Only women can whisper to gods:

Voodoo, menopause and women's autonomy[1]

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Abstract

In various parts of the world women gain autonomy as they get older. The reasons for this age-dividend and its cross-cultural variation remain largely unexplained. We hypothesize that part of the age-dividend in autonomy is rooted in beliefs regarding the supernatural powers of menopaused women. To test this hypothesis, we study the age-dividend in four West-African countries that include ethnic groups that practise(d) voodoo. Our empirical analysis relies on several rounds of DHS surveys, and a difference-in-differences strategy, in which we exploit the quasi-exogenous variation in the occurrence of menopause as well as the historical variation in supernatural beliefs across ethnicities. We find that (1) the age-dividend in women's autonomy is more pronounced in ethnic groups that practice(d) voodoo, (2) the menopause-dividend is only observed among women from these groups, and (3) it is especially large for women whose husbands believe in witchcraft.

Keywords : Beliefs, gender norms, women's autonomy, intra-household decision making.

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1. Introduction

After decades of advocacy, empowering women is now firmly established as the fifth Sustainable Development Goal "Achieve gender equality and empower all women and girls".[4] Underlying this aim is the recognition not only of the intrinsic value of gender equality, but also of its instrumental value. The 'business case' for women empowerment mainly builds on evidences of its positive impact on the uptake of family planning programs (e.g. Ashraf et al., 2014), children's health and nutrition (e.g. Duflo, 2003), and increased efficiency in household production (e.g. Goldstein and Udry, 2008).

However, in a review of the literature, Duflo (2012) concludes that empowering women is not the miracle solution that will bring instant economic development. For one, women's preferences do not always align (more than men's) with development goals. Second, in the face of sticky social norms, a one-shot intervention to boost one aspect of women's empowerment may have no favorable effect on economic development. A telling example is provided by Field et al. (2010), who find that the positive impact of a business training for women in India did not extent to Muslim women, because their restricted mobility prevented them from putting their knowledge to use.

This example illustrates what motivates this paper: designing effective female empowerment policies requires a thorough understanding of cultural norms, and how they apply differently to different women in society. In this paper, we focus on the variation of gender norms across age and ethnic groups in four West-African countries, and hypothesize that such variation is rooted in magicoreligious beliefs about the power of elderly women. More specifically, we hypothesize that this variation relates to the voodoo belief that menopaused women, so-called *tangninons*, can interact with the invisible world and derive supernatural power from this interaction. These alleged powers, in their turn, increase the bargaining power of elderly women in their

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communities and households. Alternatively, it could be that the belief in the supernatural has faded, but the cultural norm derived from it, i.e. increased awe for elderly women, persists.

To test our hypothesis, we rely on 14 Demographic and Health Survey (DHS) rounds from Nigeria, Togo, Ghana and Benin - which belong to the Gulf of Guinea that is home to four ethnic groups which practice(d) voodoo.[5] Our outcome variable is women's autonomy in decision-making, defined for about 19,500 women aged 15 to 49. We start from the observation that such autonomy increases with age, and that this age-dividend is stronger for women belonging to the four 'voodoo-ethnicities'. Then, we provide evidence for a menopause-dividend, that exists – on top of the age-dividend – only among women of voodoo-ethnicities. Since menopause is an exogenous shock, outside the control of the individual, this result indicates that the associated gain in autonomy is caused by 'something' that has to do with menstrual bleeding and is particular for voodoo-ethnicities. In support of the proposed '*tangninon*-mechanism', we show that the menopause-dividend is especially strong for women whose husbands belief in the intimate relation between the visible and invisible world and human agency herein, proxied by the self-reported belief that HIV-AIDS can be transmitted by witchcraft. To provide flesh to the bones, we complement our quantitative analysis with narratives from traditional leaders, voodoo priests and menopaused women, obtained through qualitative fieldwork in Benin.

In terms of contribution, we are – to the best of our knowledge – the first to specifically address the cross-cultural variation of the age-dividend in women's autonomy, and the first to quantitatively relate women's autonomy to cultural attitudes rooted in magicoreligious beliefs. While both voodoo and menopause are somewhat 'exotic' to the field of economics, our work constitutes a contribution to at least three strands of economic literature: (1) the individual-level determinants of female autonomy, (2) the (historical) origins of cross-cultural differences in gender norms, and (3) the economics of the supernatural. In addition, we speak to two important fields

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[5] While focusing on only four countries may reduce external validity, it has the advantage of minimizing high-level cross-cultural variation, that could otherwise confound the analysis since the concrete forms of menopause beliefs are shaped by the local cultures and by the context of everyday life (van de Grijspaarde et al. 2012).

outside economics: (4) the feminist literature on complex identities of African women, and (5) the anthropology of the supernatural and of menstruation. What we add transversally to these different strands is a specific focus on elderly women in Sub-Saharan Africa (SSA). This is a timely focus; as fertility declines and life expectancy increases, elderly women are making up an increasing share of the SSA population.

The next section briefly outlines the key aspects of these five strands of literature. In section 3, we provide background to the supernatural beliefs that prevail in the Gulf of Guinea. In sections 4 and 5, we present the data and our empirical framework, before discussing our results in section 6. Section 7 explores the underlying mechanisms driving our results and Section 8 concludes.

2. Literature

A large number of country case studies set out to identify the individual-level determinants of the autonomy of women vis-à-vis their husband (e.g. Anderson and Eswaran 2009, Azra Batool et al. 2017, Darteh et al. 2014, Fuseini and Kalule-Sabiti, 2016). In general, these studies find that age is a positive determinant of women's autonomy. Two cross-country studies confirm this general finding. First, in an analysis of DHS data from 58 countries, representing almost 80 percent of the female population of developing countries, Hanmer and Klugman (2016) find that age is consistently positively related to several measures of women's agency and empowerment. In a second study of DHS data from 23 different countries, Kishor and Subaiya (2008) conclude that *"the significant increase in decision-making alone with age is not explained away by any of the control variables, suggesting that aging directly and positively influences decision-making alone."* (p.22). Only a handful of studies devote attention to the underlying reasons for the age-dividend. Reviewing a number of such studies, Mason and Smith (2003, p.15) conclude that *"older women are argued to have more independence and empowerment than younger women because they have more experience with life, a better understanding of how to get what they want or need, a closer relationship with the husband, or because they have fulfilled certain social obligations to the husband and his family (for example, bearing children or sons) and thus are more trusted than are*

young wives, over whom tighter controls are maintained". Most of these reasons remain speculative, and – to the best of our knowledge – our paper constitutes the first attempt to empirically pin down an explanation for the age-dividend in women's autonomy.

By searching for an explanation in cultural differences across ethnic groups, we follow in the footsteps of a number of scholars who have empirically investigated cross-cultural variation in gender norms. For instance, Alesina et al. (2013) relate differences in present-day gender roles to the form of agriculture practiced in the pre-industrial period; Alesina et al. (2016) uncover the pre-colonial determinants of contemporary violence against women in Africa; while Fenske (2015) and Dalton and Leung (2014) study how polygyny in Africa today relates to colonial institutions and the intensity of the slave trades. Outside SSA, attention has focused among others on how the main monotheistic religions have affected cross-cultural gender norms, through centuries of religious socialization (e.g. Esping-Andersen 1999, Haddad and Esposito 1998). More generally, these studies belong to the strand of literature that highlights the stickiness of cultural norms, and hence the importance of considering such norms when discussing policies aimed at or premised on cultural change. To the best of our knowledge, we present the first quantitative analysis that relates the cross-cultural difference in gender norms to pre-colonial supernatural beliefs in Africa.

By doing so, we contribute to the small but growing economic literature that studies the impact of supernatural beliefs in SSA on social behavior, human well-being and development outcomes. Gershman (2016), for instance, demonstrates that witchcraft beliefs are correlated with mistrust, which may impede development; Platteau (2014) argues that the threat of witchcraft accusations discourages the accumulation of private wealth and entrepreneurship; Stoop et al. (2017) estimate a negative impact of voodoo-adherence on the uptake of biomedical preventive health care; Alonso Briones et al. (2016) study the role of voodoo in the management of the commons; Nunn and Sanchez de la Sierra (2017) study the role of supernatural beliefs in the armed conflicts in eastern Congo and argue that these beliefs help organizing community defense; and LeMay-Boucher et al. (2013) document large expenditures on magicoreligious protection by

households in Benin. These studies demonstrate that supernatural beliefs play an important role in various domains of development in SSA. We are the first to explicitly link supernatural beliefs to intra-household bargaining power of women, in particular elderly women.

While innumerable studies have looked at women of reproductive age, very little attention has gone to elderly women in SSA. Exceptions include Duflo (2003) and Edmonds (2006) who study the impact of pension schemes in South-Africa. On a completely different note, a well-known study by Miguel (2005) shows how, in Tanzania, especially elderly women fall victim to witchcraft accusations and killings in times of sharp income shocks – caused by drought or flood. Like Miguel, we study of the impact of magicoreligious beliefs on elderly women in SSA. But, whereas Miguel shows that – in times of great distress, in Tanzania – elderly women are the victim of their alleged supernatural powers, we argue that – in normal times, in the Gulf of Guinea - these powers provide them with agency.

Studying age in tandem with gender responds to a concern of the African feminist literature, that has long argued that the Western gender concept is alien to Africa. Instead, in most African societies, seniority is the key dimension of identity and status. When describing the Yoruba society in Southwestern Nigeria, Oyêwùmí (1997) argues that *"the fundamental organizing principle within the family is seniority based on relative age, and not gender"*. Thus, the person with the most seniority, regardless of gender, will assume the position of authority; and a woman's status in the extended family increases over time, as her age advances in relation to those around her. In addition, whereas the Western notion of man and woman is binary and inherent in nature, the African notion is fluid and highly situational and does not depend on body type, as aptly demonstrated in Amaduime's *"male daughters, female husbands"* (1987). Menopause can pose such a situational factor that disrupts the dichotomy of the man/woman categories. For instance, in her ethnographic study of the Beti society in South-Cameroun, Vincent (2003) argues that *"the menopause marks the access to a higher status : the menopaused woman is liberated from the submission to the man. She has become his equal ; she is 'like a man',*

as many informants put it".[6] Our study explores the intersectionality of gender, age and menopause, thus providing a quantitative test for the critique of a one-size-fits-all approach to gender in an African context.

