitized ethnographic information for the Democratic Republic of the Congo combined with original colonial-era demographic surveys, a contemporary 19-country survey from across sub-Saharan Africa, and a global catalogue of folkloric motifs from pre-industrial oral traditions. Across all of these very different settings — precolonial, colonial, and contemporary — believing in the influence of ancestors is strongly and positively associated with fertility, typically by close to one additional child. The relationship holds among people living in the same village, among migrants from different ethnic backgrounds residing in the same city, and within centuries-old oral traditions.

To move beyond these correlations, I develop a simple framework in which children are partly a *public good* for the lineage. This framework delivers two sharp predictions that competing explanations cannot easily reproduce. First, ancestral beliefs should raise fertility more in patrilineal societies, where children continue the lineage of both parents, than in matrilineal ones, where they continue only the mother's line. Second, because lineage continuation is a shared good, an individual's own fertility should fall as the number of relatives whose children would continue the same lineage rises — a specific form of free-riding within families. Both predictions are borne out in the data, and importantly, the patterns disappear when one looks instead at relatives whose children would extend a *different* lineage.

The implications reach beyond academic demography. The results suggest that high fertility in sub-Saharan Africa rests on moral and spiritual foundations — what historians and anthropologists have called the *wealth-in-people* principle — that externally designed interventions routinely overlook. Within this moral economy, having fewer children is not self-evidently better: it is, by construction, less wealth in this life and in the next. Fertility-reducing policies that treat "less is better" as obvious risk being not merely ineffective but welfare-reducing when judged against the outcomes that local populations themselves value. Any durable change in fertility behavior in the region is unlikely to come from supply- or information-side interventions alone; it will require engaging seriously with the religious and moral systems through which childbearing is understood.

1. Introduction

Fertility is collapsing worldwide, with a total fertility rate that is likely already below replacement. Far from the old popular belief that the world was doomed by high birth rates, population collapse is now understood as a critical challenge with major implications for economic growth and social stability (Bhattacharjee et al., 2024; Maestas et al., 2023). Interestingly, conventional demographic models, which focus almost exclusively on economic and health conditions, underestimate fertility decline in most parts of the world while systematically overestimating it in sub-Saharan Africa (Casterline, 2017).[1]

These limitations in understanding the factors that drive fertility differences across populations suggest room for complementary explanations that consider the importance and evolution of cultural and religious norms, values and practices. Although the relationship between fertility and Abrahamic religions has received considerable attention,[2] we know less about the influence of other prevalent belief systems that transcend religious affiliation. In particular, despite their importance in daily life and their relevance for economic behavior, the study of traditional African religious beliefs within economics has been limited (Le Rossignol et al., 2022; Butinda et al., 2023).

This paper aims to make progress by examining the demographic consequences of one of the most prevalent belief systems in sub-Saharan Africa (henceforth SSA), which emphasizes ancestry and descent and the importance of continuing one's lineage (Caldwell and Caldwell, 1987, 1988, 1990).

I examine the importance of a belief system that emphasizes the role of ancestors (the spirits of the dead) who 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 living 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 to the family, and reincarnate in new births to the lineage. The resulting belief system works to maintain high fertility by placing great emphasis on the continuation of the family line and reinforcing multigenerational family obligations. In this regard, children are seen as a collective asset that becomes the responsibility of the entire lineage, and a strong moral and spiritual

[1] Most of the literature has focused on factors related to economic development: income, infant mortality, education, participation in agriculture, urbanization, and 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 sub-Saharan Africa (Zipfel, 2022).

[2] See, for example, Ishak and Gradstein (2022) or Berger and Dasré (2024). For a review, see Götmark and Turner (2023).

obligation to have children emerges. High fertility is rewarded (both socially and spiritually), associated with righteous living and joy, while low fertility is associated with sin and misfortune, showing the disapproval of the ancestors. This contrasts with the widespread and increasing individualism and social atomization observed in most regions of the world in recent decades and may provide useful insights for understanding demographic change (Santos et al., 2017; Henrich, 2020).

I examine these questions in two steps. First, drawing from a wealth of demographic and anthropological literature, I explore the correlation between beliefs in the influence of ancestors and fertility in SSA. To accomplish this, I use several datasets. First, I use firsthand data that I collected in southern Benin. Second, I use newly digitized ethnographic information from the Democratic Republic of the Congo and match it with original historical demographic surveys, as well as contemporary Demographic and Health Surveys. Finally, I use large-scale datasets covering 19 sub-Saharan countries and containing information on the oral traditions of over 1,000 societies worldwide. My findings reveal a strong and positive relationship between ancestral beliefs and fertility rates, with an increase of nearly one additional child in my preferred specification. This relationship holds true across all samples, econometric specifications, and time periods (precolonial, colonial, and modern times).

Although standard diagnostics for omitted-variable bias (Altonji et al., 2005; Oster, 2019; Masten and Poirier, 2026) suggest that the main results are robust to unobserved confounders, these tests are not dispositive, and reverse causality and omitted-variable bias remain the central concerns in the first part of the paper.[3] To address them, in the second part I develop and test the predictions of a simple model of fertility. The model captures the main mechanism behind the positive relationship between ancestral beliefs and fertility — the strong motive to continue one's lineage — and yields predictions that are difficult for alternative explanations to account for, and that I confirm in the data. In the model, the total number of children in a lineage is a public good, since children continue the family line. Whether one's children belong to one's lineage, however, depends on whether the kinship system is patrilineal or matrilineal, owing to the asymmetry in marital allegiances (Fox, 1983).[4] The model yields two main predictions.

[3]Individual-level reverse causality is less of a concern since beliefs in ancestors are deeply-rooted cultural beliefs, which are unlikely to emerge at the individual level as a response to a shock. Moreover, the results with the historical data from the DRC alleviate this concern since ancestral beliefs are measured at the ethnic group level and are supposed to represent precolonial beliefs.

[4]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

The first prediction is that ancestral beliefs should have a stronger quantitative influence on fertility in patrilineal societies than in matrilineal societies, since the desire to continue the family line is generally stronger in the former. In matrilineal societies, a man's children do not continue his lineage; only that of his wife is continued. In contrast, in patrilineal societies, since wives integrate into their husbands' lineages, children continue both parents' lineages. Secondly, specific free-rider behaviour among siblings depends on the kinship system. In patrilineal societies that believe in ancestors, fertility decreases with the number of the husband's brothers, since their children also continue the family line. By contrast, the husband's sisters and their children belong to a different lineage, that of their husbands. Following the same logic, female fertility in matrilineal societies decreases with the number of sisters (but not brothers), since the children of the wife's sisters belong to the wife's lineage, but the children of the wife's brothers belong to their wives' lineage.

I test these predictions and find that: 1) the positive influence of ancestral beliefs on fertility is stronger in patrilineal societies;[5] And 2) there is a negative relationship between one's fertility and the number of family members capable of continuing one's lineage with their own children. I show that, relative to patrilineal societies, female fertility decreases with the number of sisters in matrilineal societies with strong ancestral beliefs. Moreover, this relationship is absent when we look instead at the number of brothers, and is attenuated in societies without ancestral beliefs — though the smaller non-ancestor subsample limits statistical power to formally distinguish the two groups. On the contrary, I show that female fertility decreases with the husband's brothers in patrilineal societies with strong ancestral beliefs.[6] These patterns replicate across sub-

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 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 I for a simple introduction to kinship systems.

[5]Similarly, I show that the positive relationship between patrilineality and fertility only exists in societies with ancestral beliefs, which reduces concerns about the results being driven by differences in the characteristics of matrilineal and patrilineal societies that are not related to the motive to continue the family line (unless these unobserved differences be correlated with the existence of ancestral beliefs).These results also help us to better understand the positive relationship between patrilineality and fertility suggested in other 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.

[6]Unfortunately, the DHS does not include information on siblings for men. For this analysis, I rely on data collected in the context of a randomized controlled trial in Burkina Faso (Dupas et al., 2025). With the DHS, I use the number of men aged 15-59 living in the household as a proxy for the number of men who can continue the respondent's lineage by having children. I show that, compared to matrilineal societies, fertility decreases with the number of men aged 15-59 living in the household, but only in patrilineal societies with strong ancestral beliefs.

Saharan Africa, are consistent with an environment in which the motive to continue the family line drives fertility upward, and are difficult to explain by alternative hypotheses.

Finally, I examine some additional implications of my findings to further validate the theory at hand. Because ancestor worship is a lineage-level cult, 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), and show that the relationship between ancestors and fertility is stronger in lineage-based societies than in age-based societies. Overall, my results show that fertility decisions are made within the larger framework of the family, clan, or lineage, and are therefore not driven solely by the interests of an individual (or couple), but rather by a much broader collective interest. In this regard, belief systems are powerful tools for reinforcing (or diluting) the cooperative ties that underpin the core of child rearing and may have contributed to maintaining human fertility above replacement levels since the emergence of our species (Boyd and Silk, 2003; Henrich, 2016; Gurven and Davison, 2019).

This paper contributes to several strands of the literature. First, I contribute to existing analyses on the role of culture and religious beliefs on fertility in sub-Saharan Africa (e.g., Ishak and Gradstein (2022), Berger and Dasré (2024), or Götmark and Turner (2023) and Church et al. (2023) for reviews).[7][8] In particular, I build on an extensive qualitative literature in demography and anthropology that linked 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). To the extent of my knowledge, this is the first paper to quantify the influence on fertility of one of the most prevalent belief systems in the context of sub-Saharan Africa.

Second, this paper contributes to the literature on the relationship between culture and social structures, and its influence on fertility (e.g., Caldwell and Caldwell 1987). More than 70 years ago, Lorimer (1954) provided qualitative evidence on the relation-

[7]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, cut across religious affiliations and socioeconomic conditions).

[8]This paper is also related to the broad literature on the relationship between fertility and other cultural or social aspects in SSA, such as clan linkages (Bauer et al., 2006), inheritance rules (Fontenay et al., 2024; Sage, 2023), or postpartum sexual abstinence (Bertocchi et al., 2025).

ship between fertility and unilineal descent groups.[9] However, this literature has paid little attention to the religious underpinnings of social structures. In this paper, I demonstrate the importance of religious and cultural beliefs that emphasize the significance of perpetuating family lineage in societies where patrilineal descent is prevalent, thereby highlighting the interconnected evolution of religious and social systems. Additionally, my findings contribute to the literature on how kin influence one's fertility and how family members interact strategically to raise children (see, for example, Sear 2017; Rossi 2018). I show that fertility decisions are influenced by the larger framework of the family, clan, or lineage (Bauer et al., 2006). Specifically, my findings demonstrate that in contexts where the desire to continue the family line increases fertility, there is free-riding behavior regarding fertility among siblings whose children continue the same family line (see, in the context of China, Yang and Spencer 2022).[10]

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 origin 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, 2019b; Stoop and Verpoorten, 2020; Sievert, 2023; Nunn and Sanchez de la Sierra, 2017; Igboin, 2022; 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 beliefs in ancestors.[11] 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 the recognition that these beliefs are prevalent

[9] Alvarez-Aragon et al. (2026b) provide quantitative evidence for the hypothesis that lineage organization contributes to higher fertility rates in Sub-Saharan Africa.

[10] Similarly, my findings underscore the importance of considering men's beliefs and motivations when examining reproductive patterns. It is surprising, then, that although it is widely recognized that men in sub-Saharan Africa have greater bargaining power than their spouses and often make fertility decisions alone, men's fertility has largely been overlooked in demographic research (Coleman, 2000; Dudel and and, 2019; Schoumaker et al., 2024). I demonstrate that men's individual incentives to have children — for example, differences in the strength of the motive to continue their lineage depending on the kinship system — are key to understanding fertility.

[11] One exception is the ongoing work of Lowes et al. (2025), where they examine how traditional beliefs that emphasize connection with ancestors interact with local politics.

and relevant to economic behavior.[12] Relatedly, by identifying the religious and moral underpinnings of high fertility in sub-Saharan Africa, this paper speaks to a recent literature emphasizing that the effectiveness of development interventions depends crucially on the local cultural context, and that policies designed without engaging with the moral foundations of local behavior — here, the *wealth-in-people* principle (Robinson, 2026) and its rooting in ancestor reverence — are prone to be ineffective or even counterproductive (Moscona et al., 2026).

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).[13] According to Asante (2009), "ancestors are those who once lived in human society and, having fulfilled certain conditions, are now in the realm of the spirits".[14] The belief in ancestors is 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

[12] 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 Kuomingtang's 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. In the case of contemporary China, Hu and Tian (2018) find a positive correlation between current ancestor worship practices and childbearing and marriage outcomes.

[13] 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.

[14] 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. An additional criterion often mentioned is to have at least one son who will worship the ancestor, 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.

the belief that the dead person continues to influence society (Radcliffe-Brown, 1922; Kopytoff, 1971).

Ancestors are seen as dispensers of both favor and misfortune, and their powers are most often used to ensure the survival of the lineage by contributing to the unification of families and people, by bringing health and children to the family, or by offering protection 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. In Appendix A, I discuss reasons why this belief system is more widespread and influent in the context of sub-Saharan Africa than in any other region.[15]

2.1. Implications of Ancestral Beliefs 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.[16] 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 the social structure of many African societies — ancestry, kinship and descent relations — to the supernatural sphere (Fortes, 1965; Caldwell and Caldwell, 1985).[17]

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

[15]Some authors (e.g.,Kenyatta 1965) prefer the term "*communion with the ancestors*" in the African context 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. 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). For simplicity, I will not make distinctions between these terms.

