Heritage of Hunger:
Ethnicity, Resource Allocation and Child Poverty

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March 6, 2026

Abstract

Researchers and policymakers increasingly recognize the importance of cultural and traditional practices in shaping economic development outcomes. In this paper, I provide a detailed descriptive account of how ethnic characteristics may shape child poverty and undernutrition in Ethiopia, Ghana, Malawi and Nigeria. I show that children's intrahousehold resource allocation and nutrition outcomes vary significantly across ethnic groups. Using a supervised machine learning technique, I identify six key ancestral ethnic characteristics that differentiate these groups and document how these traits correlate with child poverty and undernutrition. I demonstrate that differences in intrahousehold resource distribution (rather than differences in other socioeconomic traits) serve as an important mechanism underlying these ethnic patterns. This study provides descriptive evidence that effective policies to alleviate child poverty and undernutrition in Sub-Saharan Africa must be tailored to the specific cultural contexts of the populations they serve.

Keywords: Culture, Intrahousehold Resources, Individual Poverty, Undernutrition

JEL Classification: D13, I32, J12, O15, Z13

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I express my gratitude to Rossella Calvi and Isabelle Perrigne for their invaluable advice, guidance and insights that have contributed to this work.

1 Introduction

Progress on the first two Sustainable Development Goals (SDGs)—no poverty and zero hunger—has regressed over the past three years (United Nations, 2023b). This setback is primarily due to the COVID-19 pandemic and the war in Ukraine, which have destabilized food and energy security across many countries (United Nations, 2023a). As a result, designing effective policies to alleviate poverty and undernutrition has become even more critical. However, adopting a uniform approach across countries and societies may be suboptimal, as it overlooks the significant role that culture and tradition play in shaping outcomes (Alesina & Giuliano, 2015; Ashraf et al., 2020; Rao & Walton, 2004; World Bank, 2014). This consideration is especially relevant in developing countries, where diverse ethnic groups maintain distinct religious practices, norms and customs (Baland & Ziparo, 2018; Bau & Fernández, 2023).

In addition, poverty and undernutrition are closely tied to how resources are distributed within households (Brown et al., 2021). Policies that fail to address these intrahousehold dynamics may overestimate their impact. Ethnic characteristics may influence within-household bargaining power—a key determinant of resource allocation (Alesina & La Ferrara, 2005; La Ferrara, 2007; Rasul, 2008). Therefore, these cultural and ethnic factors can affect poverty and undernutrition alleviation efforts on multiple levels. Evidence that culture and ethnicity shape outcomes and identifying which specific characteristics matter can enhance our understanding of how a society's and a household's cultural context influences development policies. This understanding can, in turn, shed light on why some societies lag in addressing poverty and undernutrition effectively.

In this paper, I provide a detailed descriptive account of how ethnic characteristics are associated with child poverty and undernutrition in Ethiopia, Ghana, Malawi and Nigeria. The analysis centers on three main aspects. First, I investigate whether the intrahousehold distribution of resources and child undernutrition outcomes vary across ethnic groups. Second, using a supervised machine learning technique, I identify six key ancestral ethnic characteristics that differentiate these outcomes, providing a framework to categorize cultural influence. Third, I document how these specific traits correlate with child poverty and undernutrition, identifying intrahousehold resource distribution as a key underlying mechanism. This documentation is essential, as it reveals deep-seated cultural norms as a key dimension of intrahousehold inequality, explaining why aggregate household wealth often fails to translate into individual child welfare.

I measure children's access to resources using resource shares, which are defined as the fraction of household expenditure allocated to each household member (Browning et al., 2013; Dunbar et al., 2013; Lechene et al., 2022). Resource shares have proven valuable in various public and development policy contexts, yet the factors driving inequality in these shares remain mostly un-

derexplored.[1] The findings indicate that a few specific traditional characteristics of ethnic groups correlate with children's resource shares, highlighting how these characteristics form norms that can indirectly exacerbate poverty and undernutrition by affecting children's access to household resources. I substantiate this by matching households on spatial and socioeconomic factors, demonstrating that ethnic traits capture distinctions beyond those associated with these factors.

I use data from the World Bank's Living Standards Measurement Study (LSMS) to measure children's welfare in terms of their access to resources, poverty rates and undernutrition prevalence. I estimate intrahousehold resource shares using the collective household model of Dunbar et al. (2013). I calculate individual child poverty using these identified resource shares and undernutrition rates, based on available anthropometric data, according to the World Health Organization's child growth standards (WHO & UNICEF, 2019). The results indicate that children's intrahousehold resource allocation and nutrition outcomes vary significantly across ethnic groups in all four countries. Furthermore, children with fewer resources allocated to them and lower levels of individual expenditure are more likely to be undernourished.

Households are linked to ethnic groups as documented in Murdock's (1967) Ethnographic Atlas (EA). In the resulting sample, the EA provides nearly 60 distinct ancestral practices, each describing how different societies organized aspects of life. These ethnic traits continue to influence contemporary behaviors through cultural persistence and historical transmission (Alesina et al., 2013). Using feature selection with a random forest regressor, I identify six of these ethnic characteristics that are key for child welfare outcomes.[2] The empirical results reveal significant associations between ancestral traits and contemporary measures of child welfare. First, children from independent families or village-level hierarchies have higher per-child resource shares than those in extended families and exhibit lower rates of poverty and undernutrition.

Similar patterns are observed for ethnic groups historically characterized by easily harvestable crops and high agricultural dependence. Ancestral bride-price practices correlate with higher resource shares, a trend primarily driven by girls, and a 10% lower likelihood of being poor. Historically nomadic societies are associated with a stark resource deficit of 0.25 standard deviations. Notably, while early male circumcision rituals relate to an initial resource gap of 0.10 standard

[1] Intrahousehold resource shares provide insights into how cash transfers should be distributed (Attanasio & Lechene, 2014; Banerjee & Klasen, 2022; Haushofer & Shapiro, 2016; Tommasi, 2019), explains how divorce laws affect the outside options and behavior of married couples (Castilla & Walker, 2013; Cherchye et al., 2012, 2017; Chiappori et al., 2018), contributes to child health outcomes and educational investment (Björkman Nyqvist & Jayachandran, 2017; Brown et al., 2021; Jayachandran & Kuziemko, 2011), provides measures of individual poverty (Dunbar et al., 2013; Lechene et al., 2022) and gender inequality (Calvi, 2020), as well as allowing food programs to effectively target the nutritionally vulnerable (Harris-Fry et al., 2022).

[2] These are not the only characteristics important for child poverty and undernutrition. Others include high gods/religion, the jurisdictional hierarchy beyond the local community, class stratification, inheritance rules, sex differences in occupation and different slavery types. However, the analysis focuses on six main characteristics given sample restrictions and data limitations.

deviations, this difference shrinks among older children and these societies display lower undernutrition rates among children in non-poor households.