Another non-economic strand of related literature is concerned with the relation between the supernatural and the agency of women. Regarding this relation, Igreja et al. (2008) describe the widespread prevalence of *gamba* spirits in post-war Mozambique. These are spirits of male casualties of the war that take possession of women's bodies and, by doing so, not only help process memories of the war but also improve the status of women who greatly suffer(ed) in the war and post-war context (p. 364-365) *"Contrary to everyday conjugal unions, in which the wife is expected to subordinate herself to the husband, in this case the husband must subordinate himself, via the spirit, to his wife… In this society, people who accommodate spirits are entitled to respect and power".* Also in various other African cultures, women possessed by spirits command respect, thus turning the usually assumed man-woman dichotomy upside down (Lewis 2003; Masquelier 2001). As we will further explain in the next section, menopausal women in voodoo-cultures are not thought to be possessed by a spirit, but are thought to be able to communicate with spirits, and therefore to harbor powers that command both fear and respect.

A final strand of related ethnographic literature is the rather extensive body of studies on the 'anthropology of menstruation'. In 'Blood magic', an edited volume on the topic, Buckley and Gottlieb (1988) start by acknowledging that *"the topic of menstruation has long been a staple of anthropology, for this apparently ordinary biological event has been subject to extraordinary symbolic elaboration in a wide variety of cultures."* Anthropologists have especially focused on rites of passage - menarche rituals in the case of girls, as well as on menstrual taboos.[7] The menopause has received much less attention, although there are a few noteworthy exceptions, such as Héritier-Augé (1998), and the above-

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[6] Authors' translation from French: " l'arrêt des règles marque l'accès à un statut supérieur : la femme ménopausée est libérée de la soumission à l'homme. Elle est devenue son égale ; elle est « comme un homme », disent beaucoup d'informatrices ».

[7] Stephens (1961) classified the menstrual taboos in five categories: those against menstrual blood as itself dangerous; those that require the isolation of menstruous women; those that prohibit menstrual sex; those that prohibit menstruous women's cooking; and a broad category of "other" taboos.

mentioned study by Vincent (2003) of the Beti society in South-Cameroun. This literature goes against the popular (Western) view of menstrual taboos as a sign of oppression and lower status of women (for such stereotyping see e.g. Weideger's 'Menstruation and Menopause', 1976). Instead, several ethnographers point to the benefits of those taboos for women, as well as the spiritual nature of the taboos, which suggest that they are part of wider religious systems with cosmological ramifications (e.g. Buckley and Gottlieb, 1988). With respect to this religious character, note that menstrual taboos are found both in Islam and Christianism.[8] While our paper is not directly concerned with menstrual taboos, we need to take note of such taboos, as they may provide a competing explanation for our findings. Indeed, it may be the lifting of such taboos that explains the increase in autonomy of menopaused women, rather than the actual positive effect of entering into menopause.

We will address this concern in the empirical analysis. Now we turn to a background section on the role and status of menopaused women in voodoo cultures, both as described in the literature and as revealed during qualitative interviews in Benin.

3. Background and hypotheses

African traditional religions are characterized by a continuum between the visible and invisible world. The invisible world includes the supreme being (God), but also lesser entities such as divinities, ancestors and spirits, who are believed to possess powers that can influence earthly life. These powers can be used by the spirits and ancestors themselves, but they can also be exploited by humans through sacred rituals, or witchcraft (Geschiere, 2013).

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[8] The Greek Orthodox Church upholds the taboo against menstruating women receiving Communion, while this taboo was abolished in the Roman Catholic in the year 597 (Wood 1981: 713-714, cited in Buckley and Gottlieb, 1988, p. 258). In Islam, Verse 222 of Sourate Al-Baqarah states the following about menstruation: *"It is a state of impurity; so keep away from women in the state of menstruation, and do not approach them until they are cleansed. And when they are cleansed, then come to them as Allah has commanded you. Truly, Allah loves those who abstain from evil and keep themselves pure"*. According to the Sunnah (the portion of Muslim law, based on the words and acts of prophet Muhammad, and preserved in the traditional literature) menstruous women should not pray (Sahih Al-Bukhari 333, Book 6, Hadith 37) should not perform the Tawaf around the Ka'bah during the Hajj (Sahih Al-Bukhari 305, Book 6, Hadith 10) and should not fast during Ramadan (Sahih Al-Bukhari 304, Book 6, Hadith 9).

Voodoo is the name of a relatively widespread and well-documented African traditional religion, that still remains vibrant today. The word Voodoo, also 'Vodun', stands for 'spirit', 'god' or 'deity'. Its etymology relates to the Ewe word *vo*, translated as hole or opening, and to the Yoruba term *du* or *odu* used to designate divination signs (Gilli, 1976)[9]. This word combination illustrates that voodoo originates from the meeting of the traditional Yoruba cult and the deities of the *Fon* and *Ewe* ethnic groups (Delanne et al., 2010). This meeting occurred during the creation of the Dahomey kingdom in the 17th century, in present-day Benin. Whenever the kings of Dahomey conquered land, they adopted its deities and religious chiefs (Bay, 1998; Soumonni, 2012).[10] As a result, voodoo evolved into a 'new' supra-clan religion and spread in tandem with the kingdom's expansion. In particular, during the incumbency of king Agadja (1708-1740), voodoo expanded eastward up to the Oyo kingdom in Nigeria, and westward up to Ghana's Ashanti kingdom.

Today, voodoo is practiced along the Gulf of Guinea in the coastal areas of Benin, Togo, Ghana, Nigeria and to some extent in Côte d'Ivoire (Lando, 2013). Macé (2005) labels the coastal area spanning eastern Ghana, Togo, Benin and western Nigeria as 'voodoo land'. The groups with historical homelands in this area include the Fon, Ewe, Adja and Yoruba, as well as smaller related groups, incl. the Gun, Toli, Ayizo, Xweda, Xwla, Popo, Waci and Gen (Delanne et al, 2010; Médiohouan, 1993).

Voodoo deities can be grouped in two main categories: *tovodun* that are collective deities and *hennu vodun* that are familial deities (Horton, 1983). *Tovodun* relate to different natural elements, such as the sea, the earth, or thunder. *Hennu vodun* are deified ancestors. After death, they turn into spirits who interact with the family or the clan. They are symbolised by *"the asen, which are moveable metal objects able to hold or affix spiritual entities."* (Bay, 2008, p.1). Each family keeps its ancestral *asen* representing its *hennu vodun* in a sacred space, called *deho*.

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[9] Cited in Norman (2009).

[10] Bay (1998: 22) notes that: *"Dahomeans were always on the alert for deities of proven capability. A vodun that worked well for another community would be welcomed. Immigrants, including war captives, often carried their vodun with them and installed them in Dahomey. Dahomeans were sometimes sent to neighboring areas to be trained as priests of new gods. Vodun even arrived as spoils of war".*

Every individual member of a family is supposed to visit the *deho* at least once annually during a ceremony called *de hiho nu asen* which is led by a menopaused woman, referred to as the *tangninon* (also *tassinon* or *tansinon*, literally meaning 'elderly aunt'). During *de hiho nu asen*, only she can transmit the prayers and vows (*de hiho*) of the family members to the ancestors and consult the oracle to see if the spirits have accepted the offering and sacrifices (fowl and sheep). Furthermore, on a daily basis, the *tangninon* venerates the family ancestors through special prayers and incantations (Adohouannon, 2015).

Each family has its own *tangninon*. She is chosen, among the family's menopaused women, by the oracle (*Fâ*), a complex divination system based on 256 figures and thousands of verses, which are memorized and interpreted by a diviner. [11] For the specific case of the *tangninon* choice, the presence of all important family members and other dignitaries of the locality is required to witness the sign revealed by the Fâ and cross-check its interpretation. [12]

To complement the thin literature on tangninon, the first author of this paper undertook qualitative fieldwork in southern Benin. [13] The fieldwork consisted of semi-structured interviews with 103 informants: 62 traditional leaders and voodoo priests (males, indicated below by M), 39

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[11] Fâ (or *Ifa* in Yoruba) is the most widespread system of divination in the Gulf of Guinea and among descendants of African slaves (Bascom 1991). The oracle transmits the messages of Mawu (the supreme being in voodoo), through 256 figures that are obtained either by manipulating sixteen palm nuts or by the toss of a chain of eight half seed shells. They are then interpreted based on thousands of memorized verses. Whenever one of the 256 figures manifests itself, the associated verses are cited by the diviner (Bascom, 1941 Mediohouan, 1993). The revealed figures are given to the client on a piece of paper or calabash which allows double-checking the interpretation (Tall, 1990). Because of the rigid set of rules for interpretation, and the possibility to cross-check, there is little room for manipulation or subjectivity (Bascom, 1991; Tall, 1990). The message transmitted through Fâ is not up for dispute because it "derives from the gods and is controlled by the gods", and therefore "Ifa divination shares the sanctity of the gods, and is reinforced by the sanctions which lie behind the faith directed toward religion in general." (Bascom, 1941, p. 44).

[12] All other extended family members may also witness the ceremony or otherwise ask for the revealed sign afterwards (narratives from our qualitative fieldwork). In exceptional cases the oracle chooses a non-menopaused woman (for instance when there is no menopaused woman in the extended family). In that case, it is strictly forbidden for the tangninon to perform the rituals during her menstrual period.

[13] The fieldwork took place in 17 different localities in six distinct zones of Benin, which are all part of 'voodoo land'. The localities were chosen based on the principle of attaining maximum variation across the urban-rural divide as well as across the four main ethnic groups that (historically) practice(d) voodoo. The first zone included Abomey, which is the capital of the former Dahomey kingdom, as well as two close rural localities, i.e. Cove and Zagnanando. Abomey as well as the surrounding area is dominated by Fon. The second zone was made up of Benin's main city, Cotonou, and the neighboring urban area of Abomey-Calavi. The third zone consisted of the historic slave port city Ouidah, where the voodoo cult is considered especially vibrant, and parts of its rural commune Kpomasse. The fourth zone included the capital city Porto-Novo, and proximate rural sites Avrankou and Dangbo in the South-East of the country. The fifth zone covered the South-West, including Lokossa, Se, Athieme, Dogbo, which are home to the Adja and Ewe ethnicities. Finally, Ketou, Sakete and Pobe were included as the historic homelands of the Yoruba in Benin. The semi-structured interviews were based on interview guides. In selecting the respondents, priority was given to chiefs and kings of the localities, to voodoo priests of the main voodoo convents and tangninons. The tagninons were contacted through the convents and subsequently by snowball sampling.

tangninons (indicated by T), and two professors at the Faculty of Sociology of the University of Abomey Calavi (Benin), both specialized in gender in Benin (indicated by P).