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

[17]The fact that Traditional African Religions symbolize the key elements of social organization led some authors to conclude that "to a great extent, African religion is essentially the reproduction of the lineage" (Caldwell and Caldwell, 1987).

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).[18] Qualitative evidence from 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 (37% of $n = 1789$) also believe that their ancestors are deeply concerned about the continuation of their lineage.

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. For example, referring to societies in East Africa, Molnos (1973, p.129) mentions that continuing the lineage and commemorating ancestral spirits is one of the precise reasons for wanting "as many children as possible" since "*lineages competed by producing numerous offspring for the favor of ancestors on whom their welfare was deemed to depend*".

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.[19] In vertical systems of transmission 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 afterlife which also drives the demand for children, but with one critical difference: while old-age security can in principle be substituted by pensions, savings, or formal insurance, afterlife security can only be obtained through biological descendants who continue the family line. This distinction has direct demographic-

[18]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 inquired 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."

[19]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.

transition implications: expanding pension coverage or financial markets should reduce fertility driven by the former motive but leave the latter largely intact.

Maintaining the lineage remains one's responsibility, whether in the human world or in the afterlife. To this end, ancestors bless their progeny's fertility, provide wealth, health and children to the family, and reincarnate into new births to the lineage (Grande, 2024; Olupona, 2014).[20] 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. Moreover, high fertility, since shows the approval of ancestors, is morally associated with joy, recognition, and right living. On the other hand, low fertility or infertility are associated with misfortune, sin, mistreatment, or marginalization, showing the disapproval of ancestors. These associations are all the more important for human behavior because in societies organized hierarchically by age, ancestors are usually the most respected and venerated figures of the community, holding even greater authority than elders.

Ancestral beliefs, manifesting and symbolizing the basic organizing principles of society, transform childbearing into a moral (collective) duty and contribute to sustaining cooperative networks and high fertility rates. By emphasizing intergenerational continuity, ancestor worship reinforces strong kinship ties, fosters cooperation among extended family members in child-rearing, and constitutes the spiritual and moral foundations of the *wealth-in-people* principle (Iliffe, 1987; Vansina, 1990; Guyer, 1995; Robinson, 2026). In a moral economy in which individuals evaluate their wealth through the density and quality of their social bonds rather than through the accumulation of material goods, children are not just inputs into household production or substitutes for missing insurance markets: they are the very substance of wealth in this life and the next, and the means by which the lineage is reproduced. Although the link between this principle and the religious and belief system of the societies in which it operates has been less explored, it is central to understanding why fertility behaviors observed in sub-Saharan Africa often appear puzzling through the lens of standard demographic models, and why interventions that ignore these moral foundations tend to be ineffective (Moscona et al., 2026).

[20] These insights may help us to better understand the absence of a quantity-quality (QQ) trade-off in some sub-Saharan African societies (Alidou and Verpoorten, 2019a). One could think, for example, that in addition to have more children, parents would invest more in those children who are believed to be reincarnated ancestors.

3. Data

To study the role of traditional religious and cultural beliefs in the influence of ancestors on fertility, I rely on several datasets from different contexts and time periods, including original survey data and novel digitized ethnographic information. 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.

3.1. *First-hand data from contemporary Benin*

I collected data from a sample of 943 households living in rural areas of Southern Benin. The respondents were randomly selected, subject to inclusion criteria (e.g., having more than 0.5 hectares of land), as part of a project to support women in pineapple production.[21] The main survey was conducted in 2024 in a standard face-to-face setting. Respondents were 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 uses answers to the question "*do you believe that the spirits of your ancestors have an influence on the events of your life?*"[22][23]

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 C for details of these surveys).[24] The first contains individual-level information on 250,000 individuals in 43,000 households living in seven

[21] 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 was not married or because the husband was not present at the time of the survey (29/872).

[22] 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?".

[23] 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 question while still believing in the *existence* (rather than influence) of ancestors. The estimates are therefore likely to represent a lower bound of the true effect.

[24] 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 novel. The Urban survey has only been used in Alvarez-Aragon et al. (2025) and Guirkinger and Villar (2022). The urban/rural survey has not been used before.

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 distributed across four regions, and covers both rural and urban areas, excluding the large cities included in the urban survey (I refer to this survey as EDOZA, which was its original name). These surveys contain information on respondents' ethnicity and birth calendars for each woman over the age of 13. Using the self-reported information on ethnicity, I match respondents in the surveys to the ethnicity-level information on beliefs in ancestors present in Vansina (1966)'s book.[25]

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 an indicator that equals one if it is explicitly mentioned that an ethnic group practices ancestor worship. 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. 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 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 based on GPS coordinates, and will allow me to exploit variations in ethnicity-level beliefs in ancestors among migrants of contiguous ethnicities and same destination. Overall, I am able to match about 60,000 women over the age of 13 with the information provided by Vansina (1966).[26]

DRC Demographic and Health Surveys (DHS).– Finally, I complement the analysis with contemporary survey data from the DRC Demographic and Health Surveys, a nationally representative survey that provides detailed information on education, literacy, occupation, religion, fertility preferences, and contraceptive methods. I use data on about 40,000 individuals living in 785 clusters from both the men's and women's questionnaires. To measure ancestral beliefs, I follow the methodology of previous studies (i.e., Lowes, 2022) and use location to match respondents in the DRC DHS with the ethnographic

[25] 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 previously classified by Vansina (1966).

[26] 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.

information.[27] To do this, I combine the location of each DHS cluster with a digitized version of the map of ethnicities from Vansina (1966).

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, coming from a survey conducted by (Pew Research Center, 2009). I measure the strength of ancestral beliefs by using answers to the following question: "*Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?*".[28][29]

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

Finally, to show that the relationship is not driven by factors only affecting the post-independence fertility trajectories of societies, I leverage information from the folklore catalogue constructed by Michalopoulos and Xue (2021), combined with the Ethnographic Atlas (Murdock, 1967). This dataset includes information on the proportion of folkloric motifs in a given oral tradition related to different concepts. These motifs are considered to be the building blocks of oral traditions, representing their characteristics, important experiences, events and images, and are particularly valuable because culture is transmitted from generation to generation through oral traditions such as myths, folklore, stories, or proverbs (Galor et al., 2023).[30] 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*, and the importance of fertility by looking at

[27] 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).

[28] 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 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*".

[29] 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.

[30] Even in recent times, the presence of ancestors in the culture of many African societies is still widespread (not only in their oral and written traditions, but also in their art).

the proportion of motifs related to the word *birth* in an ethnic group's oral tradition.[31]

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 is about 8 for men and above 5 for women), 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). Beliefs in ancestors are widespread: 43% (31%) of men (women) believe that ancestors have an influence on their lives. Consistent with the qualitative evidence that emphasizes the central role of lineage continuity in this belief system, 95% of those who believe in the influence of ancestors also 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:

$$Y_i = \alpha + \beta_1 AncestralBeliefs_i + X_i'\Phi + \epsilon_i \tag{1}$$

Where Y_i is the number of children ever born and $AncestralBeliefs_i$ is a dummy variable equal to one if the respondent (or the respondent's spouse or both) 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.[32] Since men are the main decision-makers regarding fertility in this context, my baseline specification focuses on women but considers the influence of both husband and wife's beliefs.[33] Robust standard errors are reported in parentheses.

[31] 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*.

[32] 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, and whether the household has a TV (as a proxy for wealth). Finally, I include religion fixed effects (five main categories: Catholic, Celestial Church of Christ, Evangelical, Voodoo, and Other) and 1km-buffer fixed effects.

[33] This is the reason why the number of observations drops, since I focus on married women. Appendix D.1 reports the results for women only, for men only, and for men while considering the beliefs of both spouses. Interestingly, the size of the coefficients are slightly higher when both spouses hold strong beliefs in the influence of ancestors, rather than the husband or wife alone. These effects suggest some degree of complementarity between spouses and room for non-negligible importance of women's decision making.

Table 1 presents the estimates for women while sequentially including different controls. Columns (1)-(4) do not include religion fixed effects, while column (5)-(8) do. Columns (1) and (5) do not include control variables, columns (2) and (6) include only baseline controls (age, education, and access to electricity), and columns (3) and (7) include the full list of controls. Finally, columns (4) and (8) include 1km-buffer fixed effects, so I compare respondents living very close to each other but holding different beliefs. This specification allows to take into account supply-side factors such as access to contraceptives.[34]

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 about 0.7 additional children (13% of the outcome mean). These effects are quantitatively large, bigger in magnitude than the effect of having attended school, and almost as large as the difference in the total fertility rate of SSA and other low-income regions.

Finally, I show in the last three rows of the table that these results are extremely unlikely to be fully explained by unobservables, following Altonji et al. (2005), Oster (2019), and Masten and Poirier (2026)'s methodology (see Appendix D.8 for a brief explanation). For example, Oster δ^* values (15.3 and 36.4), are more than one order of magnitude above the threshold of $\delta^* = 1$ that Oster (2019) suggests as a minimum cutoff for considering an OLS estimate robust to omitted-variable bias. Finally, the conservative sign-breakdown point of Masten and Poirier (2026), $\bar{r}_X^{bp}$, is around 88% in column 7 and 87% in column 8: the standardized association between an unobserved confounder and the treatment would need to be at least 87–88% of the joint association of the full set of observed controls before the bounds on the coefficient first include zero. These diagnostics therefore reject omitted-variable bias by margins that are well beyond standard cutoffs.[35]

[34]This specification also helps to rule out that the results are driven by the spatial clustering of groups with different cultural practices and socioeconomic backgrounds that might be correlated with fertility rates.

[35]To gauge whether these magnitudes are large or small, it is useful to follow the benchmark established by Diegert et al. (2026). In their application, the authors classify as "robust" analyses for which they obtain conservative sign-breakdown points ($\widehat{\bar{r}}_X^{bp}$) of about 80.4% and 72.6%. By contrast, they classify as "sensitive" analyses for which $\widehat{\bar{r}}_X^{bp}$ ranges between 2.81% and 5.85%. Against this benchmark, the Benin estimate of $\widehat{\bar{r}}_X^{bp} \approx 88\%$ is *larger* than the value Diegert et al. (2026) treat as conclusive evidence of robustness in their replication.

Table 1: Spouses' beliefs in ancestors and female fertility in Benin

	Total number of children ever born							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral beliefs	0.750***	0.641***	0.629***	0.784***	0.825***	0.696***	0.701***	0.737***
	(0.178)	(0.161)	(0.158)	(0.195)	(0.198)	(0.180)	(0.177)	(0.216)
SE clustered at 1km buffer				[0.170]***				[0.216]***
Baseline controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Extended controls	No	No	Yes	Yes	No	No	Yes	Yes
Religion FE	No	No	No	No	Yes	Yes	Yes	Yes
1 km buffer FE	No	No	No	Yes	No	No	No	Yes
Mean Y	5.365	5.352	5.352	5.398	5.365	5.352	5.352	5.398
R-Squared Y	0.0206	0.250	0.271	0.451	0.0534	0.272	0.292	0.466
N	846	840	840	640	846	840	840	640
Altonji et al. (2005) ratio							8.23	119.77
Oster (2019) δ^* ($R_{max} = 1.3 \times R'$, $\beta = 0$)							15.30	36.35
Masten & Poirier (2026) $\bar{r}_X^{bp}$ (%)							88.47	86.59

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 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, and whether the household has been part of a program to encourage the production of pineapple. Religion fixed effects include five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Columns 4 and 8 restrict the sample to households that have at least one neighbor within 1km from them, and include 1km-buffer fixed effects. Robust standard errors are reported in parentheses; for columns 4 and 8, standard errors clustered at the 1km-buffer level are reported in brackets. The last three rows report three sensitivity-to-omitted-variables diagnostics, all computed for the long specifications in column 7 and column 8 (full specification and 1km-buffer FE). Religion fixed effects are absorbed and not used as calibration variables; in all cases, the short regression is restricted to the sample of the long specification (840 obs. in col. 7, 640 in col. 8). *Oster (2019)* δ^* and *Masten and Poirier (2026)* computed via the `regsensitivity` command. Reported as a percentage. *** for p<0.01, ** for p<0.05, * for p<0.1.

Robustness.- Appendix D provides several robustness tests. I show that the results are robust to estimating an exponential regression model using a pseudo-Poisson maximum likelihood estimator, or using alternative definitions of the explanatory and dependent variables.[36] I also show in specification curves that the coefficients barely move when including additional control variables,[37] 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), or when using the total number of *alive* children as dependent variable, to reduce concerns about differential mortality. I also rule out that the effects

[36] 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.

[37] These variables include a dummy variable that takes the value 1 if respondent have experienced pressure from their extended family or clan to increase their number of children, polygamy, overall religiosity (measured as an indicator if the respondent donates money to the church when COVID happened), household size, or having livestock.

are driven by differences in the inheritance rules of ethnic groups (Fontenay et al., 2024), by differences in old-age security that could be correlated with ancestral beliefs (Rossi and Rouanet, 2015; Rossi and Godard, 2022; Sage, 2023), or by the spatial clustering of groups with different fertility levels.[38]

4.2. *Postcolonial Democratic Republic of the Congo*

I then examine the same relationship using individual-level data from women born during the colonial period in the DRC coming from two original post-independence demographic surveys: EDOZA, which was conducted in both rural and urban areas, and an urban survey, conducted in 7 large cities of the DRC. Using self-reported ethnicity, I match women to the information on the practice of ancestor worship before European colonization from Vansina (1966)'s book. I estimate a model similar to equation 1, but the explanatory variable of interest is now measured at the ethnic group level.