The findings support empirical evidence that cultural practices and traditions are significant for development policies. However, as these ancestral traits are immutable and likely capture broader dimensions of social organization (such as institutional norms), the policy implication is not to alter culture, but to tailor interventions—especially in developing countries facing constrained resources. This paper highlights how historical ethnic characteristics may have cultivated norms that disadvantage children, resulting in lower allocable resource shares for children today. These shortfalls in daily consumption are a critical barrier to long-term development, particularly for young children, as resource deprivation often precedes and compounds negative consequences for human capital formation and adult productivity (Brooks-Gunn & Duncan, 1997; Gertler, 2004; Hoynes et al., 2016). Therefore, acknowledging and understanding these ancestral roots allows policymakers to move beyond broad stereotypes and to use historical data to identify structural contexts where standard household-targeting may fail. This approach enables optimal policies that ensure resources effectively reach children within existing cultural frameworks, rather than imposing external norms.

This paper contributes to three main strands of literature. First, it advances the literature on how culture influences the distribution of resources within households. While recent studies have examined specific traits such as patrilocality or dowry payments (Aminjonov et al., 2024; Calvi & Keskar, 2021), the influence of a broader set of ancestral norms on resource shares remains largely unexplored. I contribute by identifying six distinct ethnic practices from the EA that are significant for child welfare outcomes. Furthermore, I analyze how these traits correlate with child resource shares, ensuring that these relationships are robust to contemporary socioeconomic and spatial factors.

Second, I contribute to the literature on child nutrition and poverty (Beltramo et al., 2023; Brown et al., 2023; Durevall & Isaksson, 2024). While existing work documents that undernourished children often reside in non-poor households, I provide a cultural explanation for this puzzle. By linking these outcomes to ancestral traits, I show that intrahousehold inequality is a key channel through which resources fail to reach children, even in non-poor families. Lastly, I contribute to the literature highlighting the importance of ethnic composition and social organization in development policy (Collier, 2017; Moscona & Seck, 2024). While previous research demonstrates that economic outcomes vary across social, ethnic or religious groups, it has primarily focused on aggregate outcomes such as conflict, trust and growth (Ashraf et al., 2020; Lowes et al., 2015; Michalopoulos & Papaioannou, 2015; Nunn, 2020). I shift this focus to the micro-level, highlighting how historical ethnic practices correlate with the intergenerational transmission of resources and child welfare.

2 Importance, Background Information & Context

Researchers and policymakers increasingly recognize the importance of cultural and traditional practices in shaping economic development outcomes (Ashraf et al., 2020; Collier, 2017; World Bank, 2014). Growing evidence suggests that there are benefits to understanding a society's beliefs, norms and culture (Aminjonov et al., 2024; Ashraf et al., 2020; Rao & Walton, 2004; World Bank, 2014). Social norms are defined as values, beliefs or attitudes shared by a group of people or society as a whole (UNICEF, 2021). They guide human behavior through perceived rules that define acceptable and appropriate actions. Under this framework, cultural traits, practices and characteristics all qualify as social norms within the ethnic communities (Bisin & Verdier, 2011; Guiso et al., 2006). Understanding how these "rules of society" influence child welfare is a necessary prerequisite for designing policies tailored to specific cultural contexts.

Social norms and cultural traits are often transmitted vertically across generations, resulting in behaviors that persist long after their initial environmental or economic drivers have changed (Collier, 2017; Tabellini, 2008; Voigtländer & Voth, 2012). Bisin and Verdier (2001) demonstrate that children's preferences depend on their "parents' socialization actions and on the cultural and social environment in which children live." Similarly, Doepke and Zilibotti (2008) provide a theory of preference formation—based on the belief that culture and religion are key driving forces. Local culture and practices, such as cultural and religious fragmentation, are also associated with long-term effects—such as civil wars, corruption and public good provision (Alesina & La Ferrara, 2005).

Furthermore, historical shocks can leave a lasting imprint on a society's "cultural memory." Guiso et al. (2016) examine the impact of a positive historical shock on long-term persistence in development in Italy, showing how historical events can alter contemporary beliefs and norms in certain societies. Most notably, Alesina et al. (2013) study the historical origins of norms that lead to male-favoring outcomes by empirically testing the theory of Boserup (1970). Specifically, the authors find that descendants of societies that traditionally practiced plough agriculture have less equal contemporary gender norms due to the physical demands of plough agriculture, regardless of their current occupation. This strand of literature supports the premise that historical cultural practices, as documented in the EA, represent ancestral blueprints that continue to shape household bargaining power and resource allocation today.

In sub-Saharan Africa (SSA), where ethnic identity remains a salient feature of social organization, these ancestral norms are particularly prevalent. Literature has explored how marriage market institutions affect child marriage and a daughter's human capital (Corno et al., 2020), its effect on school construction programs (Ashraf et al., 2020) and the role of slave trades in the origin and persistence of female genital cutting (Corno et al., 2025). Michalopoulos and Papaioannou (2015)

emphasize the importance of ethnic traits in understanding the African development path. Nunn and Wantchekon (2011) trace contemporary differences in trust levels back to the transatlantic slave trade, showing that the causal mechanisms are individual-specific (i.e., cultural norms, beliefs and values). Taken together, this evidence suggests that development policies should not ignore ethnic traits, but rather adapt to these age-old traditions to ensure that interventions effectively reach and benefit children across diverse social structures.

3 Methodology and Data

In this section, I provide an overview of the identification and estimation strategy for recovering intrahousehold resource shares using the collective household framework proposed by Dunbar et al. (2013) (henceforth, DLP). I detail the structural model, the necessary identifying assumptions and the two-phase empirical estimation procedure. Following this, I describe the primary data sources, explain the integration of household surveys with historical ethnographic data from the Ethnographic Atlas (EA) and present brief descriptive statistics.

3.1 Identification and Estimation

The unequal sharing of resources within households is widely acknowledged. Chiappori's (1992) seminal contribution proposed the collective household model that explicitly considers the different preferences of several members, accounting for the bargaining process underlying household decisions. While collective models traditionally assume Pareto efficiency (leading to a sharing rule interpretation), this assumption has been scrutinized, particularly in poor-country contexts where coordination failures may occur (Baland & Ziparo, 2018; De Mel et al., 2009; Deschênes et al., 2020; Udry, 1996). However, following recent methodological advances, I interpret the sharing rule not necessarily as a condition of Pareto optimality, but as a stable equilibrium resulting from repeated intrahousehold bargaining. Under this interpretation, identification of the sharing rule remains valid as long as a consistent rule exists to govern resource allocation (Bargain & Donni, 2012; Bargain, Donni, & Hentati, 2022; Browning et al., 2013; Dunbar et al., 2013).

Following the literature, I define the resource share of a household member as the fraction of household expenditure allocated to that household member (Browning et al., 2013; Dunbar et al., 2013; Lechene et al., 2022). While data limitations often make the identification and estimation of resource shares difficult, Browning et al. (2013) (henceforth, BCL) and DLP developed structural models that provide a framework for estimating the resource shares using routinely collected survey data. Recently, Lechene et al. (2022) (henceforth, LPW) proposed a linear estimation

strategy for the DLP model with corresponding identification tests. In this paper, I follow the DLP structure, perform the linear identification test proposed by LPW and draw insights from Aminjonov et al. (2025).