First of all, the interviews make clear that each extended family that keeps contact with its own *hennu vodun*, has a tangninon designated by the *Fâ*. In performing the rituals, the tangninon can be assisted by other women of the extended family. These women are almost always menopaused but they are not chosen by the Fâ, and have a less important role: *« Some families have many menopaused women to assist the tangninon in her duties but only the tangninon (the one chosen by the Fâ) serves as intermediary with the asen. [T6 : GD-Abomey-Tangninon] ; [M55 : DF-Ouidah-Dignitary] »*. The assistants may replace the tangninon in case of her absence or sickness. In this specific condition, their words and prayers are also sacred but remain less powerful compared to those of the tangninon: *« … Prayers and worships of the assistants may or may not come true. They do not bear the same sacrality as those of the tangninon chosen by the Fâ… [T29 : AH-Avrankou-Tangninon] »*, *« … The assistants have less supernatural power than the tangninon but they also know medicinal plants and can heal people. [M72 : KH-Calavi-Vodunon]»*.

The interviews confirm that the tangninon serves as an intermediary between family members and family ancestors and is believed to have supernatural powers. For instance: *« The tangninon is equipped with supernatural powers. Only she can talk to the ancestors and request their help, assistance and protection. And they respond to her worship and requests, not everyone can do that…[M8: MG-Abomey-Dah]»*. The respondents also stress the impact of the Tagninon on (mis)fortune in the family (e.g. infertility, illness) : *« Since ages, the tangninon has the power that her prayers are realized…[T25 : HA-Porto Novo-Tangninon] »*, *« The tangninon requests assistance of the asen or the hennu vodun to solve people problems. [T45 : AI-Kétou-Présidente Fétiches] »*, *« … we can heal sick persons with our prayers and supernatural powers. We just have to ask the asen or the vodun. [T34 : #- Sakété-Tassinon]»*

The dominant feelings of people vis-a-vis the tangninon (and her assistants) are fear and respect: *«People fear the tangninon [M5: DO-Abomey-Vignan]»*, *«Family members experiencing a hard time, misfortune or successive troubles often attribute it to the tangninon and to her assistants [T68 : LW-Dangbo-*

Tangninon]», «The tangninon might also use her supernatural powers to send witchcraft to people and harm their life. A very easy way is to give a forbidden meal or drink to the hennu vodun on behalf of the one she intends to harm.» (Adohouannon, 2015)., « The deference shown to the tangninon stems from her intermediary role and from the fact that whatever she requests to the asen will come true. [T17 : MS-Zangnanado-Tangninon]»

It is also stressed that tangninons enjoy a high status : «*Tangninon is the most important position that a woman can get in the extended family and in voodoo. No position is higher than that of tangninon because she is the one taking care of the ancestors; and the vodun protecting the family belong to the ancestors. [M4 : DG-Abomey-Dah]*», *« The tangninon is as important as the Dah [chief of the extended family, a male]. The only difference is that she is female. [T25 : HA-Porto Novo-Tangninon]»*. In this status, the tangninon is involved in all main social events, not only in her family, but also in the wider community: *« .... She is consulted by traditional leaders and dignitaries for all important matters or decisions affecting the village or the community life [M1 : AH-Abomey-Dignitaire]», « The tangninon is at the core of all social ceremonies, for example for the introduction of newborns to the extended family. She also serves as marriage counselor for all couples of the extended family [M28 : AG-Avrankou-Dignitaire]».*

According to the interviewees, the tangninon status also comes with greater involvement in decision making and autonomy at the household, extended family and community level. Particular attention is paid to the tangninon requests, wishes and recommendations : *«The tangninon's judgement or opinion is final. Nobody, even the Dah (head of the family, head of village, king) can challenge it (Delanne et al, 2011) », « … My opinion matters now in all important decisions or issues in the family and in my community. It was not the case before my designation by the Fâ as tangninon. I could not even attend or talk in certain audiences [T6 : GD-Abomey-Tangninon] ; [T9 : AG-Abomey-Tassinon] ».*

At the personal level, the enhanced social status is a source of pride and self-esteem. « … *The importance and the consideration that the family and the community give me as tangninon is a source of pride and joy. [T9 : AG-Abomey-Tassinon] »,* but the increased status comes with strings attached. The tangninon must be available to people and the worship to the *asen* can be time consuming: « … *In*

case of emergency or particular situations in the extended family, I have to give up my activities to fulfill my duties as tangninon [T16 : AL-Zangnanado-Tangninon] ».

In sum, our interviews reveal that the tangninon is believed to have supernatural powers that can influence her family members' destiny in one way or another; the tangninon is feared and enjoys respect; the status comes with several privileges, social importance and is a source of pride, self-esteem and self-fulfillment; it is said to come with greater involvement in decision making and autonomy both at household, extended family and community levels. Although the power and associated status is concentrated in the tangninon, other menopaused women may enjoy spill-over effects, for at least four reasons: (1) As assistants of the tangninon, they are in close communication with her and can therefore influence her actions; (2) the assistants may replace the tangninon in case of her absence or sickness; (3) each menopaused woman has a chance to be chosen by the Fâ as the successor of the tangninon, should the latter pass away; and – more indirectly - (4) the tangninon institution may have translated into a cultural norm that commands respect for menopaused women in general.

Informed by the literature and our qualitative findings, we hypothesize that women of voodoo ethnicities gain autonomy when they get older, and in particular when they enter menopause. As regards the underlying mechanisms, we propose three possible mechanisms: (1) there could be a general cultural norm at play commanding awe for elderly and menopaused women, or (2) the menopause-dividend could be due to a more narrow tangninon-effect rooted in the actual fear for the supernatural powers of the (future) tangninon and her assistants, or (3) it could be the case that the tangninon-effect passes through an income channel, with the tangninon and her assistants deriving a higher income from ceremonial functions and the associated larger social capital, which in its turn provides them with more intra-household bargaining power. We will tentatively test for the two latter channels in Section 7. The next section explains how we estimate and identify the menopause- and the tangninon-effect.

4. Empirical strategy

Our empirical strategy is based on a Difference-in-Differences (DiD) approach, in which we consider how women's autonomy varies across age and menopause-status, and how this variation differs by ethnic group.

To start with, we estimate the simple age-dividend in women's autonomy using the following equation :

$$(Eq.1) \ Autonomy_{hwm}$$
$$= \alpha_0 + \alpha_1 \ Woman \ age_w + \alpha_2 X_{hw} + \alpha_3 X_{hm} + \alpha_4 X_c$$
$$+ \alpha_5 X_h + \Delta Region_h + \nabla \ \text{DHS}_{year} + \varepsilon_{hw}$$

where h indicates household, m the husband and w the individual woman. $Autonomy_{hwm}$ is the autonomy index, that we further explain in the data section below; X_{hw} is a vector of woman-level characteristics that includes her years of schooling, her height and an indicator variable for her religion; X_{hm} is the set of husband-level characteristics comprising his years of schooling and an indicator variable for whether he lives together with the woman; X_c stands for the age difference between the man and woman in the couple, while X_h includes the household's residence area (urban/rural), and wealth quintile.[14] We also control for the administrative region[15] of residence of the household (Region$_h$) and for the year in which the DHS survey took place (DHS$_{year}$) to capture time trends across consecutive survey rounds.

Second, we turn to a first DiD equation to investigate whether there is cross-cultural heterogeneity in the effect of age on women's autonomy: :

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[14] For each round, DHS separates all interviewed households into five wealth quintiles based on their wealth index. The wealth index is a composite measure of a household's cumulative living standard. It is calculated using principal components analysis on easy-to-collect data on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities (Standard Recode Manual for DHS 6, 2013).

[15] The region of residence is country specific and generated as follows: (country code x 1000) + region code in the country. The insertion of region fixed effects makes country fixed effects superfluous.

$(Eq. 2)$ $Autonomy_{hwm}$

$$= \beta_0 + \beta_1 \, Woman \, age_w + \beta_2 Woman \, is \, voodoo \, related_w$$

$$+ \beta_3 Woman \, age_w * Woman \, is \, voodoo \, related_w + \beta_4 X_{hw} + \beta_5 X_{hm} + \beta_6 X_c + \beta_7 X_h$$

$$+ \Delta Region_h + \nabla \, DHS_{year} + \varepsilon_{hwm}$$

In this equation, the estimated coefficient β_3 on the interaction term indicates whether the age-dividend is different for women of voodoo-related ethnicities. The binary variable *Woman is voodoo related*$_w$ absorbs the cross-cultural difference in the level of autonomy averaged across all ages.

Third, we estimate the effect of menopause on women's autonomy, by means of the following equation:

$(Eq. 3)$ $Autonomy_{hwm}$

$$= \gamma_0 + \gamma_1 \, Woman \, age_w + \gamma_2 \, Menopause_w + \gamma_3 X_{hw} + \gamma_4 X_{hm} + \gamma_5 X_c + \gamma_6 X_h + \Delta Region_h$$

$$+ \nabla \, DHS_{year} + \mu_{hwm}$$

Menopause is a dummy variable taking the value 1 if the woman is menopaused[16] and 0 otherwise. Menopause is a quasi-exogenous event. It only weakly relates to a woman's behaviour, and in spheres that are unlikely to matter in the African context, such as hormonal treatment and smoking (Bromberger et al., 1997; Meschia et al. 2000). We will further demonstrate this in the results section, by regression menopause on a set of women characteristics.

Fourth, we turn again to a DiD specification, examining the coefficient on the interaction term between menopause and a dummy variable capturing whether the woman belongs to a voodoo related ethnic group. Concretely, the specification takes the following form:

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[16] The dummy variable for menopause is derived from the DHS variable v215 (time since last menstrual period). The response options include whether a woman is menopaused and the number of days/weeks/months since her last menstrual period.

$(Eq. 4)$ $Autonomy_{hwm}$

$$= \delta_0 + \delta_1 \, Menopause_w + \delta_2 Woman \ is \ voodoo \ related_w + \delta_3 \, Menopause$$
$$* Woman \ is \ voodoo \ related_w + \delta_4 Woman \ age_w + \delta_5 X_{hw} + \delta_6 X_{hm} + \delta_7 X_c + \delta_8 X_h$$
$$+ \Delta Region_h + \nabla \, \mathrm{DHS_{year}} + \vartheta_{hwm}$$

δ_3 captures the additional menopause-dividend in voodoo-cultures, which we argue to stem from magicoreligious beliefs.