The 1970s Demographic Urban sample, composed mainly of post-independence migrants from rural areas, allows me to include city of residence fixed effects in the analysis. Therefore, in the spirit of an epidemiological approach, I identify the influence of ancestral beliefs by comparing people who lived in the same city at the time of the survey, but who migrated from different areas and have different beliefs in ancestors. This strategy is useful to rule out confounding factors related to the environment in which individuals live in (either local economic conditions, institutions, or supply-side frictions). For a formal exposition of the regression model see Appendix E.

Table 2 shows the results. Columns 1, 2 and 3 use both surveys together, while columns 4, 5 and 6 only use EDOZA (survey conducted in four regions in the west of the DRC, including both rural and urban areas), and columns 7, 8 and 9 only use the urban sample. In order to approximate complete fertility (these demographic surveys have information on all women over 13, and 75% of women under 20 are childless) and increase comparability with the first-hand data from Benin, the sample in columns 1, 2, 4, 5, 7 and 8 is restricted to women over the age of 30, while in columns 3, 6 and 9 it is restricted to women over 40. [39]

[38] 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).

[39] 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).

Belonging to an ethnic group with ancestral beliefs is associated with about one additional child (20% of the outcome mean in the full sample). The difference between urban and rural areas is not very large: the effect of ancestor worship on fertility in the EDOZA sample (that includes rural areas) 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).

Finally, I show that, as before, unobserved factors are very unlikely to fully explain the results. The urban sample's $\delta^* = 16.77$ is particularly reassuring because identification in that sample comes from comparing migrants of different ethnic origins residing in the same city: any unobservable driving the result would need to be more than fifteen times as influential as observed controls while simultaneously varying systematically across migrants of different ethnicities within the same destination city. Moreover, plausible candidate confounders — such as the local disease environment or supply-side access to health infrastructure — are absorbed by the city fixed effects. The Masten–Poirier $\bar{r}_X^{bp}$ takes values of about 47% (full sample), 55% (EDOZA), and 57% (urban), meaning that the standardized association of any unobserved confounder with the treatment would need to be at least about half of that of the full set of observed controls combined before the bounds on the coefficient first include zero.

Table 2: Ancestral beliefs and fertility in post-colonial DRC

	Total number of children ever born								
	Full sample			EDOZA			Urban sample		
	+30		+40	+30		+40	+30		+40
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ancestral beliefs	1.082***	0.861***	1.140***	1.325**	1.052***	1.344***	0.836***	0.833***	1.189***
	(0.283)	(0.205)	(0.265)	(0.525)	(0.387)	(0.401)	(0.213)	(0.173)	(0.291)
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
City fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Mean Y	5.322	5.322	5.080	4.867	4.865	4.693	5.542	5.542	5.359
R-Squared	0.0799	0.246	0.243	0.108	0.267	0.273	0.0651	0.252	0.248
N	23212	23194	12435	7558	7551	5207	15654	15643	7228
Altonji et al. (2005) ratio		2.53			3.09			9.14	
Oster (2019) δ^* ($R_{max} = 1.3 \times R'$, $\beta = 0$)		3.82			3.45			16.77	
Masten & Poirier (2026) $\bar{r}_X^{bp}$ (%)		46.6			55.0			56.9	

Note. Data: Urban Demographic Survey of 1970s and EDOZA (rural and urban areas). Columns 1–3 combine both the Urban Demographic survey and EDOZA; columns 4–6 use only the EDOZA sample; columns 7–9 use only the urban sample. Columns 1, 2, 4, 5, 7 and 8 are restricted to women older than 30, and columns 3, 6 and 9 to women older than 40. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if the ethnic group e practiced ancestor worship before European colonization. Columns 1, 4 and 7 only include age and the relevant fixed effects (region for cols. 1–6, city for cols. 7–9) as controls. The full set of controls include age, age squared, urban/rural place of birth, education, indicator for migrant, whether the father's respondent is alive, labor force participation, indicator for being a farmer (only available in the urban sample), number of household members, and year of installation in the current city. Standard errors clustered at the Vansina ethnic-group level are in parentheses. The last three rows report three sensitivity-to-omitted-variables diagnostics, all computed for the long specifications in column 2, column 5, and column 8. In every case the fixed effects are absorbed and not used as calibration variables; in all cases, the short regression is restricted to the sample of the long specification. *Oster (2019)* δ^* and *Masten and Poirier (2026)* computed via the `regsensitivity` command. Reported as a percentage. *** for p<0.01, ** for p<0.05, * for p<0.1.

Robustness.- Appendix E shows that these results are not affected by the sample restrictions (using age-specific fertility rates instead of total number of children ever born, or looking at the extensive vs the intensive margin),[40] by important confounders that have been shown to affect fertility such as unobserved differences in human capital (Fernández and Fogli, 2009) or exposure to missionaries (Guirkinger and Villar, 2022), or are robust to the use of pseudo-Poisson maximum likelihood (since the number of 0's in the dependent variable is non-negligible).

4.3. *External validity: ancestral beliefs and fertility in different contexts and time periods*

The results presented above are not a specificity of the Beninese and Congolese contexts. In this section, I leverage additional large-scale datasets that cover different time periods and contexts and replicate the above findings.

Evidence from 19 contemporary sub-Saharan African countries.– First, I look at the relationship between ancestral beliefs and fertility using individual-level data that covers more than 20.000 respondents from 19 sub-Saharan African countries (Pew Research Center, 2009). With these data, I exploit the within-country variation in ancestral beliefs measured at both the individual and the regional level.[41] Consistent with previous results, I find a positive association between ancestral beliefs and fertility across SSA, ranging from about 10% of the sample mean (individual measure) to about 16% (regional measure). The magnitude of the coefficient is similar to the influence of living in an urban area or to having primary education. Interestingly, these data allow me to rule out overall religiosity or alternative supernatural beliefs as confounders in the relationship between ancestral beliefs and fertility. See Appendix F.1 for details about the regression model, results, and robustness tests.

Ancestral beliefs and fertility in traditional Folklore.– Second, I investigate whether the positive correlation showed above is detectable in the oral traditions of ethnic groups, leveraging information from the folklore catalog constructed by Michalopoulos and Xue (2021).[42] I find a positive and strong association between the share of motifs in the oral

[40] 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%.

[41] Ancestral Beliefs are measured, at the individual level, as a dummy 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?*". At the regional level, they are measured as the prevalence of ancestral beliefs in each respondent's region of residence (measured as the fraction of survey participants in a given region who answer "yes" to the aforementioned question).

[42] The presence of ancestors in the folklore of ethnic groups is not specific of sub-Saharan Africa. We

tradition of an ethnic group related to *fertility* or *birth* and the share of motifs related to *ancestors*, both at the global level and within sub-Saharan Africa.[43] One percentage point increase in the share of motifs related to ancestors increase the share of motifs related to birth by about 5%. Appendix F.2 provides details on the regression model, results, and robustness tests.

Contraceptive use.– If the responsibility to have strong and vibrant lineages is a moral obligation imposed by ancestors, a natural implication is that contraceptive uptake, conditional on supply frictions, is probably lower in societies with ancestral beliefs. Appendix F.3 shows results in this direction, using data from all available rounds of the DHS for Benin,[44] where there is significant variation in traditional beliefs at the individual level. In the absence of direct DHS survey items on ancestral beliefs, I use adherence to the Voodoo religion as a proxy for traditional beliefs.[45] I find that, conditional on supply-side factors (including place of residence fixed-effects) and other important determinants of contraceptive uptake (including age, education, wealth, employment, marital status, or polygamy), traditional beliefs are associated with lower contraceptive use and intention to use. These results may help us to better understand the low demand for contraceptives in the context of SSA, where it has been shown that financial constraints or limited access to contraceptives are sometimes not important drivers of fertility rates (Dupas et al., 2025), and that fear to infertility is an important barrier (Ochako et al., 2015; Bau et al., 2024).[46]

find extensive presence of ancestors in the oral tradition of societies in America and South Asia and the Pacific.

[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.

[44]I also report results using the DRC DHS data, matched with the information on ancestral beliefs from Vansina (1966). Unfortunately, since both datasets are matched based on location, I cannot include place of residence fixed effects to account for supply-side factors.

[45]This choice is driven by data availability rather than pure conceptual equivalence. Although ancestor worship plays a fundamental role in Voodoo spirituality, Voodoo encompasses a broader set of supernatural beliefs and practices. Importantly, Voodoo is explicitly mentioned in the constitution as an official religion, acquiring the same status as "missionary religions", reducing concerns about undereporting of traditional religion in this context since it is not socially nor politically marginalized.

[46]Fear to infertility may be particularly high in societies with ancestral beliefs since low fertility or infertility are associated with misfortune, sin, mistreatment, or marginalization, showing the disapproval of ancestors.

5. Conceptual Framework: Mechanisms

In this section, I develop a simple model of fertility where the total number of children in the lineage is a public good that highlights the relevance of continuing one's lineage in societies with ancestral beliefs. Moreover, this model provides very specific predictions that, if validated in the data, go in line with the motive to continue the family line driving fertility upwards, and are very difficult to explain by alternative explanations. In a context where getting exogenous variation in religious and cultural beliefs is extremely challenging, the test of the model's predictions in the data provides useful insights into the validity of the hypothesis at hand.

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).[47] 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 from society and 1 if ancestral beliefs are prevalent.[48]

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.[49] 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 in matrilineal societies. Therefore, the total number of children belonging to the individual's lineage is different depending on the individual's gender and kinship system:

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

[47] 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).

[48] 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.

[49] See Appendix I for a simple introduction to kinship systems.

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

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 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, which 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 patrilineal case. 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 give the following optimality condition:

$$u'(c_i) = b'(n_i) + \beta \ell'(n_i + \sum_{j \neq i} n_j) \tag{2}$$

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 (2) 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 2, 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:

$$\frac{dr_i\,(n_j)}{dn_j} = -\frac{\frac{\partial F}{\partial n_j}}{\frac{\partial F}{\partial r_i(n_j)}} = -\frac{\frac{\partial^2 U_i(c_i, n_i, ni + \sum n_j)}{\partial ni \partial n_j}}{\frac{\partial^2 U_i(c_i, n_i, ni + \sum n_j)}{\partial n_i^2}} < 0 \tag{3}$$

Expression 3 implies that when both n_i and n_j are positive, an increase in one leads to a decrease in the other, to maintain the equilibrium between the marginal utility of consumption and children. This indicates a negative relationship between an individual's number of children and that of her husband's brothers. The intuition is that, when the husband's brothers have many children, the individual has less incentives to contribute to the continuation of the family line, since the children of the husband's brothers already do so. Conversely, when their fertility is low, the agent increases her own to help sustain the lineage. This dynamic is akin to a classic free-rider problem, in which individuals benefit from others' contributions to a public good while limiting their own.[50]

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:

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

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

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

[50]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.

$$\frac{\partial U_i(c_i, n_i, N)}{\partial c_i} = u'(c_i) = b'(n_i) = \frac{\partial U_i(c_i, n_i, N)}{\partial n_i} \tag{4}$$

This condition states that the marginal utility of private consumption must equal the marginal utility of having children. As compared to expression 2, the term associated with the motive to continue the family line has disappeared. This is because, in matrilineal societies, children do not belong to the lineage of their father and, as a result, the desire to continue the family line does not influence their fertility decisions. Finally, comparing equation 4 with the patrilineal case (equation 2), we see that men's average fertility is lower under matrilineal systems.

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.

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

From the first order conditions follow that:

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

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

$$\frac{dr_i\left(n_k\right)}{dn_k} = -\frac{\frac{\partial F}{\partial n_k}}{\frac{\partial F}{\partial r_i(n_k)}} = -\frac{\frac{\partial^2 U_i(c_i, n_i, ni + \sum n_k)}{\partial ni \partial n_k}}{\frac{\partial^2 U_i(c_i, n_i, ni + \sum n_k)}{\partial n_i^2}} < 0 \tag{5}$$

Condition 5 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 for any interior bargaining weights between spouses (i.e., provided the husband has at least some influence on fertility decisions), 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. At the corner case where the wife has full decision-making power, the prediction's sign depends on which spouse's lineage the children continue. 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 should be stronger in patrilineal ethnic groups, where the father's children continue his lineage and wives integrate the husband's lineage upon marriage.
- *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 the woman's sisters' children.

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

6. Test of the theory

Having shown that ancestral beliefs are positively correlated with fertility levels, I now turn to empirically examine whether this relationship is driven by the main mechanism suggested in the qualitative literature: the stronger motive to continue the family line in societies with ancestral beliefs. 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 hypotheses.

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.[51] About 57% 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 3 and 4 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 and want more children in the future, but only if they belong to a patrilineal ethnic group. The point estimate for ideal family size goes in the same direction but is imprecisely estimated. Interestingly, spouses' preferences are substantially affected (column 4 in table 3). In patrilineal societies with strong beliefs in ancestors, husbands are more likely to want more children than their wives. This pattern is reversed in matrilineal societies with beliefs in ancestors, where husbands are less likely to want more children than their wives — consistent with the absence of a male lineage-continuation motive in that kinship system. 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 the father's children continue his lineage and wives integrate the husband's lineage upon marriage.