3.1.1 The Model and Identifying Assumptions

Let t denote the type of member in the household: m for an adult male, f for an adult female and c for a child. The model allows for multiple members of any type and complex household structures, such as multigenerational, multifamily and single-parent households, all of which are prevalent in developing countries. Let a household consist of N^t members of each type, where $\sum_t N^t = N$ represents the total number of household members. Let y denote the observed household consumption (budget). In a similar spirit to Aminjonov et al. (2025), I let resource shares depend on sharing rule determinants z^{sr} and denote preference shifters (influencing the Engel curve slope and intercept) as z^p.

Let $\eta_t(z^{sr})$ denote the collective resource share of all household members of type t, such that $\sum_t \eta_t(z^{sr}) = 1$. I assume that all members of the same type receive the same resource share.[3] Consequently, η_t/N^t represents the per-individual resource share. This implies that each individual of type t consumes a private expenditure given by

$$y_t = \frac{y\eta_t(z^{sr})}{N^t}. \tag{1}$$

This assumption of equal intra-type shares is primarily driven by data limitations. However, since the focus of this paper is on how child welfare correlates with ethnic characteristics, it does not restrain the primary conclusions. Furthermore, I include the proportion of boys as a covariate in the sharing rule to capture any potential gender gap among children (Bargain et al., 2018; Deaton, 1997; Dunbar et al., 2013).

Key Identifying Assumption: Independence of Base. This assumption states that $\eta_t(z^{sr})$ is independent of the household's total expenditure. Intuitively, if a household experiences a shock, such as a good harvest, the proportional slices of total expenditure allocated to men, women and children remain fixed, even though the absolute size of their allocation grows. Mathematically, this implies $\partial\eta_t(z^{sr})/\partial y = 0$. This assumption is crucial because it allows the model to disentangle changes in the household's total budget from shifts in the intrahousehold sharing rule, thereby making the resource shares non-parametrically identifiable from the Engel curves of the assignable goods.

In the countries analyzed, which are low-income, near-subsistence settings, the vast majority of

[3] This assumption naturally holds for households with only one member of a given type.

expenditures are allocated to basic necessities. Hence, the sharing rule is likely to remain stable since households are not moving across massive wealth gradients. Furthermore, as I argue in this paper, persistent cultural and gender norms dictate how the sharing rule is determined. These structural determinants likely keep intrahousehold bargaining power stable regardless of marginal income fluctuations. However, it is important to acknowledge the potential impact of severe negative shocks, such as extreme floods or droughts. In such survival scenarios, women often buffer their children's consumption (Christian et al., 2019), suggesting that the independence assumption may be restrictive at the extreme lower tails of the income distribution.

Functional Form Assumption: Piglog Preferences. This semi-parametric restriction on preferences assumes Piglog indirect utility functions for each individual (Deaton & Muellbauer, 1980). This assumption implies that individual Engel curve functions are linear in $\ln y_t$, taking the form

$$w_t(y_t) = \alpha_t(z^p) + \beta_t(z^p) \ln y_t. \tag{2}$$

For this assumption to be empirically useful, one relies on private-assignable goods. Following previous literature, I use men's, women's and children's clothing and footwear as assignable goods for each household member type (Aminjonov et al., 2024, 2025; Calvi, 2020; Dunbar et al., 2013; Lechene et al., 2022). I index these assignable goods by g_t for each member type t. Here, w^{g_t} denotes the proportion of their private budget the member allocates to clothing. Using the structure imposed by (2) and substituting the private expenditure from (1), the combined expenditure on assignable goods for all members of type t as a fraction of total household expenditure, $W_t^{g_t}$, is given by

$$W_t^{g_t}(y) = \eta_t(z^{sr}) \left[\alpha_t(z^p) + \beta_t(z^p) \left(\ln y + \ln \eta_t(z^{sr}) - \ln N^t \right) \right]. \tag{3}$$

Next, I focus on the restrictions to ensure the resource shares in (3) are identifiable. First, $W_t^{g_t}(y)$ is observed in the data. Second, since $\sum_t \eta_t(z^{sr}) = 1$, men's resource shares can be written as the residual, i.e., $\eta_m(z^{sr}) = 1 - \eta_f(z^{sr}) - \eta_c(z^{sr})$. Invoking the Independence of Base assumption and taking the partial derivative of (3) with respect to the log of total expenditure yields

$$\frac{\partial W_t^{g_t}(y)}{\partial \ln y} = \eta_t(z^{sr}) \beta_t(z^p). \tag{4}$$

The term $\partial W_t^{g_t}(y) / \partial \ln y$ provides the empirical implication that household Engel curves for these assignable goods must not be flat.

Key Identifying Assumption: Similarity Across People (SAP). This assumption restricts preferences such that $\beta_t = \beta \; \forall t$ (Dunbar et al., 2013). Hence, a man and woman might have different "baseline" levels of clothing consumption ($\alpha_m \neq \alpha_f$), but they react similarly to marginal changes

in their own private expenditure. Although this is a relatively strict assumption, it has been tested, validated and utilized in several recent studies (Bargain, Lacroix, & Tiberti, 2022; Brown et al., 2021; Dunbar et al., 2021). In the context of SSA, clothing is largely viewed as a necessity and thus should exhibit similar income elasticities across household members (Lechene et al., 2022). Along with the SAP assumption, (3) is exactly identified and the structural parameters can be estimated.

3.1.2 Estimation Strategy

Similar to Aminjonov et al. (2025), I model resource shares using logistic functions to ensure they fall within the unit interval and sum up to one. Using Non-Linear Seemingly Unrelated regressions (NLSUR), I estimate the system of equations

$$W_t^{g_t}(y) = \eta_t(z^{sr}) \left[\alpha_t(z^p) + \beta(z^p) \left(\ln y + \ln \eta_t(z^{sr}) - \ln N^t\right)\right] + \varepsilon_t \ \forall t = m, f, c \tag{5}$$

where

$$\begin{aligned} \eta_f &= \frac{\exp(\gamma_f z^{sr})}{D} \\ \eta_c &= \frac{\exp(\gamma_c z^{sr})}{D} \\ \eta_m &= \frac{1}{D} \\ \text{and } D &= 1 + \exp(\gamma_f z^{sr}) + \exp(\gamma_c z^{sr}). \end{aligned}$$

To address the potential endogeneity of total household expenditure, I utilize a control function approach. I augment each equation with the Wu-Hausman residuals derived from a reduced-form regression of $\ln y$ on all regressors as well as instruments for disposable income (Banks et al., 1997; Blundell & Robin, 1999). As in Aminjonov et al. (2025), these instruments are strong predictors of $\ln y$.[4] The preference shifters (z^p) include household composition (N^m, N^w, N^c), an indicator for whether the household is in a rural area and regional fixed effects. The sharing rule determinants (z^{sr}) control for household composition, the average age of each member type, the proportion of children who are boys and the gender education gap.