Our identifying assumption in Eq. 2 and Eq. 4 is that, in the absence of the tangninon belief, the age- and menopause-dividend would be similar across voodoo and non-voodoo ethnicities. Any competing explanation should not merely have a level effect on female autonomy, but an effect that varies with age or menopause. One potential competing explanation could be that our menopause-dividend picks up the lifting of menstrual taboos, that constrain activities of younger women. We will counter this concern in the data section below, by showing that even younger women of voodoo-ethnicities enjoy more autonomy than their counterparts in non-voodoo ethnicities. While there are other differences between voodoo- and non-voodoo related ethnicities in terms of geographic location and social organization, it is hard to imagine how such differences could give way to a menopause-dividend. We will in any case compare the characteristics of across voodoo and non-voodoo related ethnicities and test for possible competing explanations, by adding interaction terms between these characteristics and menopause.

Finally, we add the interaction term $Woman \ age_w * Woman \ is \ voodoo \ related_w$ to Eq.4 in order to isolate the menopause-dividend and its additional voodoo-effect (or 'tangninon-dividend') from the more general age-dividend and its additional voodoo-effect. This gives the following:

$(Eq. 5)$ $Autonomy_{hwm}$

$$= \sigma_0 + \sigma_1 \, Menopause_w + \sigma_2 Woman \ is \ voodoo \ related_w$$
$$+ \sigma_3 \, Menopause * Woman \ is \ voodoo \ related_w + \sigma_4 Woman \ age_w$$
$$+ \sigma_5 Woman \ age_w * Woman \ is \ voodoo \ related_w + \sigma_6 X_{hw} + \sigma_7 X_{hm} + \sigma_8 X_c + \sigma_9 X_h$$
$$+ \Delta Region_h + \nabla \, \mathrm{DHS_{year}} + \tau_{hwm}$$

ε_{hw} , μ_{hw} , ϑ_{hwm} and τ_{hwm} are error terms.

We estimate the equations using a linear probability model. In all cases, we use heteroscedasticity-robust statistics and cluster error terms at household level to account for within-household correlation of the residuals. [17]

5. Data

Our database is a compilation of 14 DHS rounds collected throughout the period 1993-2014 in Benin (4 rounds), Nigeria (3 rounds), Togo (2 rounds) and Ghana (5 rounds). It encompasses information on 19,471 couples for which all variables of our econometric specification are available. Women in these couples are aged 15 to 49. The ethnic groups historically practicing voodoo - the Fon, Ewe, Adja and Yoruba - represent 32.8% of women in our analytical sample.

The DHS includes four survey questions on women's autonomy in decision making, which relate to the following areas: (1) the use of her own earnings, (2) her own health care, (3) visits to family or relatives, and (4) major household purchases. Each question had six response options regarding decision-making: respondent alone, respondent and husband/partner, respondent and other person, husband/partner alone, someone else, and others. For each area of decision-making, we created a binary variable that takes the value 1 for the first three responses that indicate the woman's involvement in decision-making, and 0 for the other response options. We then use principal component analysis to construct an *index* of the four binary variables.[18]

Table 1 provides summary statistics for our analytical sample: the average, the standard deviation, and the comparison in mean/proportion between voodoo related and non-voodoo related ethnicities. On average, women are 31.34 years old, have given birth 4 times and completed 4.14 years of schooling. 2.53% of them are menopaused and 1.23% are both menopaused and voodoo related. Women from voodoo-ethnicities are on average more involved in decision making regarding the use of their earnings, health care sought, family visits and large purchases than other

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[17] The results are robust to clustering at the ethnicity, region and country level.
[18] Using the simple sum yields almost identical results.

women. Their autonomy index stands at 0.44, compared to only 0.21 for women of non-voodoo ethnicities. They are also more likely to engage in modern activities (defined as professional/technical/managerial and clerical activities) than non-voodoo related women (6.39% versus 5.02%). A large proportion of women in our sample self-reports being Christian (49.62%), or Muslim (36.85%), while 14.89% of women from voodoo-related ethnicities reports adhering to 'traditional religion', compared to only 4.05% of non-voodoo related ethnicities. There is however considerable religious syncretism, which remains unobserved in the DHS data. Self-reported Christians or Muslims may at the same time adhere to voodoo customs, and several African Independent Churches are blending Christian traditions with voodoo-like rituals, miracles and charismatic healing (Barbier and Dorier-Apprill, 2002; Tall, 1995).

The 'autonomy index' is plotted against age in Panel A of Figure 2. The blue line shows the relationship for all women, while the red line is confined to women of voodoo-related ethnicities. Both lines reveal that on average women gain autonomy with age, but the gain is larger for women of voodoo-related ethnicities. The patterns also clearly show that, even at young ages, women of voodoo-ethnicities have higher autonomy than other women. Hence, it is unlikely that stronger menstrual taboos in voodoo-cultures account for the additional menopause-dividend. The bar chart in Panel B of Figure 2 compares the autonomy index across menopaused women and non-menopaused women, and across voodoo and non-voodoo ethnicities. It shows that the menopause-dividend is particularly important for women from voodoo related ethnicities.

Finally, we provide a comparison of ethnicity-level characteristics across voodoo and non-voodoo-related ethnic groups, that we will later pick up when discussing competing explanations for our result. A comparison of contemporary characteristics, derived from the DHS data can be found in Table 1. The comparison of historical characteristics, is based on pre-industrial ethnographic data provided by Murdock (1967). We first matched the ethnicities mentioned in the DHS with those named in Murdock's database, relying on the correspondence tables from the Ethnic Power Relations (EPR) database (Wimmer et al. 2009). We could match 21 DHS ethnicities

(out of the 28) with 14 ethnicities in Murdock's database. Table 2 gives an overview of the matching and Figure 1 gives the historic location of the 14 Murdock ethnicities. Table 3 shows the results of the comparison, across the three[19] voodoo- and eleven non-voodoo ethnicities. The patrilineal descent system dominates both in voodoo related ethnicities and non-voodoo related ethnicities, and none of the ethnicities is purely matrilineal. In both cases, polygamy and extended families were the usual form of domestic organization. Voodoo related ethnicities were more likely to belong to formed states than the non-voodoo related ethnicities, which is consistent with the fact that the Fon, Adja and Ewe were historically part of the vast Dahomey kingdom and the Yoruba founded the Oyo empire. This also had its effect on jurisdiction. While voodoo-related ethnicities had two to three levels of jurisdiction beyond the local community (village) level, there was no or just one level for more than half of non-voodoo ethnicities. Dependence on agriculture was somewhat lower in voodoo related ethnicities, but no single ethnicity relied on animal and plough cultivation. Finally, Table 3 lists the distance to the coastline, which is 230 km shorter on average for voodoo-related ethnic groups, implying they were exposed more to the slave trade than groups located further land inward.

6. Results

Main results

The estimation results of Eq. 1 indicate that women gain autonomy as they become older (Table 4, Col. I). More precisely, one additional year in age is associated with an increase of 0.017 units of AI. Figure 3 shows the estimated age-dividend across all ages 15-49 in our sample. We note an increasing trend, and find that the age-dividend is estimated consistently positive and significant from 26 onwards. The estimation results of Eq. 2 (Col. II of Table 4) show a significant additional age-dividend of 0.008 for women of voodoo-ethnicities. The estimation of Eq. 3 does not reveal a

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[19] In Murdock's classification, Adja and Fon are grouped together as Fon, while Ewe and Yoruba ethnicities are considered separately.

general menopause dividend (Col. III of Table 4). However, the estimated coefficient on the interaction term between menopause and voodoo-ethnicities reveals a 'tangninon-effect' in Eq. 4, indicating that menopause does play a significant role for voodoo-ethnicities (Col. IV of Table 4). The tangninon effect is significant (at 1%) and sizeable, estimated at 0.302, which is equivalent to the effect of an additional 9 years of education for the woman.

The size of this coefficient decreases by 30% when we add the interaction term *Woman age * Woman is voodoo related* (see Table 4, Col. V). This suggests that the menopause-dividend in voodoo-cultures as estimated in Eq. 4 is a combination of a more general age-dividend (0.006) and a specific menopause effect (0.220). The first component could be capturing, among others, a gradual transfer of autonomy to women in anticipation of their menopause status. The coefficient estimate of 0.220 on the second component remains sizeable. Its effect is equivalent to the effect of 7 additional years of education for the woman.

Women's schooling, the household wealth index, urban residence, and the presence of the husband in the house are other significant determinants of women's involvement in decision making, all entering with the expected sign. Women that enjoyed more years of schooling, that live in wealthier households, or in urban areas, tend to be more involved in household decision making, while the presence of the husband in the household reduces women's autonomy.

Robustness checks

In the first set of robustness checks, we add additional control variables to Eq. 4. First, we include a woman's age squared among the regressors to account for non-linearity of the age dividend. Second, we add additional controls that are likely to affect woman autonomy but that might be endogenous. To the vector of woman-level characteristics X_{hw}, we add woman's weight, an indicator variable for her occupation, the total number of births given by her and the number of her children who have died. To the set of household level characteristics X_h, we add the number of the household head's other wives and the number of under-five years old children in the

household. In doing so, we assume the additional exogeneity conditions described in Lechner (2008, p.6-9).

Second, since countries may provide different institutional environments for older women, e.g. in the form of inheritance or pension laws, we add interaction terms between a woman's age and country fixed effects.

The tangninon effect, i.e. the estimated coefficient on *Menopause* ∗ *Woman is voodoo related*, remains stable across all robustness checks, both in Eq. 4 and the more extensive Eq. 5. The results are summarized in Columns (I) to (III) of Table 5 (and the full results are provided in Appendix 2 to 4).

Competing explanations

To defend our identifying assumption, we rely on the fact that menopause is outside the control of the individual. Table 6 presents estimates of the determinants of menopause, showing that only age (0.012***), age at first marriage (-0.006***), and number of births given (-0.14***) are predictors of menopause. Age at first marriage most likely captures the effect of age at first menstruation which is correlated with the menopause age but goes unrecorded in the DHS. The significance of the number of children may be a consequence rather than a determinant of the timing of menopause. In any case, if anything, the signs of the coefficient estimates imply that our estimates of the menopause-dividend in women's autonomy would be an under- rather than overestimation (e.g. women that marry younger tend to have less autonomy).

Furthermore, our identification of the 'tanginon-effect' relies on the assumption, that there is no other ethnicity-level difference that could explain the menopause-dividend. To verify whether, besides the tangninon institution, other ethnicity-level differences could underlie the estimated menopause-dividend in voodoo-ethnicities, we add a battery of interaction terms to Eq. 4 and 5.