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

Table 3: Ancestral beliefs, kinship system, and fertility in the DRC

	Nb of children	Ideal Nb of children	Want more children	Husband > wife
	(1)	(2)	(3)	(4)
Ancestral beliefs	-0.156	-0.0341	-0.0348	-0.0989**
	(0.100)	(0.264)	(0.0269)	(0.0503)
Ancestral beliefs x Patrilineal	0.267**	0.333	0.0591**	0.142**
	(0.122)	(0.293)	(0.0293)	(0.0559)
Province FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	3.086	6.632	0.760	0.474
R-squared	0.623	0.224	0.221	0.0640
N	35891	33727	29568	10793

Note. Data: Demographic and Health Surveys of DRC (2007 and 2013-2014). The table reports OLS estimates of the relationship between ancestral beliefs, kinship system and fertility outcomes. The outcome variable is the total number of children ever born in column 1, the ideal number of children in column 2, a dummy equal to one if the respondent wants more children in column 3, and a dummy equal to one if the husband wants more children than his wife in column 4. "Ancestral beliefs" is a dummy variable that equals one if the ethnic group practices ancestor worship. "Patrilineal" is a dummy variable that equals one if the ethnic group has patrilineal descent. Controls include age, age squared, survey year, 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 4: Ancestral beliefs, fertility and kinship structure 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.

Discussion and robustness.- One potential concern when interpreting the results showed above is omitted variable bias related to differences between patrilineal and

matrilineal societies. However, that unobserved differences between patrilineal and matrilineal societies drive the results is unlikely for several reasons. First, I control for an extensive set of ethnic-level controls when using the Folklore data, which already reduces omitted variable concerns.[52] Second, although including these additional controls in the DRC sample reduces sample size and removes almost all the variation in ancestral beliefs, I show in Appendix G (table G1) that there are no significant differences between patrilineal and matrilineal societies in the DRC sample across important ethnic-level characteristics. Finally, I show in Appendix G (table G2) that the positive relationship between patrilineality and fertility only exists in societies with strong ancestral beliefs.[53] In fact, if the results were driven by inherent differences between patrilineal and matrilineal societies (e.g., greater women's decision-making power in matrilineal societies (Tene, 2020; Lowes, 2022), or higher economic returns to children and the need to have sons for old-age support in patrilineal societies (Rossi and Godard, 2022)), the positive association of patrilineality and fertility should be independent of ancestral beliefs.

6.2. Free-rider behavior

The third and fourth predictions generated by the model state that, in societies with strong beliefs in ancestors, 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.[54][55] In this section, I combine different data sources to examine this question. I proceed in two steps.

[52]These 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, the earliest year of publication in the group's oral tradition, whether the domestic organization is around independent nuclear families, whether people are part of localized clans that live as segmented communities, impartible inheritance, political complexity, whether monogamy is dominant, whether the group practices pastoralism, use of historical plough, historical economic development, practice of intensive agriculture, the share of motifs in an ethnic group related to "supernatural", tropical climate, rainfall, ruggedness, land quality (population weighted), and agricultural suitability.

[53]These results contribute to the literature on relationship between kinship structure and fertility (dating back to the pioneer work of Lorimer 1954). Moreover, I show that the positive relationship between fertility preferences and patrilineality in a context where the motive to continue the family line is important (such as in societies with strong ancestral beliefs) is particularly strong for men, as expected from the simple theoretical framework outlined in Section 5. See Appendix G for additional details.

[54]Strictly speaking, the model predicts a negative relationship between one's own number of children and the number of children of those in the family that belong to the same lineage. However, I look at the number of siblings instead since I do not have information about siblings' children.

[55]This result helps to rationalize some empirical findings in other contexts where the motive to continue the family line is important, 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.

First, I examine whether there exists a negative relationship between female fertility and the number of women's sisters in matrilineal societies with strong beliefs in ancestors. To do this, I combine information provided by the DRC DHS on the gender and number of women's siblings with the information on ancestor worship from Vansina (1966) and with information on kinship structures from Murdock (1967). Second, I examine whether there exists a negative relationship between fertility and the number of the husband's brothers in patrilineal societies with strong beliefs in ancestors. Since the DHS does not include information on siblings for men, I rely on data collected by Dupas et al. (2025) in the context of a large randomized controlled trial in Burkina Faso.[56]

Fertility and the number of sisters.– Table 5 shows the results on the relationship between women's fertility and the number of sisters. Consistent with the intuition in section 5, we can see in column 1 (full sample) that, as compared to patrilineal societies, the number of sisters contribute negatively to fertility in matrilineal societies.[57] Although the model predicts that the negative contribution of sisters to woman's fertility in matrilineal as compared to patrilineal societies should exist only in societies with ancestral beliefs, the fact that we already see a clear negative relationship in the full sample is explained by the fact that most of the sample belongs to societies with strong ancestral beliefs (87%). Importantly, column 2 shows, in the spirit of a falsification test, that the number of brothers (who represent similar demographic variation but whose children do not continue the lineage of the woman) has no significant differential effect by kinship system on women's fertility. This reinforces the interpretation that the negative influence of sisters in matrilineal societies captures the motive to continue the family line. The positive coefficients associated with the number of siblings may reflect the intergenerational transmission of preferences for larger families.[58]

Finally, columns 3 and 4 divide the sample based on whether respondents belong to an ancestral ethnic homeland with strong (column 3) or weak (column 4) ancestral be-

[56] In the context of the DRC, I use DHS to show similar results when using the number of eligible men (those aged 15-59) in the household as a proxy for the presence of family members capable of extending the family line.

[57] The fact that the coefficient in the pooled regression is more significant and a bit larger that the coefficients in columns 3 and 4 may be due to the larger number of observations used in the regression. When using information on ancestral beliefs from Vansina, I lose some observations since I am not able to match 100% of the DHS clusters to the ethnic homelands map in Vansina (1966).

[58] All specifications control for the total number of alive siblings, in order to account for network density effects (e.g., support from the extended family to raise children), and to get closer to isolate the quasi-random variation in the gender composition of siblings and capture the effect of having more sisters rather than simply having more siblings in general (in contrast with much of Eastern Europe and Central and South Asia, there seems to be limited use of sex-selective abortion and stopping rules in sub-Saharan Africa (Baland et al., 2023)). The results remain unchanged when controlling for the total number of siblings ever born or by the number of siblings of the opposite sex.

liefs. Consistent with the motive of continuing the family line, the interaction between matrilineality and the number of sisters is greater and only significant in societies with strong ancestral beliefs. Although the coefficient associated to *Matrilineal x N of Sisters* is ten times higher in column 3, I cannot reject the null hypothesis of equality of coefficients due to the significant difference in sample sizes (most respondents belong to societies with strong ancestral beliefs). Therefore, these results should be interpreted with caution. Similarly, as shown in column 5, when the sample is restricted to societies with strong ancestral beliefs, the negative relationship observed in column 3 disappears when examining the number of brothers.

Overall, these results provide suggestive evidence that the motive to continue the family line is at play in societies with strong ancestral beliefs, which drives fertility upwards as shown in the first part of the paper. Moreover, these findings improve our understanding of how people make fertility decisions within the larger framework of their families, clans, or lineages. Although it has long been recognized that fertility decisions are not driven solely by the interests of an individual (or couple), but rather are the result of a much broader collective interest (of the extended family or lineage) in the couple's fertility (see, for example, Smith 2004; Sear 2017), I uncover here a specific mechanism to substantiate these claims.

Table 5: Ancestral beliefs and free-riding behavior in matrilineal societies

	Total number of children ever born				
			Ancestors=1	Ancestors=0	Ancestors=1
	(1)	(2)	(3)	(4)	(5)
Number of sisters	0.0481***		0.0457***	0.0452	
	(0.0104)		(0.0120)	(0.0281)	
Matrilineal x Sisters	-0.0301**		-0.0265*	-0.0104	
	(0.0142)		(0.0155)	(0.0540)	
Number of brothers		0.0348***			0.0390***
		(0.0105)			(0.0122)
Matrilineal x Brothers		-0.00822			-0.00466
		(0.0139)			(0.0154)
Province FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Mean Y	3.074	3.074	3.048	3.277	3.048
R-squared	0.615	0.615	0.627	0.552	0.627
N	26445	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 ever born. The sample is restricted to women. The sample is restricted to ethnic groups with ancestor worship in columns (3) and (5) and to ethnic groups without ancestor worship in column (4). "Matrilineal" is a dummy variable that equals one if the ethnic group has matrilineal descent. "Number of sisters" is the number of sisters that the respondent has ever had. "Number of brothers" is the number of brothers that the respondent has ever had. The total number of alive siblings is always included as control variable. Controls include age, age squared, survey year, 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.

Fertility and the number of husband's brothers.– Following the same logic, we expect a negative relationship between fertility and the number of the husband's brothers in patrilineal as compared to matrilineal societies. Unfortunately, the DHS only includes information on siblings for women. I overcome this limitation in two ways.

First, I rely on data collected as part of a large randomized controlled trial conducted among 14,545 households of married women in rural Burkina Faso with the main objective of testing the hypothesis that limited access to contraception is an important driver of high fertility rates in West Africa (see Dupas et al. 2025 for details on the intervention and main results). These data's value is twofold. On the one hand, the authors collected detailed information on the number of siblings, for both spouses. On the other hand, the setting is well suited to examine our hypothesis since most ethnic groups in the sample are characterized by having traditional belief systems where the spirits of ancestors play a pivotal role.[59]

[59]Based on Human Relations Area Files (2024), Asante and Mazama (2009), 101 Last Tribes (2024), and

Table 6 shows the results. I find that the number of husband's brothers contributes negatively to fertility in patrilineal societies. This effect is particularly strong for groups with strong beliefs in ancestors. In contrast, the negative correlation between the number of the husband's brothers and female fertility disappears in groups without strong ancestral beliefs. As a falsification check, columns 4-6 show that the same patterns do not hold if we instead look at the relationship between fertility and the number of the husband's sisters.

Table 6: Female fertility and husband's siblings in a patrilineal society

	Number of children ever born					
		Ancestors=1	Ancestors=0		Ancestors=1	Ancestors=0
	(1)	(2)	(3)	(4)	(5)	(6)
Number of husband's brothers	-0.0248**	-0.0353***	-0.00922			
	(0.0115)	(0.0127)	(0.0176)			
Number of husband's sisters				0.00594	-0.00667	0.0273
				(0.0114)	(0.0140)	(0.0201)
Mean Y	3.952	3.985	3.877	3.952	3.985	3.877
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.331	0.327	0.353	0.330	0.326	0.354
N	8171	5674	2497	8170	5673	2497

Note. Data: (Dupas et al., 2025). Sample is restricted to women. Columns 1 and 4 use the full sample. Columns 2 and 5 restrict the sample to ethnic groups with strong ancestral beliefs, while columns 3 and 6 restrict the sample to ethnic groups without strong ancestral beliefs. Controls include whether the respondent has formal education, age, date of interview, whether the respondent owns land, religion fixed effects, whether the respondent worked for income during the previous year, and whether the respondent was randomly selected into the treatment of the randomized experiment. Province fixed effects are used in all specifications. Robust standard errors clustered at the health center level in parentheses. *** for p<0.01, ** for p<0.05, * for p<0.1.

Second, I use the same DRC DHS data but proxy the number of husband's brothers by the number of men aged 15-59 in the household.[60] Table G3 in Appendix G.1 shows that, consistent again with the theoretical framework, the number of men in the household assumed to be able to continue the lineage with their own children contributes negatively to fertility in patrilineal as compared to matrilineal societies (columns 1 and

Gall and Hobby (2009), I classify the 19 ethnic groups in the Dupas et al. (2025) sample as follows. *Belief in ancestors*: Dagara, Dogon, Fulse (Kurumba), Gourmantche, Gourounsi, Mossi, and Senoufo. *No belief in ancestors*: Bissa, Bobo, Bwaba, Dafi, Dioula, Fulfulde/Peul, Haoussa, Lobi, Marka, Samo, Songhai, and Touareg/Bella. Together, these classifications cover the full sample. Mossi alone account for 8,564 of the 13,914 respondents and Fulfulde/Peul for 1,129.

[60]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.

2). Moreover, the negative effect of the number of eligible men on fertility is driven by societies with strong beliefs in ancestors.[61]

Validation across sub-Saharan Africa.– These results are not a specificity of the Congolese context. I show in Appendix G.1 that these results hold across sub-Saharan Africa by putting together 93 DHS surveys from 37 countries with information on siblings.[62] First, since I do not have accurate information on beliefs in ancestors beyond the DRC and Benin, I look in table G4 simply at the relationship between the siblings' gender and female fertility by kinship system.[63]

Second, I try to get closer to my preferred specifications and construct region-level measures of beliefs in ancestors using individual-level information from the Pew Research Center (2009). Then, I match these measures by location with the GPS location of DHS clusters, which leaves me with a (regional-level) measure of ancestral beliefs for about 800,000 women in 16 countries. With this information, table G5 in Appendix G.1 tests all model's predictions. Column 1 shows that ancestral beliefs correlate positively with fertility. Column 2 shows that this relationship is driven by patrilineal societies. Column 3 shows that, as compared to patrilineal societies, the number of sisters contribute negatively to female fertility in societies with ancestral beliefs.[64] Finally, column 4 includes a falsification test showing that the same negative relationship does not exist when looking instead at the number of the woman's brothers, since their children do not continue the woman's lineage in matrilineal societies.