A primary goal of this paper is to identify which ancestral ethnic traits from the EA matter for child welfare outcomes and how these traits correlate with resource shares. To achieve this, my empirical strategy proceeds in two phases. In the first phase, I estimate a baseline model where the sharing rule determinants (z^{sr}) do not include any ethnic characteristics. Using these

[4]These instruments include the month the survey was conducted to account for seasonality, as well as a quadratic term of total income. For Malawi and Nigeria, I also include dummy variables that capture household wealth, such as whether the household owns a home, a phone, a bed, a television, a plough, a non-agricultural business, a bank account or has access to electricity.

baseline estimates, I calculate the calorie-adjusted individual poverty rate for children (Brown et al., 2021). I then employ supervised machine learning, utilizing these child poverty rates as well as undernutrition indicators (stunting, underweight and wasting), to select six highly predictive ethnic characteristics from the EA.[5]

In the second phase, I denote these six selected ethnic characteristics as θ and augment the sharing rule determinants such that

$$\tilde{z}^{sr} = \begin{bmatrix} z^{sr} & \theta \end{bmatrix}. \tag{6}$$

I then re-estimate the following structural system of equations using the augmented sharing rule determinants (6):

$$W_t^{g_t}(y) = \eta_t(\tilde{z}^{sr}) \left[\alpha_t(z^p) + \beta(z^p) \left(\ln y + \ln \eta_t(\tilde{z}^{sr}) - \ln N^t \right) \right] + \varepsilon_t. \tag{7}$$

Finally, because the analysis spans geographic regions with spatially dispersed ethnic groups, regional price variation is a potential concern. If one ethnic group faces significantly higher prices for assignable goods (clothing), resource shares may be biased. To mitigate this, I include regional dummies in the preference shifters to absorb broad spatial differences in price levels. Furthermore, while absolute levels of welfare are sensitive to prices, the identification of resource shares remains robust provided household members face the same relative prices for assignable goods within their local markets (Dunbar et al., 2013). Since adult and children's clothing are highly tradable goods often sold in the same rural market stalls, this is a plausible assumption.

3.1.3 Tests of Identification

To test the empirical implication of non-flat Engel curves, I utilize the linear identification test proposed by LPW.[6] In essence, this test uses ordinary least squares to verify whether the overall household-assignable-goods Engel curve has a non-zero slope with respect to total expenditure. For every observed household h, the linear overall household assignable goods Engel curve can be written as

$$W_h = a_h + b_h \ln y_h + \epsilon_h. \tag{8}$$

Therefore, estimating (8) provides a household-specific slope estimate $\hat{b}_h$. Hence, for each household in the sample, I test whether $\hat{b}_h$ equals zero and report the fraction of households for which it is statistically significant. The second test evaluates whether the overall assignable-goods Engel curve, evaluated at the mean of the covariates, is decreasing or increasing. That is, one can perform a Z-test using $E[\hat{b}_h]$. Lastly, I calculate the post-estimation structural parameter β from the main system of equations given in (5). Similarly, I report the fraction of households in the

[5] I provide more detail on the machine learning technique in Section 4.2.

[6] I provide a brief overview of the linear reframing in Appendix Section A

sample for which this β is significantly different from zero.

Table 1 summarizes the results of the LPW linear identification tests alongside the post-estimation non-linear significance levels. These results confirm that the structural model is empirically well-identified for Ethiopia, Ghana, Malawi and Nigeria, all of which meet the 80% threshold for non-flat Engel curves. In the LPW linear pre-test, Ghana and Malawi demonstrate particularly robust identification, with 86% and 98% of their respective samples exhibiting significant slopes, while Ethiopia and Nigeria also surpass the threshold at 84% and 80%, respectively. Conversely, Niger (0%), Tanzania (26%) and Uganda (79%) are excluded from the primary analysis due to insufficient sample significance. Post-estimation sample significance also supports excluding these countries. This selection process ensures that the structural estimates are derived from a foundation of clear, non-zero Engel curves, as theoretically required by the DLP framework.

Table 1: Budget and Identification

Country	Number of Households	Total Household Consumption (2017 US$ PPP)	Budget Share of the Assignable Good	Z-Test of Slope (LPW)	% of Sample Significant (LPW)	% of Sample Significant (Non-Linear)
Ethiopia	6426	4795.6 (4300.3)	0.043 (0.041)	−4.98	0.84	0.79
Ghana	12926	6765.4 (5150.7)	0.055 (0.042)	−5.14	0.86	1.00
Malawi	11073	3118.9 (2657.9)	0.019 (0.026)	10.50	0.98	1.00
Niger	3344	6553.9 (4278.2)	0.026 (0.023)	−0.21	0.00	0.61
Nigeria	4270	6283.5 (3701.4)	0.043 (0.030)	−2.76	0.80	0.96
Tanzania	4096	5580.9 (4143.8)	0.032 (0.027)	−1.88	0.26	0.27
Uganda	2798	6013.9 (4476.9)	0.018 (0.018)	−3.66	0.79	0.46

Note: Values for household consumption and budget shares are reported as means, with standard deviations in parentheses. The budget share represents the proportion of total expenditure allocated to adult and children's clothing and footwear. The Z-test, following LPW, evaluates the hypothesis that the aggregate assignable-goods Engel curve is non-zero (either upward- or downward-sloping). Sample significance (LPW) reflects the fraction of households with non-flat Engel curves, calculated using the linear method proposed by LPW. Post-estimation sample significance results for the non-linear method are also provided. For the retained sample of Ethiopia, Ghana, Malawi and Nigeria, the non-linear estimation is augmented by income residuals to control for endogeneity. All sample significance tests for non-flat Engel curves are conducted at the 5% level ($\alpha = 0.05$).

3.2 Data

I rely on the World Bank's Living Standards Measurement Study (LSMS) and the Ethnographic Atlas (EA) (Murdock, 1967) as the two primary data sources. I also utilize Giuliano and Nunn's (2018) database to obtain precise historical locations of ethnic groups based on ancestral languages. The LSMS data contains household-level expenditure and child anthropometric information needed to estimate resource shares and calculate both poverty rates and undernutrition indicators.[7] The EA describes cultural traits for 1291 societies worldwide, with a sound coverage of African ethnic groups and has been used in several studies (Aminjonov et al., 2024; Ashraf et al., 2020; Corno et al., 2025; Enke, 2019; Nunn & Wantchekon, 2011).

From these sources, I initially identify seven African countries with the required expenditure data, child anthropometric data and information to match households to the EA (Ethiopia, Ghana, Malawi, Niger, Nigeria, Tanzania and Uganda).[8] However, the final analysis focuses on Ethiopia, Ghana, Malawi and Nigeria, as these met the strict requirements for the identification tests outlined in Section 3.1.3. I use the latest wave of LSMS data for Ghana (2016/17) and Malawi (2019/2020). For Ethiopia, I use the fourth wave (2018–2019) rather than the fifth, as the latter excludes the Tigray region due to conflict. For Nigeria, I use the fourth wave (2018/19) rather than the fifth because the most recent wave does not provide the necessary disaggregation of clothing expenditure between adult men and adult women.