First, we interact menopause with proxies for 'modernization'. It could be argued that, in more modernized ethnic groups, women's achievement in the areas of education and work become

important determinants of autonomy, while among groups that remain traditional, factors such as polygamy, type of descent, or tangninon status are key factors that shape women' autonomy (Kritz, 1999). Based on differences in women education and their involvement in modern activities, we demonstrate that voodoo-cultures are not per se more 'traditional' than the others (see Table 1). We also add interaction terms between voodoo-ethnicities and women's education, and their involvement in modern activities.

Second, we control for the potentially confounding effect of polygamy, by adding *Menopause*Polygamy*. Polygamy is significantly higher in voodoo-related ethnicities, conditional upon controlling for Islam, which dominates in the northern regions of our four countries. This relative high prevalence among voodoo-ethnicities could relate to their historic location near the coastline and thus higher exposure to the Atlantic slave trade, which caused a relative scarcity of men and thus a greater demand for polygamy (Dalton and Leung, 2014). If elderly co-wives enjoy more autonomy than younger co-wives, polygamy could violate our parallel trends assumption (in Eq. 4 but not in Eq. 5 where we control for the interaction between age and ethnic group).

Finally, because of their historical location along or near the coastal area in the Gulf of Guinea, it is likely that all voodoo-ethnicities have had earlier and longer contact with European cultures than the other ethnic groups in our sample. To verify that the differential effect of menopause status across ethnic groups is not confounded by a different timing of contact with Europeans, we control for distance to coastal line of historical location of each ethnic group (computed using latitude and longitude of the centroid from Murdock classification[20] and the interaction term *Menopause * Distance to coastal line*).

The tangninon effect, i.e. the estimated coefficient on *Menopause * Woman is voodoo related*, remains stable when adding these interaction terms one by one to Eq. 4 (Results summarized in Columns (IV) to (VI) of Table 5 and the full results are provided in

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[20] For Hausa, Peulh, Fulani, Bariba, Dendi and Kanuri/beriberi ethnicities, we collect main city of historical kingdom/chieftaincy from different sources and then use www.findlatitudeandlongitude.com to retrieve geographical coordinates.

Appendix 4 to 7). In the case of the more demanding Eq. 5, the tangninon effect loses significance for (1) the subsample estimation that includes the controls with distance to coastline, and (2) when including interaction terms between voodoo-ethnicities and women's education and their involvement in modern activities.

Heterogeneity of the tangninon effect

We explore the heterogeneity of the tangninon effect with respect to the four dimensions of women's autonomy that we used to construct our index: the use of her earnings, the seeking of care for her health, the visits to family or relatives, and large household purchases. For each of these four separate areas $Autonomy_{hwm}$ equals 1 if the woman has some say, and 0 when she does not have a say. A large majority of women in our sample (89.81%) are involved in decision making regarding the use or their earnings; over half (61.62%) have some say in visiting family or relatives; just half are involved in decisions about their health care (50.95%) and a bit less than half have a say about large household purchases (47.57%). Table 7 shows that there is a positive tangninon effect for all these four dimensions. The effect is however only significant for large household purchases. In this case the effect size is quite large at 0.144 and remains significant in the more extensive Eq. 5, instead of Eq. 4. The overall effect on AI is thus mainly driven by this fourth dimension.

Next, we distinguish between full and partial autonomy in women's autonomy in each of the above four dimensions of women autonomy. Full autonomy is an indicator variables that takes 1 if a woman reports deciding alone and 0 otherwise, whereas partial autonomy takes 1 in case the respondent decides with her husband/partner and 0 otherwise. Consistently with the fact that couples in West-Africa have separate budgets, 70.04% of women in our sample have full command over the use of their own earnings, while only 19.77% decide together with husbands on how to use their earnings. However, not many women enjoy full autonomy regarding decisions for care

sought for themselves (12.76%), visits to family members (12.00%) and large household purchases (8.77%). Here partial autonomy accounts for larger proportions, at 38.19%, 49.63%, and 38.81%, respectively. Looking at the regression result in Table 8, we find no significant tangninon effect on women's full autonomy (Panel I) while the tangninon effect is positive and significant for women's partial autonomy notably in care sought (0.113), visit to family (0.077) and large purchases (0.157) decisions (Panel II). Therefore, the overall tangninon effect highlighted in Table 4 (Col. IV) stems mostly from partial autonomy.

Finally, we look at the cross-country variation of the tangninon effect. As voodoo originates from Benin, we expect to find a larger tangninon effect in this country. Table 9 reveals that the menopause dividend in voodoo-related ethnicities is positive in all four countries but only (slightly) significant in Ghana (0.625) and in Benin (0.378).

7. Mechanisms

This section tentatively explores the underlying mechanisms of the tangninon effect. We first assess whether the effect is rooted in persistent cultural beliefs or whether it is transmitted through specific local institutions. Second, we explore whether the above established increased autonomy of menopaused women relates to an income effect (that they may derive from a larger role in the community) or a fear factor (with their husband fearing their supernatural powers).

Level of transmission: interpersonal or institutional ?

The awe for the tangninon could be transmitted from one generation to the other in two distinct ways, the first one operating at the individual level through parental education, the other one via the institutional environment beyond the family level. In the former case, we expect to find the tangninon effect also for voodoo-related individuals who no longer live in their historic ethnic homelands, whereas in the latter case, we expect the tangninon effect to be more pronounced in the historic ethnic homelands, even for immigrants belonging to ethnicities who are not related to voodoo.

To assess the relative importance of persistent cultural beliefs versus specific localized institutions, we include the variable *Woman lives in homeland of voodoo ethnicities$_w$* and the interaction term *Menopause$_w$ * Woman lives in homeland of voodoo ethnicities$_w$* in our Eq. 4. The latter term captures the effect of specific local institutions while *Menopause$_w$ * Woman is voodoo related$_w$* captures transmission through individual beliefs. The results, shown in Table 10, only provide support for the institutional mode of transmission. However, these should be taken with a grain of salt because of important multicollinearity stemming from the high correlation (0.908) between the two interaction terms.[21] The lack of a critical mass of 'voodoo women' outside 'voodoo land' could drive the absence of evidence for individual-level transmission.

Transmission channel: income factor or fear factor

In the background section, we documented that tangninons are both feared and respected, and enjoy a special status both in the family and the larger community, and this special status may extend to all menopaused women of the voodoo-ethnicities. The results of our quantitative analysis indeed reveal that, for those ethnic groups, menopause increased women's involvement in household decision-making. We proposed two specific channels that could explain such increased involvement.

First, her higher status could provide the menopaused woman with greater access to income-increasing opportunities, e.g. through a larger social network or because people reward the tangninon and her assistants for their (ceremonial) services. According to conventional intra-household models (e.g. Basu, 2006; Browning et al, 1994) the higher income, in its turn, could affect the woman's threat point in intra-household bargaining. To tentatively test for this channel,

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[21] 91.88% of menopaused women living in the historic homeland of voodoo ethnicities also belong to voodoo-related ethnicities, and 90.70% of menopaused women living outside these homelands are of non-voodoo ethnicities. The largest Variance Inflation Factor after the regression including both terms is 37.79 so greater than 10 (commonly used as rule of thumb) and the multicollinearity test by Farrar and Glauber (xxxx) further confirms multicollinearity issues when simultaneously including the two interactions terms (p-value=0.000).

we add a dummy variable to Eq. 4 capturing whether a woman earns the same or more money than her husband.[22] Results in Table 11 show that earning the same or more money than her husband significantly (at 1%) and sizeably increases a woman's AI (0.477) and her participation in decision regarding large purchases (0.170). However, our coefficient of interest that measures the tangninon effect is only marginally affected by the inclusion of this variable, more specifically with a slight diminution of the tangninon effect of -3.93 per cent for AI and -3.92 per cent for large purchases. Hence, while the income effect clearly is important for intra-household bargaining, it seems to operate largely independently from the tangninon effect.

Second, a more direct effect may be operating, i.e. a husband may consider his menopaused spouse more highly because of her alleged supernatural powers. This channel is conditional on the husband's belief in human agency in the harnessing of supernatural powers. The DHS survey includes one question[23] that provides us with a proxy of such belief, i.e. whether "HIV can be transmitted by witchcraft or supernatural means". The answer categories are: 'no', 'yes' and 'don't know'. A direct comparison of the tangninon effect across subsamples of women whose husbands believe AIDS can be caused by witchcraft and women whose husband do not believe so, would be plagued by selection bias. For instance, in our sample we find that those who believe HIV can be transmitted by witchcraft are less educated, tend to live more in rural areas, and are less wealthy. To overcome this caveat, we first pair-matched women whose husbands believe AIDS can be

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[22] This information is based on the DHS variable v746 : "respondent earns more than husband/partner", with answer categories: more than him, less than him, about the same and husband/partner doesn't bring in money. The DHS also provides information on the woman's labor participation, but at a 99.83% of participation, there is too little variation for this variable to be useful.

[23] An alternative would be to compare the tangninon effect in couples with husband self-reporting to adhere to traditional religion to those who do not. However, self-reported traditional religion is not very informative about people's actual beliefs. Large numbers of African Christians and Muslims also believe in witchcraft, evil spirits, sacrifices to ancestors, reincarnation and other elements of traditional African religions (PEW, 2010). This is confirmed in our qualitative research. As such, a tangninon explains: « I am Christian, still I am the tangninon of family. I must respect the spiritual heritage of my ancestors, including the worship of *asen*. God is unique and is the same. Religions are all about peace, harmony and caring about people. I see no contradiction in being at the church early every morning and worshipping the *hennu vodoun* later that same day. [T56 : JA-Ouidah-Tangninon]».
Furthermore, in our DHS sample, only 8.82% of husbands report adhering to traditional religion while 22.19% believe that AIDS can be caused by witchcraft or supernatural means and 12.35% are agnostic about it. And, among the 3,870 husbands believing that witchcraft can transmit HIV in our sample, only 11.32% are ATR adherents, 53.77% reported to be Christians and 29.61% reported to be Muslims. Because of the syncretism of individual religious beliefs, we use the more straightforward variable on the mode of HIV transmission that directly probes into a concrete magicoreligious belief about human agency over supernatural powers.

caused by witchcraft to their counterparts (women whose husbands do not believe so), based on a propensity score[24] obtained from a probit regression. This provides us with two samples: (i) a sample of 5,422 women with non-believing husbands, and (ii) an equal-size sample of women with either believing husbands (3,423 women) or with husband not quite sure HIV can be transmitted by witchcraft or supernatural means (1,988). Results in Table 12 indicate that the tangninon effect is much higher in the second sample. In so far the two samples indeed have similar characteristics and only differ in the husband's belief about whether HIV can be transmitted by witchcraft or supernatural means, this result provides tentative evidence for the 'fear factor'.