Alternative explanations.– The four-way pattern documented above — negative same-sex sibling effect in the lineage-continuing direction, null cross-sex and cross-kinship-system effects, attenuated in groups without ancestral beliefs — is hard to generate by explanations other than the lineage-continuation motive. I discuss the three most plausible alternatives here; Appendix Table G6 reports the corresponding robustness tests in a single panel, and shows that across all controls the *Matrilineal* $\times$ *Sisters* coefficient remains negative and significant while the *Matrilineal* $\times$ *Brothers* falsification remains

[61] However, I cannot reject the null hypothesis of equality of coefficients; therefore, these results remain suggestive. Finally, the falsification test in column 5 shows that the negative pattern in column 3 between fertility and the number of men in patrilineal societies with strong ancestral beliefs does not extend to the number of women, suggesting that this negative relationship is related to the desire to continue the lineage rather than to the mere number of people living in the household.

[62] Appendix G.1 lists all DHS waves in the sample.

[63] Exploring these relationships is meaningful for the purpose of this paper if we assume that an important fraction of the population in sub-Saharan Africa holds ancestral beliefs and cares about the importance of continuing the family line. In this regard, these relationships are similar to the first column in tables 5 or G3.

[64] I report the results as a triple interaction since the regional-level measure of beliefs in ancestors is now continuous.

null.

Sex-specific resource competition. In matrilineal societies sisters are co-claimants on matrilineal land and inheritance; in patrilineal societies brothers are co-claimants on patrilineal land. More same-sex siblings could therefore reduce the per-claimant resources available for childrearing. The first problem with this story is that it should hold *regardless* of ancestral beliefs, yet the patterns weaken or vanish in groups without them. Because identifying variation is thin in that subsample, I additionally control for (i) the continuous DHS wealth-factor score, addressing the household-budget version in which the sister effect should concentrate in low-wealth households, and (ii) whether real property is inherited through matrilineal heirs in the respondent's ethnic group, addressing the inheritance version. The *Matrilineal* $\times$ *Sisters* coefficient is essentially unchanged in both. The story also makes a sharper prediction the data rejects: brothers are same-generation matrilineal co-claimants too, so more brothers should also lower the woman's per-claimant share and her fertility. The observed null on *Matrilineal* $\times$ *Brothers* in Table 5 is inconsistent with this prediction.

Patrilocal co-residence and shared childcare. Patrilineal societies tend to be patrilocal: a wife resides near her husband's brothers, who could share childcare in a way that substitutes for her own childbearing. This story can rationalize the patrilineal husband's-brothers result but not the matrilineal sisters result: matrilineal societies in the sample are predominantly virilocal, so sisters rarely co-reside with the respondent. To confirm that the matrilineal sister effect operates net of residence patterns, I add a patrilocality indicator as a control; the coefficient is again essentially unchanged.

Differential male bargaining power. If ancestral beliefs proxy for traditional gender norms more broadly, the kinship interaction could reflect differential male authority over reproductive decisions rather than lineage continuation (Lowes, 2022). But bargaining power should shift the *level* of fertility, not its *interaction* with sibling sex composition, and so does not naturally generate the four-way pattern. More directly, the spousal-preferences test in Table 3 (column 4) documents the precise asymmetry the lineage theory predicts and bargaining-power accounts cannot: husbands want more children than their wives in patrilineal-ancestor groups, but *fewer* in matrilineal-ancestor groups. Controlling for a wife-beating-justification index and an indicator for whether the respondent currently works — both proxies for women's bargaining power — leaves the *Matrilineal* $\times$ *Sisters* coefficient unchanged.[65]

[65]Proxies using decision-making variables are worse in this context since they are only available for a sub-sample of women.

6.3. *Additional implications: Ancestral beliefs and social organization*

As suggested by the results showed in the previous section, underlying the relationship between ancestors and fertility is the more fundamental institution of lineage, which plays 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?

I explore this question by making use of the distinction between lineage-based and age-based societies (Moscona and Seck, 2024).[66] 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 a weaker 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.[67]

Table H1 in Appendix H shows the results. Although the estimates are less precise due to the reduced sample size, I find suggestive evidence that the positive influence of ancestral beliefs on fertility is stronger in kinship-based societies as compared to age-based societies.

7. Conclusion

Fertility is collapsing globally, in many places faster than expected, rising as one of the world's most pressing problems and creating new challenges for economic growth

[66] 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. Although ancestors are mainly concerned with the reproduction of the lineage, beliefs in ancestors also exist in age-set societies. First, because 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. 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.

[67] 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).

and social stability (Bhattacharjee et al., 2024; Maestas et al., 2023). The limitations of existing theories in understanding fertility decline suggest room for complementary explanations that consider the importance and evolution of religious and cultural beliefs and practices. In this regard, the study of traditional religious and cultural beliefs in sub-Saharan Africa, the region with the highest fertility rates and slower fertility decline, which have been extremely understudied, may provide us with important insights to better understand fertility patterns.

This paper examines the importance of deep-seated cultural norms, rooted in traditional beliefs, in explaining fertility rates in sub-Saharan Africa. I examine the role played by the belief in the influence of ancestors, a belief system that emphasizes ancestry and descent and the importance of continuing one's lineage (Lesthaeghe, 1989; Caldwell and Caldwell, 1987, 1988, 1990; Caldwell et al., 1992). I document and test the hypothesis that ancestral beliefs, which places great emphasis on the continuation of the family line and reinforces multigenerational family obligations, contributes to sustain high fertility rates. I find a positive association between beliefs in ancestors and fertility in different contexts and time periods, that holds across ethnic groups, individuals within regions and villages, and across migrants who live in the same city but come from places that differ in the practice of ancestor worship.

Then, I demonstrate how the positive correlation between ancestral beliefs and fertility is connected to the value placed on perpetuating one's lineage. To accomplish this, I test two main predictions derived from a simple model that captures the motive to continue the family line. First, I demonstrate that the influence of ancestral beliefs on fertility depends on the kinship system because the importance of this motive varies. I find that ancestral beliefs have a stronger positive effect on fertility in patrilineal societies, where the father's children continue his lineage and wives integrate the husband's lineage upon marriage. In these societies, having children continues the family line of both spouses. In contrast, in matrilineal societies, the father does not belong to his wife's lineage, and children belong exclusively to the mother's lineage. Thus, there is no motive for men to continue the family line with their own offspring.

Second, I identify specific free-rider behavior among siblings that depends on the kinship system. Specifically, I show a negative relationship between one's own fertility and the number of family members who can continue the family line with their own children. In matrilineal societies with strong ancestral beliefs, fertility decreases with the number of sisters (but not brothers), while in patrilineal societies with strong ancestral beliefs, fertility decreases with the number of men in the household who can continue the lineage (but not with the number of women).

These findings provide insights into the determinants of fertility by highlighting the

potential role that culture and religious beliefs may play. In this regard, an interesting avenue for future research is to examine whether recent changes in the social fabric and culture of societies (e.g., the high and increasing individualism, the dominance of nuclear families, the absence of cooperative parenting, or the transformation of childbearing from a shared social duty to a personal choice) has affected the (faster than expected) fertility collapse in other parts of the world; or to examine whether factors that contribute to the dissolution of traditional beliefs systems such as New Christian "post-colonial" churches (Alvarez-Aragon et al., 2026a) will contribute to accelerate fertility decline in sub-Saharan Africa.

A further implication of these findings concerns the design and evaluation of fertility-related interventions in sub-Saharan Africa. If ancestral beliefs constitute the spiritual and moral foundations of the *wealth-in-people* principle (Iliffe, 1987; Vansina, 1990; Guyer, 1995; Robinson, 2026), then children are not merely a source of old-age support or productive labor: they are the substance of wealth in this life and in the next, and the very means by which the lineage is reproduced. Within this moral economy, having children is a normative responsibility rather than a purely private choice, and lower fertility is, by construction, lower wealth. Fertility-reducing interventions that are designed outside this context and that take "less is better" as self-evident therefore risk being not merely ineffective but welfare-reducing when evaluated against the outcomes that local populations themselves value (Moscona et al., 2026). A corollary is that any sustainable change in fertility behavior in sub-Saharan Africa is unlikely to come from supply- or information-side interventions alone: it will require engaging seriously with the religious and moral systems that underlie reproduction in the region.

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Online Appendix

Paths *to* the Rainforests: Ancestral Beliefs and Fertility in Sub-Saharan Africa

May 27, 2026

Appendix Contents

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A. Prevalence of ancestral beliefs in SSA

As noted by Caldwell and Caldwell (1987), ancestor worship is not historically unique to SSA, and 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.[68] The most prominent example outside SSA is South Asia, especially China, where it has been shown to influence fertility and son preference historically and today (Ahern, 1973; Hu, 2016; Hu and Tian, 2018; Zhang, 2024).[69]

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).

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, 1965, 1985; Platteau, 2000). Collective farms based on production activities such as shifting cultivation are efficiently managed by extended families or lineages. As population density increases and land becomes scarce, private property rights tend to emerge and family structures shift towards the conjugal family, diluting lineage-based organization (Platteau, 2000; Guirkinger and Platteau, 2014). 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: "[...] 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 patterns 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

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

[69] Other ancient societies, such as the Greeks, did not develop ancestor worship but rather a cult of the dead. Catholic societies have a cult of the saints and organize masses for the dead, but they are not considered to be ancestor worshippers (Fortes, 1965). 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.

and the emphasis on descent are higher in SSA than in any other region of the world. In this framework, ancestor worship provides the moral foundations 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, 2019b).

Finally, historical and institutional factors specific to SSA have traditionally favored the reproduction and persistence of cultural traits over time (Platteau, 2009). 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 during 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. [70]

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). With respect to beliefs in ancestors, Igboin (2022) and McCall (1995) highlight that, although ancestors remain a central feature of many 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.

B. Variable definitions

B.1. Ethnicity-level variables

B.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).

[70] 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).

B.1.2. Ethnographic Atlas:

Domestic organization around extended families: is based on variable 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 group's 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.

B.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 group's 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 Organization's 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 FAO's 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 location's ancestors.

C. 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:

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. 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. The budgetary survey contains information on household expenditures and transactions for 1/50 of the households identified in each city.

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). The original survey includes around 210.000 individuals in about 45.000 households. However, only 50.000 individuals in 11.000 households could be recovered from the UCLouvain archives. To the extent of my knowledge, the rest of the EDOZA sample is lost.

D. Ancestral beliefs and fertility in southern Benin

D.1. Effects on women and complementarity between spouses

Tables D1 (D2) present the estimates of equation 1 for men (women) when using only the beliefs of the husband (wife) as explanatory variable. Finally, Table D3 shows the results of regressing male fertility on both husband and wife's beliefs. The same set of control variables as in Table D1 are included. The results show a systematic positive relationship between beliefs in ancestors and fertility, particularly strong when both spouses hold ancestral beliefs.

Table D1: 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***	1.514***	1.460***	1.267***	1.152***
	(0.379)	(0.345)	(0.348)	(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.

Table D2: Woman's beliefs in ancestors and female fertility in Benin

	Total number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.570***	0.423***	0.392***	0.630***	0.460***	0.430***
	(0.155)	(0.139)	(0.138)	(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
R-Squared Y	0.0139	0.237	0.256	0.0455	0.254	0.274
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. 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 D3: Spouses' beliefs in ancestors and male fertility in Benin

	Total 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
R-Squared Y	0.0459	0.219	0.233	0.0752	0.249	0.261
N	846	832	832	841	830	830

scriptsizeNOTE. First-hand data collected in southern Benin. The sample is restricted to men. 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.

D.2. Poisson model and Alternative explanatory variables

Table D4: Ancestors and female fertility in Benin, Poisson regression

	Total number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.135***	0.114***	0.111***	0.149***	0.125***	0.125***
	(0.0310)	(0.0284)	(0.0278)	(0.0345)	(0.0317)	(0.0311)
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 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 both spouses 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, access to electricity and education. Extended controls include the number of agricultural fields, TV ownership, participation in a program to encourage the production of pineapple. 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 D5: Ancestors (alternative measure) and female fertility in Benin

	Total number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.483***	0.428***	0.401***	0.559***	0.486***	0.485***
	(0.161)	(0.144)	(0.141)	(0.172)	(0.155)	(0.152)
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
R-Squared	0.0103	0.243	0.263	0.0439	0.265	0.286
N	846	840	840	846	840	840

NOTE. Data: First-hand data collected in southern Benin. The sample is restricted to women. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if both spouses answer *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. 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 D6: Ancestors (combined measure) and female fertility in Benin

	Total number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.486***	0.442***	0.423***	0.568***	0.504***	0.511***
	(0.160)	(0.142)	(0.139)	(0.173)	(0.155)	(0.152)
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
R-Squared	0.0106	0.244	0.264	0.0444	0.266	0.287
N	846	840	840	846	840	840

NOTE. Data: First-hand data collected in southern Benin. The sample is restricted to women. The outcome variable is the total number of children ever born. "Ancestral beliefs" is a dummy variable that equals one if both spouses answer *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. 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.

D.3. Number of alive children

Table D7: Beliefs in ancestors and alive number of children in Benin

	Total number of alive children					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.475***	0.424***	0.410***	0.595***	0.525***	0.526***
	(0.149)	(0.142)	(0.141)	(0.157)	(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	4.759	4.751	4.751	4.759	4.751	4.751
R-Squared Y	0.0122	0.204	0.206	0.0395	0.221	0.231
N	838	832	832	838	832	832

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 alive at the time of the survey. "Ancestral beliefs" is a dummy variable that equals one if both spouses 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. 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.