After removing households with missing location, expenditure and demographic data, the sample includes 6426 households from Ethiopia, 12926 from Ghana, 11073 from Malawi and 4270 from Nigeria.[9] To ensure cross-country consistency, I aggregate expenditure on clothing and footwear for adult men, adult women and children to serve as the assignable goods required for the model estimation.[10] To maintain methodological consistency, households in Ethiopia, Malawi and Nigeria are matched to their ancestral ethnic groups in the EA using GPS coordinates. In Ghana, where GPS data is unavailable, I use the directly reported ethnicity. I successfully match approximately 95% of each country's sample to the EA, resulting in a final sample of 28 ethnic groups for Ethiopia, 24 for Ghana, 8 for Malawi and 55 for Nigeria. These are all mapped in Figure 1 along with the available GPS coordinates of household clusters.

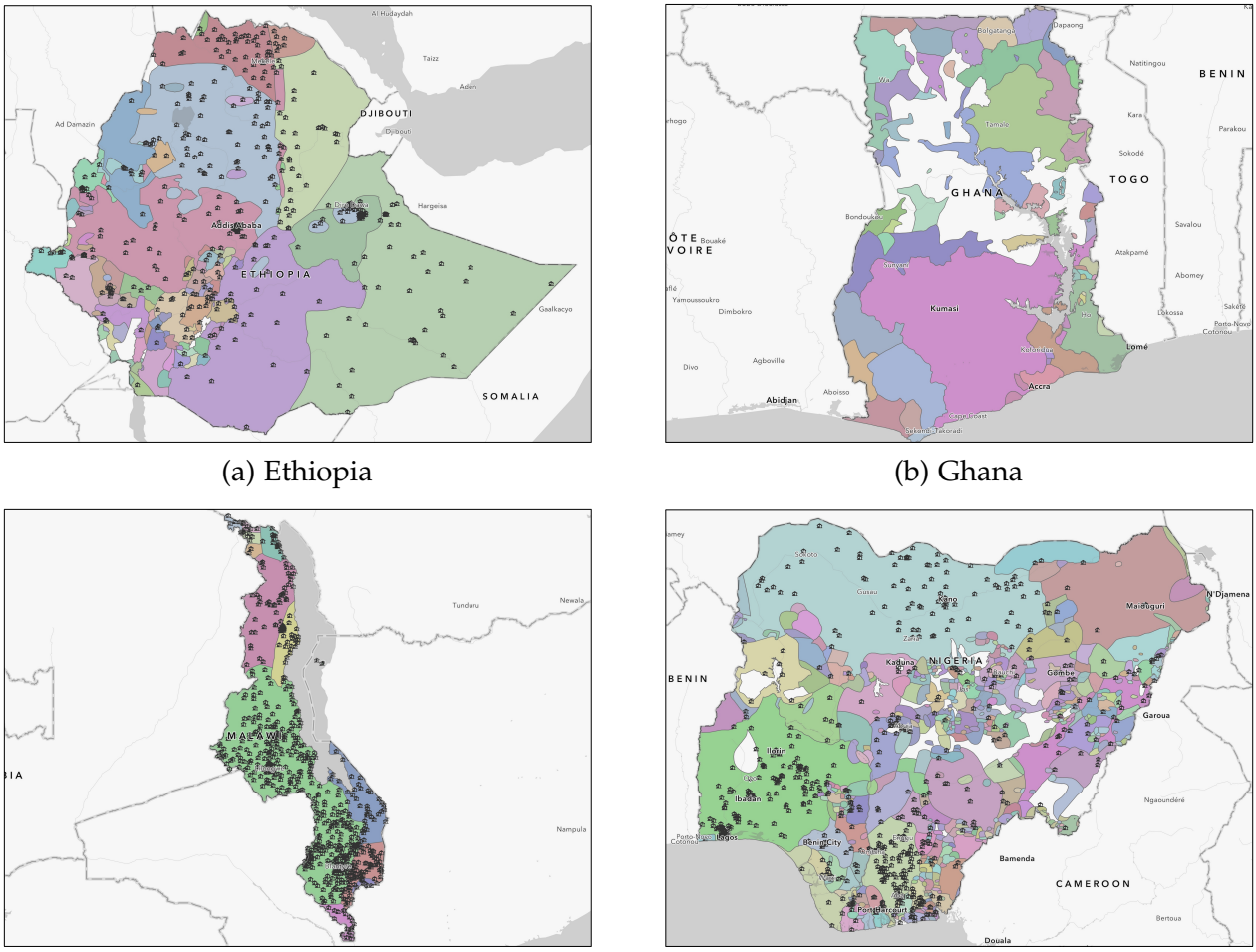
[7] Stunting, underweight and wasting are defined using anthropometric measurements (height, weight) relative to the age and sex of the child, based on the 2006 WHO Child Growth Standards. Z-scores for length/height-for-age (HAZ), weight-for-age (WAZ) and weight-for-length/height (WHZ) are calculated. Children with Z-scores below -2 standard deviations from the reference median are classified as stunted (HAZ), underweight (WAZ) and wasted (WHZ).

[8] For Tanzania and Uganda, GPS coordinates are restricted. However, location information exists at the parish and division level, respectively, which can be utilized to match households to ethnic groups in the EA.

[9] Table B1 in the Appendix provides a detailed breakdown of the different samples.

[10] Table B2 in the Appendix contains detailed information on the available assignable goods for each country and the definition of children based on age.

Figure 1: Ethnic Groups



(a) Ethiopia

(b) Ghana

(c) Malawi

(d) Nigeria

Note: These maps depict the historical boundaries of ethnic groups in Ethiopia, Ghana, Malawi and Nigeria as documented in the Ethnographic Atlas (EA) and mapped by Giuliano and Nunn (2018). For Ethiopia, Malawi and Nigeria, the household dots represent the locations of surveyed households. To protect respondent privacy, these coordinates are offset by $0-2km$ for urban areas, $0-5km$ in rural areas and $0-10km$ in extreme cases (1% of enumeration areas). Therefore, these points represent coordinates that are representative at the cluster level and fall within established limits of geographic accuracy. GPS coordinates for Ghana are restricted and matching was performed using directly reported ethnic identity.

3.3 Descriptive Statistics

Since the analysis focuses on countries in SSA, expenditure levels, as seen in Table 1, are relatively low. Specifically, the average annual household expenditure (2017 US$ PPP) is $3118.9 in Malawi and $4795.6 in Ethiopia. Levels of expenditure in Ghana and Nigeria are higher at around $6765.4 and $6283.5, respectively. When estimating resource shares, I control for the average age of men, women and children; household composition (number of men, women and children); the gender gap in education; the proportion of children who are boys; and regional/rural indicators.

On average, men in the sample are 37 years old and women are 34 years old. Each household typically contains one to two men and women and three children, with an even split between boys and girls. While men generally have higher educational attainment, the average for both genders is less than six years of education (primary school). The sample is predominantly rural, at 75% in Ethiopia, 50% in Ghana, 84% in Malawi and 72% in Nigeria. For children under five, the average age is approximately 30 months. The mean height-for-age Z-score (HAZ) is -1.38 and the mean weight-for-age Z-score (WAZ) is approximately -0.7. These values reflect the expected prevalence of undernutrition in these contexts. Notably, in Ethiopia, Malawi and Nigeria, around 40% of children under five are classified as stunted.[11]

4 Results

The primary focus of this section is to examine how ancestral ethnic characteristics correlate with modern intrahousehold resource allocation and child poverty. To achieve this, the results are presented in three progressive steps. First, I present the baseline results from the Phase 1 estimation, detailing the relationships between resource shares, child poverty and undernutrition, alongside observable differences across ethnic groups. Second, I outline the supervised machine learning procedure utilized to isolate the six ancestral ethnic traits from the Ethnographic Atlas (EA) that are most highly predictive of child welfare outcomes. Finally, using these six selected traits, I analyze correlations with resource shares and employ logistic regressions of child poverty (and undernutrition) on household per-capita expenditure to quantify how these child welfare outcomes vary across the specific ancestral ethnic characteristics. The section concludes with an assessment of the robustness of the findings.