8. Conclusion

This study relies on several rounds of DHS surveys, and a Difference-in-Differences strategy to explore the interrelation between women's autonomy, menopause and magicoreligious beliefs. Our results reveal that menopaused women gain decision power in communities of voodoo-related ethnicities. Regarding the channels, both our qualitative field work and a quantitative test suggest that this menopause-dividend is driven by magicoreligious beliefs in the supernatural powers of the tangninon.

This result entails two main contributions. First, it provides to the best of our knowledge the first quantitative support for the critique forwarded in the African feminist literature, that the concept of 'gender' in an African context is much more fluid and context-dependent than the simple man/woman dichotomy. Second, our results add to the body of both ethnographic and quantitative studies that argue that magicoreligious beliefs continue to play a tangible role in many African societies. As demonstrated in our case study, this role also affects intra-household bargaining. While it is well documented that elderly women are often the victim of such

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[24] We construct two subsamples that are comparable as much as possible based on observables characteristics; the only difference being the husband's belief. The propensity score is based on variables that are likely to affect women autonomy (e.g. woman's age, education) with the aim to reduce as much as possible group differences in these variables so that difference in our coefficient of interest can be attributed to difference in husband belief (see details in Appendix 9).

magicoreligious beliefs (in the form of witchcraft accusation), we are the first to make explicit the positive side of the medal.

Given the demographic evolution in SSA, a better understanding of cultural attitudes towards elderly African women will become more important for policymakers in the future; as fertility declines and life expectancy increases, elderly women will increase in numbers, both in absolute and relative terms. For instance in Benin (one of the four countries of this study), a plan for active aging is implemented to provide various support to elderly with a specific focus on women (Ministère en charge des personnes âgées, 2012).

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Figures

Figure 1. Historical location of DHS ethnicities

Note.— This figure shows the historical location of the ethnicities in our DHS sample, as derived from the ethnic homeland in Murdock's database.

Figure 2. Women's autonomy index (AI): heterogeneity with respect to age, menopause and relation to voodoo

Panel A : Average of women' AI with respect to age and relation to voodoo
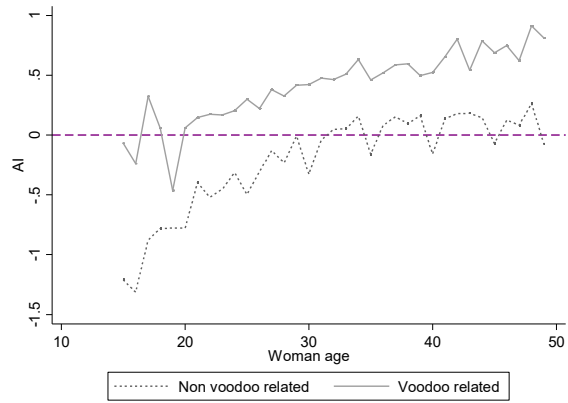
Panel B : Average of women' AI with respect to menopause status and relation to voodoo
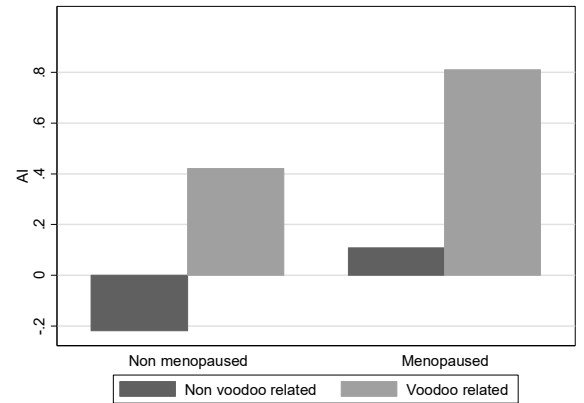
Source : Authors, based on data from 14 DHS rounds over the period 1993-2014 in Benin (4 rounds), Nigeria (3 rounds), Togo (2 rounds) and Ghana (5 rounds).

Figure 3. The effect of age on women's autonomy
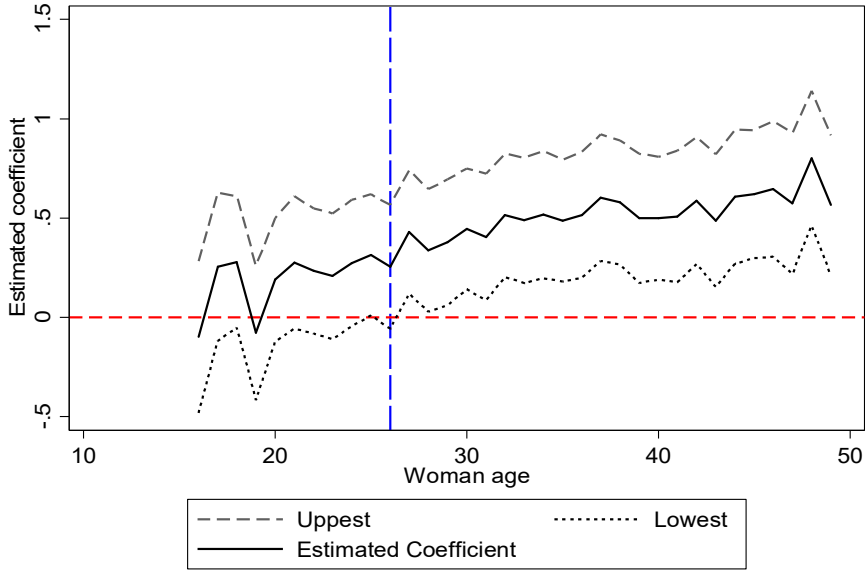
Note.— The figure shows the estimated coefficients (with 95% - CI) on the complete set of indicator variables for a woman's age, when used a regressors to expain the AI. The control variables are as specified in E. 1: couple- and woman-level characteristics (age difference between the woman and her partner, the woman's education, religion and height), husband-level characteristics (his education and an indicator variable for whether he lives together with the woman), household-level characteristics (residence area, wealth quintile, administrative region) and an indicator variables for the interview year. Standard errors are clustered at the household level and reported in parentheses.

Tables

Table 1. Sample means and proportions of key variables

Variables	Mean/Proportion	St. Dev	Woman is not voodoo related (I)	Woman is voodoo related (II)	Difference (II)-(I)
Woman age	31.34	7.68	30.95	32.14	1.19***
Woman years of education	4.14	5.03	4.10	4.24	0.14*
Age difference (husband's age-wife's age)	7.85	5.87	8.27	7.01	-1.26***
Woman height (Cms)	158.85	63.30	158.66	159.24	0.58***
Woman is voodoo related	32.77	0.47	-	-	-
Wife is menopaused	2.53	0.16	1.93	3.75	1.82***
Wife is menopaused * Woman is voodoo related	1.23	0.11	-	-	-
Percentage of women in modern activities	5.47	0.23	5.02	6.39	1.37***
Percentage of women in polygamous household	31.18	0.46	31.83	29.84	-1.99***
Labor participation	99.81	0.04	99.98	99.45	-0.53***
Autonomy in decision making about:					
Use of earnings	*89.81*	*0.30*	*88.02*	*93.46*	*5.44***
Seek for health care	*50.95*	*0.50*	*45.74*	*61.62*	*15.88***
Visit to family	*61.62*	*0.49*	*54.76*	*75.71*	*20.95***
Large purchases	*47.57*	*0.50*	*42.09*	*58.82*	*16.73***
Autonomy Index (mean)	*0.00*	*1.49*	*-0.21*	*0.44*	*0.65***
Husband's years of education	6.01	5.51	5.90	6.24	0.34***
Husband living in the same house	98.60	0.12	98.79	98.21	-0.58***
Percentage of women living in urban area	35.00	0.48	29.70	45.87	16.17***
Household wealth quintiles					
Poorest	*21.66*		*26.49*	*10.39*	*-16.10***
Poorer	*21.05*		*22.83*	*16.42*	*-6.41***
Middle	*19.03*		*18.95*	*18.40*	*-0.55*
Richer	*18.88*		*16.45*	*25.26*	*8.81***
Richest	*19.37*		*15.28*	*29.53*	*14.25***
Wife religion					
Christian	*49.62*		*44.51*	*62.70*	*18.19***
Islam	*36.85*		*48.96*	*17.16*	*-31.80***
Traditional	*9.49*		*4.05*	*14.89*	*10.84***
Other	*0.39*		*0.09*	*0.97*	*0.88***
No religion	*3.64*		*2.38*	*4.28*	*1.90***
Wife activity					
Not working	*0.17*		*0.02*	*0.55*	*0.53***
Professional/technical/managerial	*4.38*		*4.42*	*5.42*	*1.00***
Clerical	*0.70*		*0.61*	*0.97*	*0.36***
Sales	*49.20*		*49.49*	*49.83*	*0.34*
Agricultural - self employed	*18.27*		*15.22*	*19.81*	*4.59***
Agricultural - employee	*6.68*		*9.70*	*2.35*	*-7.35***
Household and domestic	*0.04*		*0.05*	*0.03*	*-0.02*

Services	6.03		5.12	9.36	4.24***
Skilled manual	13.21		14.30	9.97	-4.33***
Unskilled manual	0.67		0.52	0.77	0.25**
Others	0.65		0.57	0.94	0.37***
Woman weight (Kgs)	59.67	12.78	59.01	61.00	1.99***
Total birth given	3.95	2.56	4.08	3.67	0.41***
Number of children who have died	0.59	1.09	0.67	0.44	0.23***
Number of husband's other wives	0.41	0.70	0.40	0.43	-0.03***
Number of under five children in the household	1.66	1.32	1.75	1.47	0.28***
Country					
Benin	26.67		11.50	57.77	
Nigeria	50.99		61.96	28.49	
Togo	7.57		7.46	7.77	
Ghana	14.78		19.07	5.97	
Year of interview					
2001	6.91		3.31	14.29	
2003	8.52		11.00	3.43	
2006	11.52		5.38	24.13	
2008	22.83		27.15	13.96	
2011	0.79		0.12	2.16	
2012	7.44		2.70	17.18	
2013	31.17		37.52	18.15	
2014	10.82		12.83	6.69	
Number of observations	**19.471**		**13.090**	**6.381**	

Source : Authors, based on data from 14 DHS rounds in the period 1993-2014 in Benin (4 rounds), Nigeria (3 rounds), Togo (2 rounds) and Ghana (5 rounds). Modern activities include professional/technical/managerial and clerical activities.