D.4. Specification curves: sensitivity to additional controls

Under random assignment, point estimates should not dramatically change after the inclusion of control variables. In this sense, low sensitivity to the inclusion of control variables may reduce concerns about omitted variable bias. 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:

Pressure from extended family to have children: To reduce concerns related to the fact that the measure of ancestral beliefs may be capturing the importance of extended family networks and the prevalence of clan-based relationships, I include an indicator for having experienced pressure from his/her extended family to have children.

Polygyny: Since I am focusing on married couples, polygyny is an important factor to consider. In fact, about 60% of men who report having 10 or more children are polygynous.Polygyny was not included 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, p.13) 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"

Husband's father practices Vodoun: To proxy for parental preferences for children and aspects related to the traditional practices of the family, I include an indicator equal to one if the husband father's main religion is Voodoo.

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.

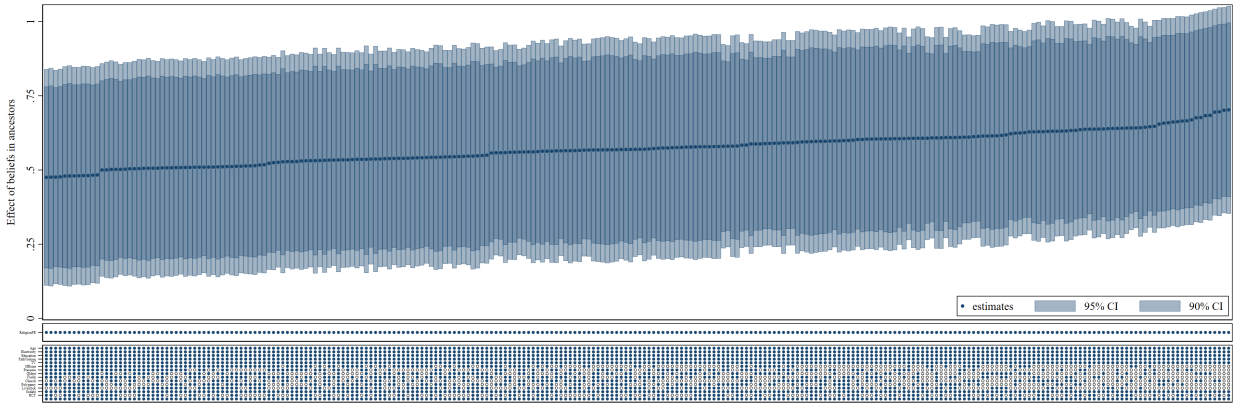
Money to church for protection against COVID: I try to account for strong religiosity (beyond the inclusion of religion fixed effects) by looking at whether the respondent has donated some money to his church for protection against COVID (average is 14%).

Drinking sodabi for protection against COVID: I proxy for the strength of other traditional practices (not related to beliefs in supernatural powers) by measuring the subjective effectiveness of traditional medicine. I include an indicator that equals one if the respondent drank a traditional alcoholic drink (sodabi) for 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.

Husband is the 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's husband is the oldest sibling (among those from the same mother).

Figure D1: 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 husband's father is Voodoo 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 for protection 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) for protection against COVID.

D.5. 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. Although the number of children is an increasing function of age (though at a decreasing pace), the share of women believing in ancestors is rather constant. In Table D8 I show that adding age fixed effects does not change the results.

Table D8: Ancestral beliefs, female fertility, and age fixed effects

	Total number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.750***	0.714***	0.710***	0.825***	0.728***	0.749***
	(0.178)	(0.165)	(0.161)	(0.198)	(0.184)	(0.181)
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	5.356	5.356	5.365	5.356	5.356
R-Squared Y	0.0206	0.296	0.315	0.0534	0.316	0.335
N	846	832	832	846	832	832

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 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. 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.

D.6. Partible vs Impartible inheritance

Differences in inheritance rules may have an influence on fertility behavior. 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). Moreover, impartible inheritance may be correlated with ancestral beliefs. Chu (1991) has shown that impartible inheritance may emerge in traditional societies as the family's head optimal policy when the objective function is the continuation of the family line, which is important in societies with strong ancestral beliefs.

I conduct two different tests to rule out the possibility that differences in inheritance rule are driving the results. First, I identify which ethnic groups traditionally practiced impartible inheritance.[71] I show that the results remain unchanged when I include ethnicity fixed effects. Although there is positive correlation between ancestral beliefs and impartible inheritance (column 1, Chu 1991), the importance of impartible inheritance

[71] Fon and Adja, while Yoruba was characterized by partible inheritance.

disappears in a horse race with ancestral beliefs. These results suggest that, although impartible inheritance and the motive to continue the family line may be related, the positive influence on fertility is due to the latter in this context.

Table D9: Beliefs in ancestors, female fertility, and ethnicity fixed effects

	Total number of children ever born					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.825***	0.696***	0.701***	0.896***	0.719***	0.728***
	(0.198)	(0.180)	(0.177)	(0.202)	(0.184)	(0.181)
Baseline controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Religion FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.365	5.352	5.352	5.366	5.353	5.353
R-Squared Y	0.0534	0.272	0.292	0.0586	0.275	0.295
N	846	840	840	844	838	838

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 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. Religion fixed effects includes five categories: Vodoun, Roman Catholic, Evangelic, Celeste and other. Ethnicity fixed effects include Adja, Fon, Yoruba and Other. Robust standard errors in parenthesis. *** for p<0.01, ** for p<0.05, * for p<0.1.

Table D10: Beliefs in ancestors, impartible inheritance, and fertility

	Impartible inheritance	Total number of children ever born		
	(1)	(2)	(3)	(4)
Ancestral beliefs	0.0664***		0.878***	0.722***
	(0.0174)		(0.214)	(0.191)
Impartible inheritance		0.225	-0.0388	0.203
		(0.241)	(0.276)	(0.234)
Controls	No	No	No	Yes
Religion FE	Yes	Yes	Yes	Yes
Mean Y	0.926	5.302	5.323	5.312
R-Squared Y	0.152	0.0316	0.0565	0.302
N	767	860	767	763

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 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?*. "Impartible inheritance" equals one if the respondent's ethnic group practiced impartible inheritance. 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.

D.7. 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 afterlife 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 afterlife. 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 D11: Ancestral beliefs, female fertility, and land ownership

	Total number of children ever born			
	(1)	(2)	(3)	(4)
Ancestral beliefs	0.701***	0.696***	0.716***	0.695***
	(0.177)	(0.177)	(0.177)	(0.177)
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
R-Squared Y	0.286	0.286	0.293	0.286
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. "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?*. Controls include age, age squared, whether the household has electricity, education, whether the household owns a TV. "Area fields" includes the area in squared meters of owned and rented fields. "Number fields" includes the number of owned and rented fields. 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.

D.8. Robustness Tests for Selection on Unobservables

I assess robustness to omitted-variable bias using three sensitivity diagnostics. The first is the Altonji et al. (2005) ratio, which divides the coefficient from the fully controlled regression by the change in the coefficient when controls are added (the uncontrolled minus the controlled estimate). It gauges how much stronger selection on unobservables would need to be, relative to selection on observables, to drive the estimated effect to zero; values well above one indicate that implausibly strong unobserved confounding would be required.

Oster (2019) sharpens this logic by tying coefficient movements to movements in R^2 and requiring two explicit inputs: δ, the relative degree of selection on unobservables versus observables (with $\delta = 1$ as the standard upper bound), and $R^2_{\max}$, the maximum

R^2 achievable with the full set of relevant controls (I follow Oster (2019)'s recommendation of setting $R^2_{\max}$ to 1.3 times the R^2 from the controlled regression). Given these inputs, Oster derives a bias-adjusted treatment effect that scales the controlled coefficient down by the residual coefficient movement that selection on unobservables would induce, weighted by the gap between the maximum and controlled R^2 relative to the gap between the controlled and uncontrolled R^2. The critical value δ^* that drives this adjusted effect to zero provides a scalar measure of robustness.

Masten and Poirier (2026) and Diegert et al. (2026) address two limitations of the AET–Oster framework: it presumes the observed controls are exogenous, and its sensitivity parameter is built from R^2 movements rather than a direct causal object. Their breakdown point $\bar{r}_X^{bp}$ is defined symmetrically in the treatment-selection equation as the largest ratio of the standard deviations of the unobserved and observed indices for which the identified set for β_{long} still excludes zero. The conservative version reported in the tables allows the observed controls to be arbitrarily endogenous and imposes no restriction on the unobservable's effect on the outcome, yielding a particularly demanding diagnostic that is directly comparable to the relative explanatory power of the controls already included.

E. Democratic Republic of Congo: Robustness

E.1. Regression model

The equation I estimate takes the following form (with small variations depending on the specification). Let i denote individuals, e denote ethnicity, and c denote city of residence.

$$Y_{iect} = \beta_0 + \beta_1 AncestralBeliefs_e + X_i'\Phi + \alpha_c + \epsilon_{iect} \tag{6}$$

Where Y_{iect} is a fertility outcome, $AncestralBeliefs_e$ is an indicator that equals one if the respondent belongs to an ethnic group that traditionally practiced ancestor worship. X_i' is a vector of individual-level control variables such as age, age squared, urban/rural place of residence, education, indicator for migrant, whether respondent's father is alive, employment status, whether the respondent works in agriculture (only available for the urban sample), and year of installation in the current city. Finally, α_c denotes city of residence 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.[72]

[72] In this setting, I can 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).

The presence of city of residence fixed effects means that the influence of ancestor worship is identified by comparing respondents living in the same place (and therefore facing the same supply constraints) but who migrated from different areas and have different belief systems.

E.2. Age-specific fertility rates

Using birth calendars, I reconstruct the number of births at ages 35, 40, and 45.

Table E1: Ancestral beliefs and age-specific fertility in the DRC

	Births at 35			Births at 40			Births at 45		
	All	EDOZA	Urban	All	EDOZA	Urban	All	EDOZA	Urban
	(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
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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 practices 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.

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

Table E2: Ancestral beliefs and fertility in the DRC, Poisson regression

	Total number of children ever born					
	Full sample		EDOZA		Urban sample	
	+30	+40	+30	+40	+30	+40
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestral beliefs	0.188***	0.249***	0.218***	0.284***	0.186***	0.276***
	(0.0434)	(0.0533)	(0.0731)	(0.0651)	(0.0358)	(0.0622)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.322	5.080	4.865	4.693	5.542	5.359
N	23194	12435	7551	5207	15643	7228

Note. Data: Urban Demographic Survey of 1970s and EDOZA (rural and urban areas). Columns 1 and 2 combine both the Urban Demographic survey and EDOZA. Columns 3 and 4 use only the EDOZA sample. Columns 5 and 6 use only the urban sample. In columns 2, 4, 6, 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. "Ancestral beliefs" is an indicator equal to one if the ethnic group practiced ancestor worship before European colonization. Controls include age, age squared, urban/rural place of birth, 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 fixed effects are included for the urban sample and region fixed effects included 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 E3: Ancestral beliefs and fertility in the DRC, extensive vs intensive margin

	Total number of children ever born					
	Full sample		EDOZA		Urban sample	
	Has children (1)	Number of children (2)	Has children (3)	Number of children (4)	Has children (5)	Number of children (6)
Ancestral beliefs	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
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Extensive margin	Yes	No	Yes	No	Yes	No
Mean Y	0.882	6.036	0.840	5.793	0.902	6.146
R-Squared	0.112	0.214	0.151	0.196	0.0937	0.240
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 practices 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.

E.4. Unobserved human capital

A potential concern is that societies where ancestor worship is important were less receptive to missionaries, lowering the human capital of the ethnic network and affecting marriage or employment prospects. If unobserved human capital accounted for part of the results, it should be reflected in wages. Using an expenditure survey covering 1/50 of the households in the same seven cities of the 1970s Urban Demographic Survey, Table E4 regresses wages on ancestor worship and a vector of controls, including education. Ancestor worship is insignificant in every specification, ruling out unobserved human capital as a driver of the fertility results.

Table E4: Ancestral beliefs and unobserved human capital in post-colonial DRC

	Pseudo-Poisson Maximul Likelihood	OLS estimates	
	Total wage (1)	Log(1+ total wage) (2)	Total wage (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.

E.5. Exposure to missionary presence

The 1970s datasets do not contain information on religious beliefs, yet the rapid expansion of Christianity in the DRC went hand in hand with missionary activity that may have weakened family and ethnic lineages and emphasized universal over kin-centered moral values such as reverence to ancestors (Platteau, 2009; Reybrouck, 2014; Bergeron, 2025), while also affecting education (Alvarez-Aragon et al., 2025) and fertility (Guirkinger and Villar, 2022).[73]

Using the West Zaire Demographic surveys and mission data from Guirkinger and Villar (2022) and Alvarez-Aragon et al. (2025), I construct a territory-year measure of exposure to Christian missions opened between 1885 and 1948, assigned to each respondent born before 1948 according to year of birth.[74]

Table E5: Ancestral beliefs, missions, and age-specific fertility in the DRC

	Births at 35			Births at 40			Births at 45		
	All	EDOZA	Urban	All	EDOZA	Urban	All	EDOZA	Urban
	(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
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	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 practices ancestor worship. Details on how exposure to missions is constructed can be found in the corresponding section. 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.