4.1 Baseline Results

The structural estimation of the baseline system of equations, given by (5), yields the predicted resource shares reported in Table 2. I present results for both nuclear households (mfc) and all family-type households (mfc, mf, mc, wc). Across these samples, per-child shares (η_c/N^c) range from 0.09 to 0.21. Notably, children in Nigeria receive the lowest per-child share of household resources, while children in Malawi receive the largest. Across all countries and household compositions, men consistently have larger resource shares than women. These results are broadly

[11] Detailed descriptive statistics are provided in Tables B3, B4 and B5.

consistent with recent findings in the literature (Aminjonov et al., 2025).[12]

Table 2: Predicted Resource Shares

Country	Men, Women, Children Households				All Family-Type Households			
	Number of Households	Per-Man Share	Per-Woman Share	Per-Child Share	Number of Households	Per-Man Share	Per-Woman Share	Per-Child Share
Ethiopia	3891	0.23 (0.10)	0.21 (0.09)	0.16 (0.06)	5542	0.28 (0.15)	0.25 (0.13)	0.17 (0.07)
Ghana	6451	0.22 (0.09)	0.19 (0.10)	0.13 (0.04)	9766	0.25 (0.12)	0.24 (0.15)	0.14 (0.05)
Malawi	7315	0.20 (0.08)	0.16 (0.09)	0.21 (0.07)	10066	0.23 (0.12)	0.20 (0.13)	0.21 (0.08)
Nigeria	2909	0.21 (0.07)	0.19 (0.12)	0.09 (0.04)	3773	0.23 (0.08)	0.22 (0.15)	0.10 (0.04)

Note: This table displays the mean and standard deviation of estimated per-person resource shares, η_t/N_t for men, women, and children. Family-Type households encompass nuclear, single-parent, and childless-couple compositions.

Using these estimated resource shares and total household expenditure, I calculate individual and calorie-adjusted poverty rates (Brown et al., 2021) for all household members (detailed in Appendix Table C1). Malawi exhibits the highest per-capita poverty headcount at 70%, followed by Nigeria (42%), Ethiopia (40%) and Ghana (37%). However, when using the calorie-adjusted individual poverty lines, 36% of children in Ethiopia, 34% in Ghana, 46% in Malawi and 49% in Nigeria are classified as poor. These results illustrate that traditional per-capita measures often mask the specific deprivation levels experienced by children within the household.

To explore the relationship between resource shares and child undernutrition, I utilize the following categories according to the WHO: not undernourished (Z-score > -2), moderately undernourished ($-3 \leq$ Z-score < -2) and severely undernourished (Z-score < -3) for stunting (HAZ), underweight (WAZ) and wasting (WHZ). Figure C1 demonstrates that across all three

[12]For Ethiopia, per-child resource shares have ranged from 0.1 to 0.32 depending on household composition (Aminjonov et al., 2025; Belete et al., 2022). For Ghana, per-child shares have ranged from 0.06 to 0.1 and per-woman shares from 0.22 to 0.31 (Aminjonov et al., 2024, 2025). For Malawi, several studies have been conducted with various estimates of resource shares. Depending on household compositions, estimates of per-child shares range from 0.07 to 0.21, while shares for women and men range from $0.24 - 0.41$ and $0.3 - 0.51$, respectively (Aminjonov et al., 2024, 2025; Bose-Duker et al., 2021; Dunbar et al., 2013; Lechene et al., 2022; Penglase, 2021). For Nigeria, a previous study found per-child shares of 0.05, per-woman shares of 0.26 and per-man shares of 0.33 for nuclear households (Aminjonov et al., 2025). Several factors account for the deviations from previous results. First, I utilize more recent survey waves for Ethiopia, Malawi and Nigeria. Second, to capture as many households as possible, I do not impose strict sample restrictions. Third, I draw on the methodology of Aminjonov et al. (2025) to address potential endogeneity in expenditure.

indicators, for both boys and girls, there is a trend of children with lower resource shares being in the severely undernourished category. Logistic regressions (Figures C2a and C2b) reveal a clear income effect, with a 14 and 10 percentage point difference in the predicted probability of stunting and underweight between the highest and lowest expenditure percentiles.

However, even at the top expenditure percentile, the prevalence rates remain strikingly high with 27% for stunting and 10% for underweight. This persistence likely stems from two factors. First, in these low-income settings, the top percentile does not necessarily represent a high absolute standard of living. Second, children in the sample reside predominantly in rural communities where poor sanitary infrastructure and recurrent disease environments can directly impact nutrition outcomes. Consequently, the income effect is more muted, corroborating the findings by Brown et al. (2019) and further supported by the concentration curves in Figure C3.

Finally, to establish that these outcomes vary meaningfully across ethnic lines within the same countries, I utilize ANOVA tests and Kernel density estimates. For every country, the ANOVA tests (Table C2) reject the null hypothesis of equal mean resource shares across ethnic groups. Similarly, tests for child anthropometrics and undernutrition prevalence (Table C3) also reject the equality of means across groups. Visual inspections of the Kernel densities confirm these results, showing distinct distributional shifts between ethnic groups within the same country. This confirms that child welfare outcomes and intrahousehold allocations are ethnically heterogeneous, providing the necessary empirical basis for investigating the role of ancestral cultural traits.

4.2 Feature Selection

Identifying the specific ancestral ethnic characteristics that matter for contemporary child poverty and nutrition outcomes is computationally challenging. The EA contains 94 primary variables, most of which are categorical and expanding these into indicator variables yields over 250 potential ethnic characteristics.[13] Manually selecting the most "relevant" ethnic characteristics from this set would be infeasible, arbitrary and subject to researcher bias. To address this, I employ a supervised machine learning approach to identify the features with the highest predictive power for child welfare.