Table 2. Classification of DHS ethnicities and corresponding Murdock classification according to voodoo affiliation

Voodoo related ethnicities		Non voodoo related ethnicities	
DHS	**Murdoch classification**	**DHS**	**Murdoch classification**
Adja	Fon	Akan	Ashanti
Ewe	Ewe	Akposso/akebou	
Fon	Fon	Ana-ife	
Yoruba	Yoruba	Bariba	
		Betamaribe	Somba
		Dendi	
		Ekoi	Ekoi
		Fulani	
		Ga/dangme	Ga
		Grusi	Dagomba
		Guan	Dagomba
		Gurma	Dagomba
		Hausa	
		Ibibio	Ibibio
		Igala	Igala
		Igbo	Ibo
		Ijaw/ izon	Ijaw
		Kabye/tem	Tem
		Kanuri/ beriberi	
		Mole-dagbani	Dagomba
		Para-gourma/akan	
		Peuhl	
		Tiv	Tiv
		Yoa	Somba
N = 4	**N=3**	**N = 24**	**N=11**

Source : Authors, based on Murdoch's classification and ethnicities in our DHS sample.

Table 3. Comparison of historical characteristics across the voodoo and non-voodoo ethnicities

	Voodoo related ethnicities	Non voodoo related ethnicities
	N= 3	N=11
Dependence on agriculture		
36-45% dependence	0	1
46-55% dependence	1	2
56-65% dependence	1	1
66-75% dependence	0	5
76-85% dependence	1	1
86-100% dependence	0	1
Animal and plough cultivation		
Absent	3	11
Jurisdictional hierarchy beyond the local community		
No levels	0	3
One levels	0	3
Two levels	1	3
Three levels	2	2
Political integration		
Insufficient information	1	9
Minimal states	0	1
States	2	1
Type of society		
Patrilineal	2	7
Duolateral	0	2
Ambilineal	0	1
Mixed	1	1
Polygamy		
Polygynous: unusual co-wives	0	1
Polygynous: usual co-wives	1	1
Small extended families	0	3
Large extended families	2	6
Average distance to coastal line (in Km)		
	108	338

Source : Authors, based on Murdoch's classification and a distance calculation in ArcGIS.

Table 4. Cross cultural heterogeneity in the effect of age on women's autonomy

	DEPENDENT VARIABLES : AUTONOMY INDEX				
	(I)	(II)	(III)	(IV)	(V)
Woman age	0.017***	0.015***	0.016***	0.017***	0.015***
	(.001)	(.002)	(.001)	(.001)	(.002)
Woman is menopaused			0.073	-0.099	-0.074
			(.060)	(.084)	(.085)
Woman is voodoo related		-0.072		0.175***	-0.028
		(.099)		(.040)	(.102)
Woman age* Woman is voodoo related		0.008***			0.006**
		(.003)			(.003)
Woman is menopaused * Woman is voodoo related				0.302***	0.220*
				(.114)	(.119)
Woman education	0.033***	0.032***	0.027***	0.032***	0.032***
	(.003)	(.003)	(.003)	(.003)	(.003)
R-squared	0.231	0.232	0.241	0.231	0.232
Observations	19,471	19,471	19,471	19,471	19,471

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables include woman-level characteristics (education, religion and height), husband-level characteristics (education and an indicator variable for whether he lives together with the woman), the age difference between the spouses, household-level characteristics (residence area, wealth quintile), and indicator variables for the administrative region of residence of the household and for the year in which the DHS survey took place. Standard errors are clustered at the household level and reported in parentheses.

Table 5. Summary of robustness checks and tests for competing explanations

	DEPENDENT VARIABLES : AUTONOMY INDEX					
	(I)	(II)	(III)	(IV)	(V)	(VI)
Woman is voodoo related	0.172***	0.179***	0.175***	0.313***	0.176***	0.123**
	(.040)	(.040)	(.040)	(.052)	(.040)	(.052)
Woman is menopaused * Woman is voodoo related	0.308***	0.289**	0.345***	0.281**	0.303*	0.325**
	(.114)	(.113)	(.132)	(.114)	(.114)	(.151)
Woman education	0.032***	0.027***	0.032***	0.035***	0.031***	0.028***
	(.003)	(.003)	(.003)	(.004)	(.003)	(.003)
Controls as in baseline Eq. 4	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*
Controls of robustness checks and competing explanations						
Age squared	*YES*					
Endogenous controls		*YES*				
Country FE interacted with woman age and menopause status			*YES*			
Modernization factors interacted with woman is voodoo related				*YES*		
Polygamy interacted with menopause status					*YES*	
Coastal distance interacted with menopause status						*YES*
R-squared	*0.232*	*0.235*	*0.232*	*0.233*	*0.234*	*0.262*
Observations	*19,471*	*19,327*	*19,471*	*19,471*	*19,331*	*16,079*

*** p<0.01, ** p<0.05, * p<0.1

Note.— Detailed results of robustness checks are reported in Appendix 2 to 7.

Table 6. Determinants of menopause occurrence

	DEPENDENT VARIABLE : MENOPAUSE STATUS	
	(I)	(II)
Woman age	0.009***	0.012***
	(.000)	(.000)
Woman height	-0.000	-0.000
	(.000)	(.000)
Woman weight	-0.000***	-0.000
	(.000)	(.000)
Age at first marriage	-0.005***	-0.006***
	(.000)	(.001)
Number of births given	-0.011***	-0.014***
	(.001)	(.002)
Haemoglobin level	-	-0.000
		(.000)
Anaemia level	-	-0.005
		(.006)
R-squared	*0.103*	*0.127*
Observations	*19,467*	*9,023*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. We control for woman' activity, the administrative region of residence and the wealth quintile of the household and also for the year in which the DHS round took place. In Col (II) we add haemoglobin level and anaemia level of the woman measured at the time of the survey. Standard errors are clustered at the household level and reported in parentheses.

Table 7. Tangninon effect and multidimensionality of women autonomy

	DEPENDENT VARIABLES			
	Use of earnings (I)	Seek for health care (II)	Visit to family (III)	Large purchases (IV)
Woman age	0.002***	0.005***	0.004***	0.005***
	(.000)	(.000)	(.000)	(.001)
Woman is voodoo related	0.013	0.029**	0.077***	0.040***
	(.009)	(.014)	(.013)	(.014)
Woman is menopaused	-0.022	-0.022	0.010	-0.060**
	(.020)	(.030)	(.030)	(.030)
Woman is menopaused *	0.011	0.067	0.047	0.144***
Woman is voodoo related	(.026)	(.041)	(.037)	(.042)
Woman education	0.002***	0.010***	0.007***	0.010***
	(.001)	(.001)	(.001)	(.001)
R-squared	*0.060*	*0.181*	*0.187*	*0.190*
Observations	*19,471*	*19,471*	*19,471*	*19,471*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 8. Full and partial and full autonomy with respect to the dimension of autonomy

	DEPENDENT VARIABLES			
	Use of earnings (I)	Seek for health care (II)	Visit to family (III)	Large purchases (IV)
	FULL AUTONOMY			
Woman is menopaused *	-0.012	-0.020	-0.035	0.008
Woman is voodoo related	(.038)	(.039)	(.035)	(.032)
R-squared	*0.153*	*0.083*	*0.067*	*0.054*
Observations	*19,471*	*19,471*	*19,471*	*19,471*
	PARTIAL AUTONOMY			
Woman is menopaused *	0.067	0.113**	0.077*	0.157***
Woman is voodoo related	(.082)	(.048)	(.043)	(.046)
R-squared	*0.134*	*0.180*	*0.181*	*0.188*
Observations	*5,834*	*16,987*	*17,135*	*17,764*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 9. Heterogeneity of tangninon effect across country

	DEPENDENT VARIABLE: autonomy index			
	Benin (I)	Ghana (II)	Nigeria (II)	Togo (IV)
Woman is menopaused *	0.378*	0.625*	0.352	0.130
Woman is voodoo related	(.204)	(.368)	(.246)	(.338)
R-squared	*0.148*	*0.235*	*0.263*	*0.046*
Observations	*5,192*	*2,877*	*9,929*	*1,473*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 10. Level of transmission: interpersonal or institutional ?

	DEPENDENT VARIABLE : AUTONOMY INDEX
Woman age	0.017***
	(.001)
Woman lives in homeland of voodoo ethnicities	0.382***
	(.089)
Woman is voodoo related	0.183***
	(.040)
Woman is menopaused	-0.125
	(.086)
Woman is menopaused* Woman lives in homeland of voodoo ethnicities	0.346*
	(.188)
Woman is menopaused* Woman is voodoo related	0.017
	(.189)
Woman education	0.032***
	(.003)
R-squared	*0.232*
Observations	*19,471*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 11. Transmission channel: income factor ?

	DEPENDENT VARIABLES			
	Autonomy index (I)	Large purchases (II)	Autonomy index (III)	Large purchases (IV)
Woman is menopaused*	0.289**	0.104*	0.285**	0.102*
Woman is voodoo related	(.141)	(.053)	(.139)	(.052)
Woman earn same or more than husband			0.491***	0.177***
			(.034)	(.012)
R-squared	*0.272*	*0.225*	*0.282*	*0.237*
Observations	*14,199*	*14,199*	*14,199*	*14,199*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Table 12. Transmission channel: fear factor ?