[73]The relationship between missionaries and ancestor worship is contested: some argue Christian and Islamic doctrines prohibited it, while others note ancestor worship was often tolerated as a cultural rather than religious practice (Caldwell and Caldwell, 1990; Olupona, 2014). Consistent with the latter, I find no correlation between being Catholic and ancestral beliefs in Benin.

[74]For each territory and year, I generate 1000 random points and compute the average distance to the closest mission, separately for Catholic, Catholic-with-nuns, and Protestant missions. I report negative log distances for ease of interpretation.

F. External validity: ancestors and fertility in different time periods and contexts

F.1. Ancestral beliefs and contemporary fertility in 19 Sub-Saharan African countries

F.1.1. Regression model

I estimate a similar model than in equation 1, but including country fixed effects and a different set of control variables that varies by specification. I measure ancestral beliefs at the individual and the regional level. I estimate the following equation, where i denotes individuals, r denotes regions, and c denotes countries:

$$Y_{ic} = \alpha + \beta AncestralBeliefs_{i(r)} + X_i'\Phi + \phi_c + \epsilon_{ic} \tag{7}$$

Y_{ic} is the total number of children ever born of individual i living in country c, $AncestralBeliefs_{i(r)}$ is the main explanatory variable. At the individual level, it is measured as an indicator that equals 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?*"). At the regional level, it is measured as the fraction of survey participants in a given region who answer "yes" to the aforementioned question. The vector X_i' contains an extensive set of individual-level covariates that vary according to the specification.[75] The analysis exploits within-country variation by including country fixed effects (ϕ_c). Robust standard errors are included in parenthesis.

Table F1: Ancestral beliefs and contemporary fertility in sub-Saharan Africa

	Number of children ever born							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral Beliefs	0.507***	0.248***	0.233***	0.172***				
	(0.0378)	(0.0302)	(0.0301)	(0.0292)				
Ancestral beliefs (region)					0.472***	0.611***	0.550***	0.335***
					(0.136)	(0.103)	(0.103)	(0.0995)
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	2.093	2.087	2.087	2.097
R-squared	0.0635	0.417	0.424	0.480	0.0559	0.415	0.422	0.478
N	22926	22791	22791	21997	23394	23258	23258	22386

NOTE. Data: PEW research forum 2008-2009 Survey. The outcome variable is the total number of children ever born. "Ancestral beliefs" 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?". "Ancestral beliefs (region)" is the regional prevalence of ancestral beliefs and it is set equal to the fraction of survey participants in a given region who personally believe in 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.

[75] These include age, age squared, gender, urban/rural place of residence, religion, education, marital status, and an indicator for self-reported economic well-being.

F.1.2. Robustness

The results are not driven by potential confounders such as overall religiosity, the importance of alternative traditional magico-religious beliefs, and are not sensitive to alternative definitions of the explanatory variable, to the inclusion of region fixed effects, or to alterative clustering of the standard errors.

Alternative definitions of "ancestral beliefs":

Table F2: Sacrifices to ancestors and contemporary fertility in sub-Saharan Africa

	Number of children ever born							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sacrifices to ancestors	0.332***	0.167***	0.149***	0.102***				
	(0.0370)	(0.0294)	(0.0294)	(0.0286)				
Sacrifices to ancestors (region)					0.636***	0.476***	0.493***	0.342***
					(0.161)	(0.123)	(0.122)	(0.117)
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	2.101	2.095	2.095	2.103	2.093	2.087	2.087	2.097
R-squared	0.0606	0.418	0.425	0.481	0.0560	0.415	0.421	0.478
N	22243	22115	22115	21361	23394	23258	23258	22386

Note. Data: PEW research forum 2008-2009 Survey. The outcome variable is the total number of children ever born. "Sacrifices to ancestors" 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?". "Sacrifices to ancestors (region)" is the regional prevalence of ancestral beliefs and it is set equal to the fraction of survey participants in a given region who personally believe in the influence of making sacrifices to 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 F3: Rituals or sacrifices to ancestors and fertility in sub-Saharan Africa

	Number of children ever born							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rituals or Sacrifices	0.393***	0.192***	0.180***	0.130***				
	(0.0350)	(0.0279)	(0.0278)	(0.0270)				
Rituals or Sacrifices (region)					0.703***	0.678***	0.681***	0.475***
					(0.139)	(0.107)	(0.107)	(0.103)
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	2.098	2.093	2.093	2.101	2.093	2.087	2.087	2.097
R-squared	0.0625	0.418	0.425	0.481	0.0564	0.415	0.422	0.478
N	21910	21783	21783	21077	23394	23258	23258	22386

Note. Data: PEW research forum 2008-2009 Survey. The outcome variable is the total number of children ever born. "Rituals or Sacrifices" is an indicator equal to one if respondent answers "yes" to at least one of the following questions: "Do you ever participate in traditional African ceremonies or perform special acts to honor or celebrate your ancestors?" or "Do you believe that sacrifices to spirits or ancestors can protect you from bad things happening?". "Rituals or Sacrifices (region)" is the regional prevalence of ancestral beliefs and it is set equal to the fraction of survey participants in a given region who personally conduct rituals to honour ancestors or believe in the influence of making sacrifices to 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.

Additional controls: region fixed effects and clustered standard errors:

Table F4: Ancestral beliefs and fertility in sub-Saharan Africa, region fixed effects

	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 F5: Ancestral beliefs and fertility in sub-Saharan Africa, alternative clustering

	Number of children ever born							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestral Beliefs	0.507***	0.248***	0.233***	0.172***				
	(0.0568)	(0.0382)	(0.0375)	(0.0374)				
Ancestral beliefs (region)					0.472*	0.611***	0.550***	0.335*
					(0.281)	(0.218)	(0.206)	(0.184)
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	2.093	2.087	2.087	2.097
R-squared	0.0635	0.417	0.424	0.480	0.0559	0.415	0.422	0.478
N	22926	22791	22791	21997	23394	23258	23258	22386

NOTE. Data: PEW research forum 2008-2009 Survey. The outcome variable is the total number of children ever born. "Ancestral beliefs" 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?". "Ancestral beliefs (region)" is the regional prevalence of ancestral beliefs and it is set equal to the fraction of survey participants in a given region who personally believe in 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.

Additional controls: religiosity and supernatural beliefs:

Religiosity is positively related to fertility (Hayford and Morgan, 2008; Herzer, 2019), so even with religious-affiliation fixed effects the results could be biased if ancestral beliefs correlate with residual religiosity. Table F6 shows that the coefficient is unchanged

after controlling for frequency of service attendance and the self-reported importance of religion, the two standard measures in the literature. A second concern is that alternative magico-religious beliefs also shape economic outcomes (Platteau, 2014; Le Rossignol et al., 2022). Table F7 shows that controlling for the use of traditional healers, belief in miracles, participation in initiation rituals, witchcraft, and knowledge of other traditional African religions does not affect the results, indicating that the proxies capture something specific to ancestral beliefs.

Table F6: Ancestral beliefs, religiosity, and contemporary fertility in sub-Saharan Africa

	Number of children ever born		
	(1)	(2)	(3)
Ancestor Worship	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
Basic 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 F7: Ancestral beliefs and fertility, controlling for other supernatural beliefs

	Number of children ever born									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ancestor Worship	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.

F.2. Ancestral beliefs and fertility in folklore

F.2.1. Regression model

Due to the presence of zeros in the dependent variable and the skewness in its distribution, 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).[76] I estimate the following model, where e indexes ethnicity:

$$Y_e = \exp\left(\alpha + \beta AncestralBeliefs_e + X_e'\Phi\right)\epsilon_e \tag{8}$$

Where Y_e is the share of folkloric motifs in the oral tradition of an ethnic group related to the word *birth* in the main specification, and $AncestralBeliefs_e$ is the share of folkloric motifs in the oral tradition of an ethnic group related to the word *ancestors*. The vector X_e' includes ethnicity-level controls: total number of motifs in an ethnic group's oral tradition, the number of publishers of the sources used to identify those motifs, and

[76] In their paper analyzing the 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). Table F9 shows that the results do not change when I estimate a linear regression model by ordinary least squares.

the earliest year of publication in the group's oral tradition (folklore controls); domestic organization around extended families and the presence of segmented communities and localized clans,[77] patrilineality, 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 (ethnographic controls). Finally, I also include tropical climate, precipitation, ruggedness, land quality (population-weighted), and agricultural suitability (geographic controls). Continent fixed effects are always included when I focus on the global sample. Appendix B provides a detailed description of how these variables were constructed.

Table F8: Ancestral beliefs and birth-related motifs in folklore, Poisson regression

	Share of motifs related to *birth*							
	Sub-Saharan Africa				Global			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestor worship	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. The outcome variable is the share of motifs related to "birth" in the oral tradition of an ethnic group. 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. Columns 1-4 restrict the sample to sub-Saharan African ethnic groups; columns 5-8 use the global sample with continent fixed effects. 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.

[77] 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.

F.2.2. Ancestral beliefs and fertility in folklore: robustness

Table F9: Ancestral beliefs and birth-related motifs: linear specification

	Share of motifs related to *birth*							
	Sub-Saharan Africa				Global			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestor worship	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
R-squared	0.308	0.317	0.390	0.398	0.185	0.190	0.182	0.188
N	407	407	307	306	1245	1245	951	862

Note. Data: Ethnographic Atlas and Folklore. The outcome variable is the share of motifs related to "birth" in the oral tradition of an ethnic group. The table reports OLS estimates. "Ancestor worship" is the share of motifs related to "ancestors" in an ethnic group's oral tradition. Columns 1-4 restrict the sample to sub-Saharan African ethnic groups; columns 5-8 use the global sample with continent fixed effects. 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 F10: Ancestral beliefs and fertility-related motifs in folklore

	Share of motifs related to *fertility*							
	Sub-Saharan Africa				Global			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ancestor worship	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. The outcome variable is the share of motifs related to "fertility" in the oral tradition of an ethnic group. 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. Columns 1-4 restrict the sample to sub-Saharan African ethnic groups; columns 5-8 use the global sample with continent fixed effects. 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.

F.3. Contraceptive use

Table F11: Traditional beliefs and contraceptive use in Benin DHS

	Currently (1)	Traditional (2)	Modern (3)	Ever (4)	Intention (5)	Fear side-effects (6)	AIDS witchcraft (7)
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.

Table F12: Ancestral beliefs and contraceptive use in the DRC

	Currently (1)	Traditional (2)	Modern (3)	Children condom (4)	Intention to use (5)	Fear side-effects (6)	Knowledge (7)
Ancestral Beliefs	-0.0258**	-0.0270**	0.00120	-0.0736***	0.0000178	0.0219**	0.000325
	(0.0129)	(0.0108)	(0.00586)	(0.0265)	(0.0204)	(0.00887)	(0.0226)
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	0.0974	0.0498	0.0516	0.0644	0.0935	0.0410	0.148
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 is a dummy equal to one if the respondent currently uses contraception (column 1), uses traditional contraception (column 2), uses modern contraception (column 3), thinks children should know about condoms (column 4), intends to use contraception in the future (column 5), fears side-effects of contraception (column 6), or does not know any modern contraceptive method (column 7). "Ancestral Beliefs" is a dummy variable that equals one if the ethnic group practices ancestor worship. Controls include age, age squared, survey year, 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.

G. Kinship structure, ancestral beliefs and fertility behavior

Table G1: Ethnic-level characteristics by kinship system

	(1) Matrilineal		(2) Patrilineal		(1)-(2) Pairwise t-test	
Variable	N/Clusters	Mean/(SE)	N/Clusters	Mean/(SE)	N/Clusters	Mean difference
Intensive agriculture	13597	0.000	13421	0.034	27018	-0.034
	24	(0.000)	30	(0.035)	47	
Precolonial development	13597	6.655	13421	6.793	27018	-0.137
	24	(0.206)	30	(0.261)	47	
Political complexity	13597	0.201	13421	0.293	27018	-0.092
	24	(0.112)	30	(0.140)	47	
Malaria Index	14855	12.640	19440	11.624	34295	1.015
	28	(1.067)	36	(1.228)	56	
Ruggedness	14855	51625.918	19440	64575.432	34295	-1.29e+04
	28	(10073.638)	36	(14165.482)	56	
Agricultural suitability	14855	0.314	19440	0.366	34295	-0.052
	28	(0.129)	36	(0.079)	56	
Land quality	14855	5.922	19440	5.678	34295	0.244
	28	(0.186)	36	(0.150)	56	
Rainfall	14855	1492.304	19440	1487.956	34295	4.349
	28	(83.805)	36	(39.736)	56	
Patrilocal	14855	0.032	19440	0.949	34295	-0.917***
	28	(0.021)	36	(0.030)	56	
Altitude	14855	0.475	19440	0.600	34295	-0.125
	28	(0.048)	36	(0.090)	56	
Coast	14855	0.180	19440	0.000	34295	0.180
	28	(0.125)	36	(0.000)	56	
River	14855	0.973	19440	0.852	34295	0.121
	28	(0.019)	36	(0.079)	56	
(Log) Population density	5311	1.428	6830	1.166	12141	0.263
	10	(0.672)	18	(0.333)	26	
High Gods	2462	1.941	10581	1.985	13043	-0.044
	9	(0.067)	18	(0.048)	23	

NOTE. Sample: DRC DHS (2007 and 2003-2014) and Ethnographic Atlas. The value displayed for t-tests are the differences in the means across the groups. "Intensive agriculture" equals one if the society practiced "intensive agriculture" or "intensive irrigated agriculture". "Precolonial development" describes the pattern of settlement of societies, and takes on the values of 1 to 8, with 1 indicating fully nomadic groups and 8 groups with complex settlement. "Political complexity" measures the number of jurisdictional hierarchy beyond local communities, ranging from no levels beyond local community to four levels beyond local community. "Malaria Index" measures the suitability of malaria in the ancestral ethnic homeland. "Ruggedness" is constructed as the average across points on a grid 1 kilometer apart within a country of an index of terrain ruggedness. "Agricultural suitability" is the fraction of land that is suitable for the cultivation of barley, wheat, rye, sorghum, foxtail millet, or pearl millet. "Land quality" is measured as a non-additive combination of climate constraints, soil constraints and terrain slope constraints. "Rainfall" is the average annual precipitation (mm). "Patrilocal" equals one if the dominant post-marital residence is patrilocal. "Altitude" is the mean altitude of the ancestral ethnic homeland. "Coast" equals one if the ancestral ethnic homeland. "River" equals one if there is at least one river in the ancestral ethnic homeland. "(Log) Population density" is the population density of the ancestral ethnic group estimated by Murdock. "High Gods" equals one if the society believes in the existing of a moralizing high god. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. Standard errors are clustered at the ethnicity level.