The selection process follows four steps. First, I reduce the EA to a subset of 84 variables by removing alternative forms and traits with near-zero variation in the sample (see Appendix Table D1). Second, as is standard practice, I expand the categorical variables into indicator variables and normalize the ordinal variables to the $[0, 1]$ interval. Third, I define four outcome variables

[13]For example, the "prevailing type of transfer or exchange at marriage" variable in the EA contains seven distinct categories—bride price, bride service, token bride price, female relative exchange, absence of consideration and dowry payments—which are mutually exclusive characteristics.

indicating child welfare: poverty, stunting, underweight and wasting.[14] Lastly, I perform feature selection using a Random Forest algorithm across 20 distinct specifications, encompassing four outcomes for each of the four countries and the pooled total sample.[15]

The most relevant ancestral traits are identified based on their aggregate importance scores and the frequency with which they appear in the "top 10" across all 20 feature selection specifications (see Appendix Table D2). To capture structural differences between ethnic groups while accounting for sample size constraints and the need for meaningful cross-household heterogeneity, this data-driven process yields six key ethnic practices. First, the jurisdictional hierarchy of the local community (θ_1) is classified into three levels—independent (nuclear) families, extended families and clan-barrios (village-level families)—to reflect the complexity of local social organization. Second, principal crop type (θ_2) distinguishes between "easy-harvestable" crops, such as tree fruits, roots and tubers, and other crops like cereal grains, which require more specialized harvesting and are generally storable (Mayshar et al., 2022).

Third, dependence on agriculture (θ_3) is defined as the percentage of subsistence derived from farming relative to gathering, hunting, fishing and animal husbandry, categorized into low ($0-25\%$), medium ($26-75\%$) and high ($76-100\%$) levels of dependence. Fourth, male circumcision (θ_4) differentiates between ethnic groups where rituals occur during early childhood ($0-5$ years) and those where the practice is either absent or performed during adolescence or adulthood. Fifth, regarding marriage transactions (θ_5), the analysis focuses on the distinction between societies that practice bride price or bride wealth (including token payments) and those that do not, as this represents the dominant transaction type in the sample regions. Finally, settlement patterns (θ_6) are classified into nomadic-type societies—encompassing nomadic, fully migratory, semi-nomadic or semi-sedentary groups—and non-nomadic societies.

4.3 The Role of Ancestral Ethnic Characteristics

To explore the role of the ancestral ethnic characteristics identified in Section 4.2, I let θ in (6) consist of indicator variables identifying each of the ethnic characteristics and estimate the system of equations given by (7). Resource share and poverty estimates for the structural model estimated in Phase 2 are available in Tables E1 and E2, respectively. Even with updated sharing rule determinants and different sample sizes (due to missing ethnic data), results remain qualitatively

[14] A child is poor based on estimated resource shares and the calorie-based-adjusted poverty line, assuming that US$2.15/day is the average threshold for adults aged 15 to 45 (Brown et al., 2021).

[15] To ensure the robustness of the feature selection, I also perform Recursive Feature Elimination with Cross-Validation (RFECV) to identify the optimal feature subsets across all specifications (see Appendix Table D3). Additionally, I use Group Lasso feature selection to validate the importance of these ethnic traits (see Appendix Table D4).

similar to those in the baseline and resource share estimates do not deviate by more than 4 percentage points. When deviations do occur, they primarily reflect a slight reallocation of resources toward men (who see share increases of 2 to 4 percentage points in Ethiopia, Ghana and Nigeria). This reallocation is drawn primarily from women in Ethiopia and from children in Ghana and Nigeria. Using the calorie-adjusted individual poverty lines, 36% of children in Ethiopia, 46% in Ghana, 44% in Malawi and 60% in Nigeria are classified as poor. A slight increase in child poverty occurs in Ghana and Nigeria, mirroring the effect of children receiving fewer resources.

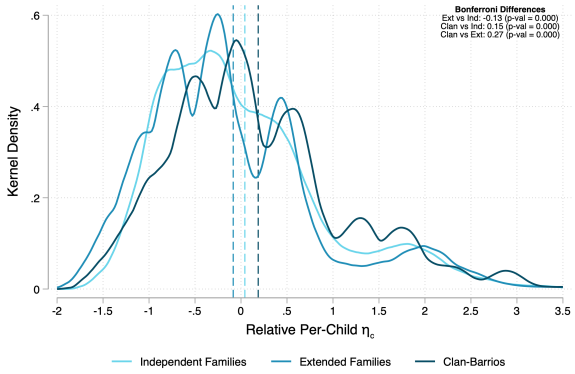
Associations with Resource Shares. First, I use kernel densities of the within-country relative per-child resource shares to explore the correlation between historical ethnic traits and resources allocated to children. I also provide Bonferroni and t-tests for differences in means across these ancestral traits. Figure 2a highlights that children in extended families have systematically less access to resources compared to those in independent families or clan-barrio structures.[16] Bonferroni differences confirm this, showing that on average, extended families allocate 0.13 standard deviations less to children than independent families and 0.27 standard deviations less than clan-barrio hierarchies. Figure 2b shows a clear horizontal shift between the distributions of ethnic groups with historically easy-harvestable crops and those with other crops, with a substantial mean difference of 0.28 standard deviations.

Figure 2c reveals a clear divergence between societies whose ancestors depended heavily on agriculture and those that did not. The kernel density for societies with only $0-25\%$ historical dependence on agriculture peaks at approximately 1.1 standard deviations below the mean. Bonferroni differences confirm this with a large discrepancy of 0.65 standard deviations between the lowest and highest agriculture dependence groups. Even though Figure 2d indicates a statistically significant mean difference of 0.12 standard deviations between societies where male circumcision historically occurred at young ages (0–5 years) and those where it was absent or occurred later, the divergence in their overall kernel distributions is less pronounced. Similarly, Figure 2e shows nearly identical kernel densities and a small mean difference (0.04 standard deviations) between ancestral bride price societies and those with other marriage transactions. Lastly, Figure 2f reports a stark contrast in resource allocation between historically nomadic and non-nomadic ethnicities. The difference in means is 0.38 standard deviations and nomadic societies display a thick left tail that peaks roughly 1 standard deviation below the average.

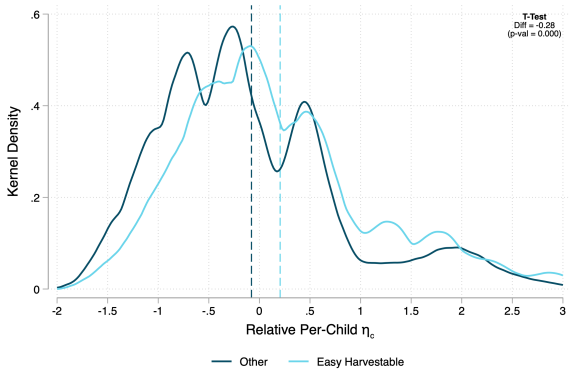
To dive deeper into these correlations, I use OLS regressions of these ethnic traits on the relative per-child resource shares, controlling for child age, child sex, household demographic compo-

[16]It is important to note that, on average, extended families have larger household sizes and higher dependency ratios than independent families. As such, the observed reduction in per-child resource shares in extended families may partially reflect the mechanical strain of supporting more dependents. However, this strain could be offset by unobserved household economies of scale and similar resource penalties are not observed in clan-barrio societies (which also feature large household structures), suggesting a potential cultural mechanism.