	DEPENDENT VARIABLES					
	Husband does not believe HIV can be transmitted by witchcraft or supernatural means		*Husband believes HIV can be transmitted by witchcraft or supernatural means*		*Husband believes or is uncertain HIV can be transmitted by witchcraft or supernatural means*	
	Autonomy index (I)	Large purchases (II)	Autonomy index (III)	Large purchases (IV)	Autonomy index (V)	Large purchases (VI)
	PANEL I : FULL SAMPLE					
Woman is menopaused* Woman is voodoo related	0.297**	0.140*	0.569**	0.266***	0.479**	0.235***
	(.200)	(.075)	(.242)	(.094)	(.219)	(.078)
R-squared	0.223	0.174	0.170	0.150	0.199	0.173
Observations	5,422	5,422	3,434	3,434	5,422	5,422
Historical location control	NO	NO	NO	NO	NO	NO
Additional controls	NO	NO	NO	NO	NO	NO
	PANEL II : ONLY VOODOO RELATED ETHNIC GROUPS					
Woman is menopaused* Woman is voodoo related [(b)]	0.143	0.067	0.492***	0.168***	0.278*	0.100*
	(.152)	(.060)	(.156)	(0.063)	(.151)	(.055)
R-squared	0.094	0.079	0.114	0.110	0.091	0.090
Observations	1,743	1,743	1,122	1,122	1,677	1,677

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. To avoid selection bias issues in our comparison, the subsamples in Cols (1) and (2) comprise couples in which the husband does not believe HIV can be transmitted by witchcraft or supernatural means that are matched to couples in which the husband does. The matching is based on a propensity score obtained from a probit regression of the likelihood to believe HIV can be transmitted by witchcraft or supernatural means. [(b)] Here the tangninon effect is exactly the menopause effect.
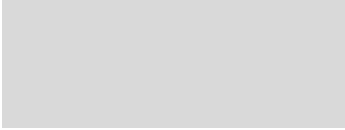
APPENDIX

Appendix 1. Kaiser-Meyer-Olkin measure of sampling adequacy (Assessement of the Principal Component Analysis)

Variables	KMO
Use of earnings	0.860
Seek for health care	0.692
Visit to family	0.768
Large purchases	0.695
Overall	0.718

Note : The Kaiser–Meyer–Olkin measure of sampling adequacy compares the correlations and the partial correlations between variables. If the partial correlations are relatively high compared to the correlations, the KMO measure is small, and a low-dimensional representation of the data is not possible. Kaiser (1974) characterization of KMO values is as follows : 0.00 to 0.49 unacceptable; 0.50 to 0.59 miserable; 0.60 to 0.69 mediocre; 0.70 to 0.79 middling; 0.80 to 0.89 meritorious; 0.90 to 1.00 marvellous.

Appendix 2. Effect of tangninon status on women's autonomy (Robustness check 1: with woman age squared)

	DEPENDENT VARIABLES : AUTONOMY INDEX	
	(I)	(II)
Woman age	0.049***	0.050***
	(.010)	(.010)
Woman age squared	-0.001***	-0.001***
	(.000)	(.000)
Woman is voodoo related	0.172***	-0.069
	(.040)	(.103)
Woman is menopaused	-0.040	-0.005
	(.086)	(.087)
Woman is menopaused * Woman is voodoo related	0.308***	0.210*
	(.114)	(.119)
Woman age * Woman is voodoo related		0.008***
		(.003)
Woman education	0.032***	0.032***
	(.003)	(.003)
R-squared	*0.232*	*0.232*
Observations	*19,471*	*19,471*

*** p<0.01, ** p<0.05, * p<0.1

*Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term Woman age * Woman is voodoo related as in (Eq.5).*

Appendix 3. Effect of tangninon status on women's autonomy with potentially endogenous controls (Robustness check 2)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age	0.015***	0.013***
	(.002)	(.002)
Woman is voodoo related	0.179***	-0.003
	(.040)	(.103)
Woman is menopaused	-0.100	-0.077
	(.085)	(.085)
Woman is menopaused * Woman is voodoo related	0.289**	0.215*
	(.113)	(.119)
Woman age * Woman is voodoo related		0.006*
		(.003)
Woman education	0.027***	0.027***
	(.003)	(.003)
R-squared	*0.235*	*0.236*
Observations	*19,327*	*19,327*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. To controls variables specified in the note of Table 4, we here add woman's weight, an indicator variable for her occupation, the total number of births given by her and the number of her children who have died to the vector of woman-level characteristics Xw ; the number of household head's other wives and the number of under-five years olds children in the household to the set of household level characteristics Xh. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term Woman age * Woman is voodoo related as in (Eq.5).

Appendix 4. Effect of tangninon status on women's autonomy while including country FE and its interaction terms woman age and menopause status (Robustness check 3)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age _Benin	0.021***	0.017***
	(.003)	(.004)
Woman age _Togo	0.019***	0.017***
	(.005)	(.005)
Woman age _Ghana	0.022***	0.021***
	(.003)	(.003)
Woman age _Nigeria	0.013***	0.012***
	(.002)	(.002)
Woman is voodoo related	0.175***	0.012
	(.040)	(.116)
Woman is menopaused_Benin	-0.240*	-0.195
	(.137)	(.140)
Woman is menopaused_Togo	0.156	0.175
	(.187)	(.188)
Woman is menopaused_Ghana	-0.174	-0.165
	(.131)	(.131)
Woman is menopaused_Nigeria	-0.084	-0.073
	(.134)	(.134)
Woman is menopaused *	0.345***	0.279**
Woman is voodoo related	(.132)	(.138)
Woman age * Woman is voodoo related		0.005
		(.003)
Woman education	0.032***	0.032***
	(.003)	(.003)
Togo[b]	-0.237	-0.212
	(.237)	(.237)
R-squared	0.232	0.232
Observations	19,471	19,471

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. [c] Other country FE dummies are omitted because of multicollinearity. At the difference of Col. (I), Col. (II) includes the interaction term Woman age * Woman is voodoo related as in (Eq.5).

Appendix 5. Effect of tangninon status on women's autonomy while controlling for modernization factors (Competing explanation 1)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age	0.017***	0.015***
	(.001)	(.002)
Woman is voodoo related	0.313***	0.100
	(.052)	(.107)
Woman is menopaused	-0.091	-0.064
	(.084)	(.085)
Woman is menopaused * Woman is voodoo related	0.281**	0.194
	(.114)	(.119)
Woman age * Woman is voodoo related		0.007**
		(.003)
Woman education	0.035***	0.035***
	(.004)	(.004)
Woman education * Woman is voodoo related	-0.022***	-0.022***
	(.006)	(.006)
Woman is in modern activity	0.165***	0.171***
	(.060)	(.060)
Woman is in modern activity * Woman is voodoo related	-0.005	-0.018
	(.094)	(.094)
R-squared	0.233	0.233
Observations	19,471	19,471

*** p<0.01, ** p<0.05, * p<0.1

*Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term Woman age * Woman is voodoo related as in (Eq.5).*

Appendix 6. Effect of tangninon status on women's autonomy while controlling for polygamy and its interaction term with menopause (Competing explanation 2)

	DEPENDENT VARIABLE : AUTONOMY INDEX	
	(I)	(II)
Woman age	0.018***	0.016***
	(.001)	(.002)
Woman is voodoo related	0.178***	-0.032
	(.040)	(.102)
Woman is menopaused	-0.141	-0.115
	(.096)	(.097)
Polygamy	-0.142***	-0.143***
	(.025)	(.025)
Woman is menopaused* Polygamy	0.107	0.107
	(.118)	(.117)
Woman is menopaused * Woman is voodoo related	0.299***	0.213*
	(.114)	(.120)
Woman age * Woman is voodoo related		0.007**
		(.003)
Woman education	0.031***	0.031***
	(.003)	(.003)
R-squared	*0.234*	*0.234*
Observations	*19,331*	*19,331*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. At the difference of Col. (I), Col. (II) includes the interaction term Woman age * Woman is voodoo related as in (Eq.5).

Appendix 7. Effect of tangninon status on women's autonomy including historical location and its interaction term with menopause (Competing explanation 3)

	DEPENDENT VARIABLE : AUTONOMY INDEX		
	(I)	(II)	(III)
Woman age	0.016***	0.016***	0.012***
	(.001)	(.001)	(.002)
Woman is voodoo related	0.209***	0.123**	-0.211*
	(.048)	(.052)	(.111)
Woman is menopaused	-0.127	-0.117	-0.073
	(.092)	(.153)	(.154)
Woman is menopaused * Woman is voodoo related	0.335***	0.325**	0.193
	(.119)	(.151)	(.155)
Woman age * Woman is voodoo related			0.010***
			(.003)
Woman is menopaused * Distance to coastal line		0.000	0.000
		(.000)	(.000)
Distance to coastal line		-0.000***	-0.000***
		(.000)	(.000)
Woman education	0.028***	0.028***	0.027***
	(.003)	(.003)	(.003)
R-squared	*0.262*	*0.262*	*0.263*
Observations	*16,079*	*16,079*	*16,079*

*** p<0.01, ** p<0.05, * p<0.1

*Note.— The sample is here restricted to a subsample of 15-49 women in couple for which distance from historical homeland of ethnic group to coastal line could be computed. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses. Col. (I) serves as baseline to assess how inclusion of distance to coastal line and its interaction term with menopause status in Col. (II) affects our coefficient of interest. At the difference of Col. (II), Col. (III) includes the interaction term Woman age * Woman is voodoo related as in (Eq.5).*

Appendix 8. Tangninon effect and multidimensionality of women autonomy using extensive equation (Eq.5)

	DEPENDENT VARIABLES			
	Use of earnings (I)	Seek for health care (II)	Visit to family (III)	Large purchases (IV)
Woman age *	-0.000	0.002**	0.001	0.003**
Woman is voodoo related	(.000)	(.001)	(.001)	(.001)
Woman is menopaused *	0.016	0.039	0.032	0.111**
Woman is voodoo related	(.027)	(.043)	(.039)	(.043)
R-squared	*0.060*	*0.182*	*0.187*	*0.191*
Observations	*19,471*	*19,471*	*19,471*	*19,471*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables are as specified in the note of Table 4. Standard errors are clustered at the household level and reported in parentheses.

Appendix 9 : Probit regression of the likelihood that woman's husband believes HIV can be transmitted by supernatural means

DEPENDENT VARIABLE : HUSBAND BELIEVES OR IS UNCERTAIN THAT HIV CAN BE TRANSMITTED BY SUPERNATURAL MEANS

Husband education	-0.049***
	(.003)
Wife education	-0.010***
	(.003)
Age difference between spouses	-0.005***
	(.002)
Wealth quintile (Poorest)	
Poorer	-0.110***
	(.036)
Middle	-0.061
	(.039)
Richer	-0.117***
	(.044)
Richest	-0.146***
	(.053)
Pseudo R-squared	*0.070*
Observations	*17,343*
Percentage of correct classification	*68.47*

*** p<0.01, ** p<0.05, * p<0.1

Note.— The sample includes 15-49 women in couple. Control variables include woman-level characteristics (age, total number of birth given by her, number of her children who have died), husband-level characteristics (an indicator variable for whether he lives together with the woman), household-level characteristics (residence area, wealth quintile, number of under five years children in the household, number of co-wives) and indicator variables for the administrative region of residence and the year in which the DHS survey took place. Standard errors are clustered at the household level and reported in parentheses.