Table G2 shows that, on top of higher ideal family sizes in patrilineal societies with beliefs in ancestors, there is great heterogeneity by gender: while the influence of patrilineality is strong for men (0.8 additional children), its influence is close to 0 for women. This is consistent with the theoretical framework, since men's children continue the man's lineage only in patrilineal societies.

Table G2: Patrilineality, gender and ideal number of children by ancestral beliefs

	Ideal number of children					
	Full sample		Ancestors=1		Ancestors=0	
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal	0.530***	0.767***	0.668***	0.853***	-0.0734	0.152
	(0.140)	(0.165)	(0.195)	(0.220)	(0.271)	(0.379)
Female		-0.610***		-0.577***		-1.054***
		(0.0612)		(0.0628)		(0.257)
Patrilineal x Female		-0.350***		-0.275***		-0.323
		(0.0919)		(0.102)		(0.301)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	6.595	6.595	6.608	6.608	6.792	6.792
R-squared	0.223	0.223	0.238	0.238	0.167	0.167
N	36186	36186	29356	29356	4371	4371

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 has patrilineal descent. "Female" is a dummy variable that equals one if the respondent is a woman. Controls include age, age squared, survey year, 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.

G.1. Female fertility and siblings' gender across SSA

DHS sample–. Angola 2015; Burkina Faso 1998,2003,2010; Benin 1996, 2017; Burundi 2010, 2016; DRC 2007, 2013; Central African Republic 1994, Congo 2005, 2011; Cote d'Ivoire 1994, 2012; Cameroun 2004, 2011, 2018; Ethiopia 2000, 2005, 2011, 2016; Gabon 2012, Gambia 2013, 2019; Guinea 1999, 2005; Kenya 2003, 2008, 2014; Komoros 2012; Liberia 2007, 2013, 2019; Lesotho 2004, 2009; Madagascar 1997, 2008; Mali 1995, 2001, 2006, 2012, 2018; Mauritania 2020; Malawi 2000, 2004, 2010, 2015; Mozambique 2011; Nigeria 2008, 2013, 2018; Niger 1992, 2006, 2012; Namibia 1992, 2000, 2006, 2013; Rwanda 2005, 2010, 2014, 2019; Sierra Leone 2008, 2013, 2019; Senegal 1992, 2005, 2010; Sao Tome and Principe 2008; Eswatini 2006; Chad 1996, 2004, 2014; Togo 1998, 2013; Tanzania 2010, 2015; Uganda 2000, 2006, 2011, 2016; South Africa 1998, 2016; Zambia 1996, 2001, 2007, 2013, 2018; Zimbabwe 1999, 2005, 2010, 2015.

Table G3: Ancestral beliefs and free-riding behavior in patrilineal societies

	Total number of children ever born				
			Ancestors=1	Ancestors=0	Ancestors=1
	(1)	(2)	(3)	(4)	(5)
Nb eligible men	-0.336***	-0.338***	-0.282***	-0.758***	
	(0.0418)	(0.0409)	(0.0418)	(0.192)	
Patrilineal x Nb men	-0.109***	-0.0853**	-0.111***	0.0292	
	(0.0367)	(0.0370)	(0.0398)	(0.186)	
Nb eligible women					0.264***
					(0.0426)
Patrilineal x Nb women					0.138***
					(0.0512)
Province FE	Yes	Yes	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes	Yes	Yes
All controls	No	Yes	Yes	Yes	Yes
Mean Y	3.111	3.099	3.054	3.432	3.054
R-squared	0.641	0.647	0.660	0.598	0.660
N	12233	12049	9706	1515	9706

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 ancestral beliefs in columns 3 and 5, and to ethnic groups without ancestral beliefs 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. "Nb of eligible women" is the number of women aged 15-49 in the household. The total number of eligible people in the household is always included as a control variable. Basic controls include age, age squared, survey year 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.

Table G4: Female fertility, kinship system and siblings' gender across sub-Saharan Africa

	Number of children ever born		
	(1)	(2)	(3)
Matrilineal x Number sisters	-0.0199		
	(0.0070)***		
Matrilineal x Sisters' children		-0.0256	
		(0.0093)***	
Matrilineal x Number brothers			-0.0100
			(0.0068)
Individual controls	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes
Mean Y	3.034	4.223	3.034
R-squared	0.641	0.546	0.641
N	572342	56947	572342

Note. Data: 93 DHS waves from 37 sub-Saharan African countries with information on siblings. The sample is restricted to women. The outcome variable is the total number of children ever born. "Matrilineal" is a dummy variable that equals one if the ethnic group has matrilineal descent. "Number of sisters/brothers" is the number of sisters/brothers that the respondent has ever had. "Sisters' children" is the total number of children of the respondent's sisters. Individual controls include age, age squared, whether the respondent is catholic, single years of education, whether the DHS cluster is urban, and whether the respondent works in agriculture. Country-year fixed effects and matrilineal-year fixed effects are included. Standard errors clustered at the ethnic group-level in parenthesis. Robust standard errors in brackets. *** for p<0.01, ** for p<0.05, * for p<0.1.

Table G5: Ancestral beliefs and free-riding behavior across SSA

	Number of children ever born			
	(1)	(2)	(3)	(4)
Ancestral Beliefs (region)	0.331***	-0.264	0.305***	0.342***
	(0.0441)	(0.212)	(0.0599)	(0.0602)
Ancestral Beliefs x Patrilineal		0.562***		
		(0.215)		
Number of sisters			0.0303***	
			(0.00291)	
Nb of Sisters x Ancestral Beliefs			0.000248	
			(0.0114)	
Nb of Sisters x Ancestral Beliefs x Matrilineal			-0.332***	
			(0.102)	
Number of brothers				0.0319***
				(0.00288)
Nb of Brothers x Ancestral beliefs				-0.0116
				(0.0111)
Nb of Brothers x Ancestral Beliefs x Matrilineal				-0.0838
				(0.0950)
Country and year FE	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Mean Y	2.919	2.975	3.037	3.037
R-squared	0.602	0.599	0.630	0.630
N	775411	615759	379170	379170

Note. Data: 120 Country-waves from the DHS matched to regional-level ancestral beliefs constructed from the PEW 2008-2009 Survey. The outcome variable is the total number of children ever born. "Ancestral Beliefs (region)" is the fraction of PEW respondents in a given region who conduct rituals to honour ancestors or believe in the influence of making sacrifices to ancestors. "Patrilineal" and "Matrilineal" are dummy variables that equal one if the ethnic group is patrilineal or matrilineal. Controls include age, age squared, gender, a dummy variable that equals one if the respondent is christian, single years of education, whether the DHS cluster is urban, and whether the respondent works. Standard errors clustered at DHS cluster-level in parenthesis.*** for < 0.01, ** for < 0.05, * for < 0.1.

Table G6: Free-riding in matrilineal societies: robustness to alternative explanations

	Total number of children ever born									
	Baseline		Wealth		Inheritance		Empowerment		Patrilocality	
	Sisters (1)	Brothers (2)	Sisters (3)	Brothers (4)	Sisters (5)	Brothers (6)	Sisters (7)	Brothers (8)	Sisters (9)	Brothers (10)
Number of sisters	0.0457***		0.0436***		0.0390***		0.0472***		0.0450***	
	(0.0120)		(0.0120)		(0.0137)		(0.0122)		(0.0121)	
Matrilineal x Sisters	-0.0265*		-0.0262*		-0.0341**		-0.0276*		-0.0283*	
	(0.0155)		(0.0154)		(0.0171)		(0.0157)		(0.0158)	
Number of brothers		0.0390***		0.0379***		0.0450***		0.0397***		0.0396***
		(0.0122)		(0.0122)		(0.0145)		(0.0124)		(0.0124)
Matrilineal x Brothers		-0.00466		-0.00572		-0.0208		-0.00416		-0.00469
		(0.0154)		(0.0154)		(0.0174)		(0.0155)		(0.0157)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional control	None	None	Wealth	Wealth	Inheritance	Inheritance	Empowerment	Empowerment	Patrilocal	Patrilocal
Mean Y	3.048	3.048	3.048	3.048	3.025	3.025	3.085	3.085	3.034	3.034
R-squared	0.627	0.627	0.629	0.629	0.627	0.627	0.625	0.625	0.629	0.629
N	21437	21437	21437	21437	16383	16383	21097	21097	20819	20819

Note. Combined robustness checks for Table 5 (free-riding in matrilineal societies), restricted to the ancestors=1 subsample. Columns 1-2 reproduce the baseline specification (no additional control) for the number of sisters and the number of brothers respectively. Each subsequent pair of columns adds one robustness control to the baseline specification: Wealth (continuous DHS wealth-factor score, columns 3-4); Inheritance (dummy for matrilineal heirs inherit land, Ethnographic Atlas V74 codes 2 or 3, columns 5-6); Empowerment (wife-beating-justification index and currently-working dummy, columns 7-8); Patrilocality (dummy for patrilocal residence, Ethnographic Atlas V12 code 8, columns 9-10). Within each pair, the first column uses the number of sisters and the second uses the number of brothers as a falsification check. The Matrilineal x Sisters coefficient is expected to remain negative across the four robustness controls if the lineage-continuation channel is operative; the Matrilineal x Brothers coefficient is expected to remain null. Coefficients on the four robustness controls themselves are absorbed and not reported. Sample restrictions otherwise, controls, fixed effects and standard-error clustering are identical to Table 5.

H. Additional implications: ancestral beliefs and social organization

Table H1: Ancestral beliefs and contemporary fertility: lineage-based vs. age-based societies (Kenya)

	Number of children ever born					
	Full sample		Age>24		Number of children > 0	
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestor Worship	0.741**	0.328	0.861**	0.720**	0.895***	0.538*
	(0.354)	(0.248)	(0.389)	(0.330)	(0.306)	(0.308)
Ancestor Worship 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, restricted to Kenya. The outcome variable is the total number of children ever born. "Ancestor Worship" 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?" "Age-based" is a dummy variable that equals one if the respondent belongs to an ethnic group classified as age-based by Moscona and Seck (2024). Controls include age, age^2, sex, whether the individual lives in a urban or rural area, religion, a dummy variable that equals one if the respondent has completed primary education, a dummy 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. Robust standard errors in parenthesis. *** for p<0.01, ** for p<0.05, * for p<0.1.

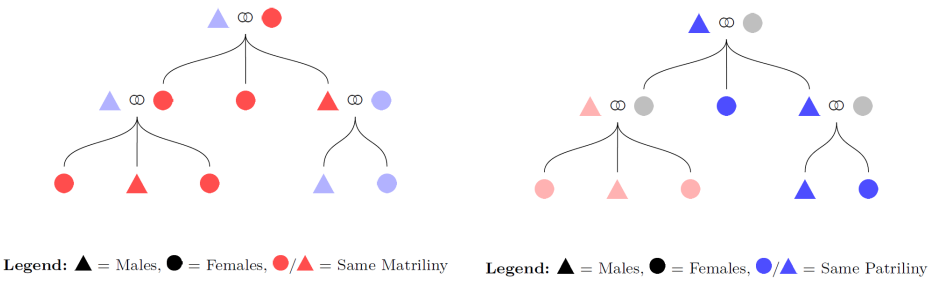
I. Background on kinship systems

Two persons are kin when one is descended from the other. However, kinship results from the recognition of a *social* relationship between parents and children. 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, kin includes individuals on maternal and paternal sides who may not be related to one another. On the other hand, descent groups in which one belongs exclusively to one's father's or mother's line are called *unilineal systems*. In unilineal descent groups, one's descent is traced either exclusively through male ancestors (patrilineal descent groups), or exclusively through female ancestors (matrilineal descent groups). 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 patrilineal 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 matrilineal son who marries maintains his birth lineage (in fact, inheritance often passes from the maternal uncle to his sisters' children). Figure I1 summarizes these differences:

Figure I1: Matrilineal and patrilineal kinship systems, from Lowes (2022)



Source: Lowes (2022). The figure shows the kinship structure of both patrilineal and matrilineal societies. The bracket over the triangle/circle indicates sibling-ship.

Alma Mater Studiorum - Università di Bologna

DEPARTMENT OF ECONOMICS

Strada Maggiore 45
40125 Bologna - Italy
Tel. +39 051 2092604
Fax +39 051 2092664
http://www.dse.unibo.it