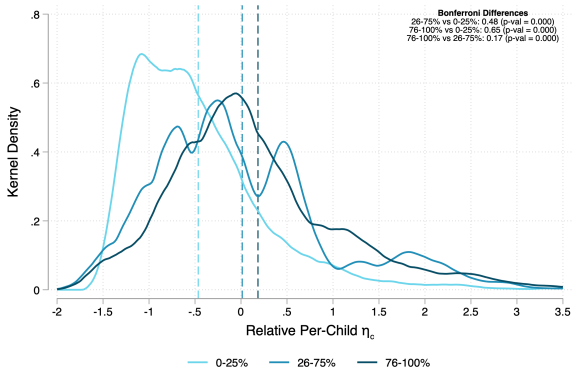
Figure 2: Relative Per-Child Resource Shares by Ethnic Characteristics



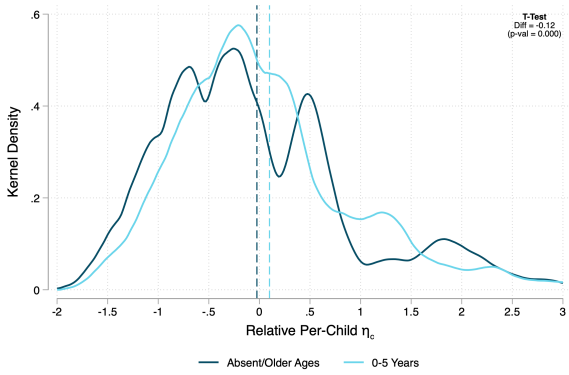
(a) Jurisdictional Hierarchy



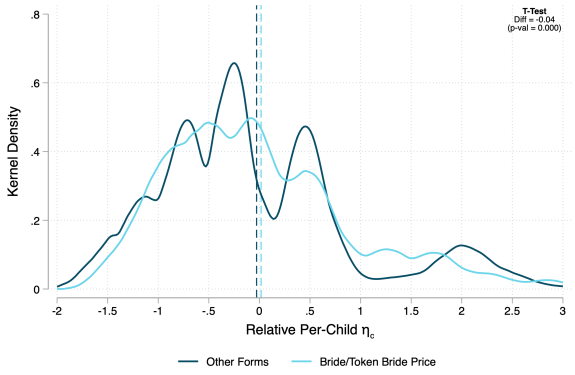
(b) Principal Type of Crop



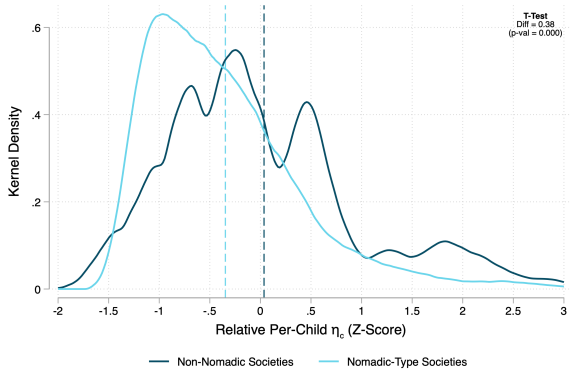
(c) Dependence on Agriculture



(d) Male Circumcision



(e) Transactions at Marriage



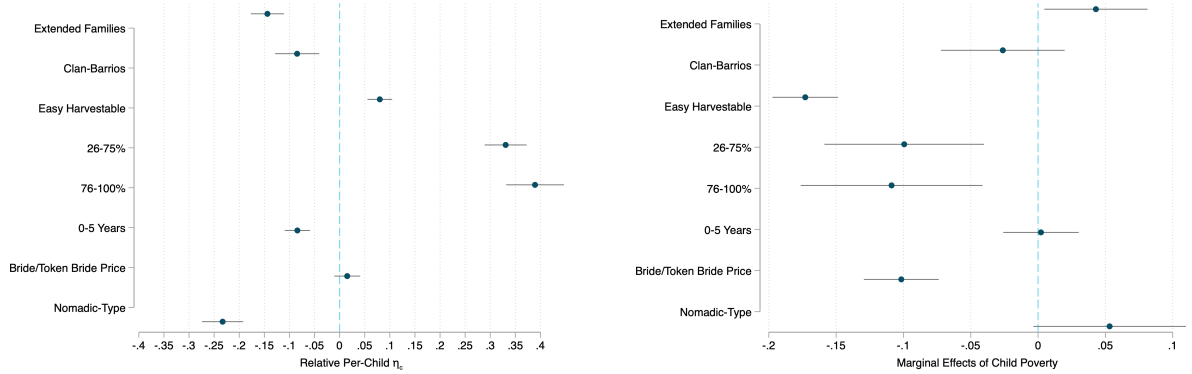
(f) Settlement Patterns

Note: This figure depicts kernel densities of the relative estimated per-child resource shares (Z-scores of η_c/N_c). The full sample is utilized, pooling data from Ethiopia, Ghana, Malawi and Nigeria. The vertical dashed lines indicate the mean per-child resource share for each respective ethnic characteristic subgroup. Results from two-sample t-tests or Bonferroni-adjusted multiple comparisons for differences in means are reported in the upper right.

sition, rural household status, wealth indicators and country fixed effects. Figure 3a plots the

coefficients from these six separate regressions. All ethnic coefficients, except the bride price characteristic, are statistically significant and indicate that these ethnic characteristics are persistently associated with resource distribution, even after controlling for several other factors. Notice that children in independent family structures receive around 0.14 and 0.08 standard deviations more per-child resource shares than those in extended and clan-barrio societies, respectively. Children whose ancestors cultivated easily harvestable crops receive around 0.08 standard deviations more per-child resources. The figure also shows that ancestral groups with low agricultural dependence rates allocate around 0.35 standard deviations less than groups with medium or high dependence. Similarly, historical nomadic societies allocate 0.23 standard deviations fewer resources to children.

Figure 3: Resource Shares and Poverty



(a) Resource Shares (b) Child Poverty

Note: This figure displays the relationship between ancestral characteristics (θ_1 through θ_6), resource shares and child poverty outcomes. Panel A displays the estimated OLS coefficients and 95% confidence intervals for each distinct ancestral characteristic on the standardized per-child resource share. Panel B depicts the average marginal effects and 95% confidence intervals from logit regressions on the likelihood of a child being poor. To abstract from multicollinearity, estimates are derived from separate regressions for each trait. All specifications control for child age, child sex, household demographic composition and country fixed effects. The OLS regressions in Panel A additionally control for household wealth indicators, such as ownership of a non-agriculture business, a home, or livestock. Standard errors are clustered at the primary sampling unit level. The vertical dashed lines at zero represent the null effect, indicating no statistical difference from the omitted base category. The base categories are: independent families (for extended families and clan-barrios); 0–25% (for 26–75% and 76–100% dependence levels); and "Other" as detailed in Section 4.2 for the remaining traits.

Interestingly, societies where male circumcision occurs at young ages allocate around 0.08 standard deviations less resources per child, even though their kernel densities appeared visually similar. Even though there are no gender differences for this ethnic trait, Figure E1a illustrates how these resources are allocated across a child's age. From ages $0-5$, there is an average initial gap of approximately 0.10 standard deviations between societies with these different traits. However, the gradient is steeper for the early-circumcision group (rising from roughly -0.17 at age 0 to -0.04 at age 18), with no significant difference compared to groups with absent or delayed circumcision rituals at age 18. This suggests a narrowing of the gap over time, hinting that as

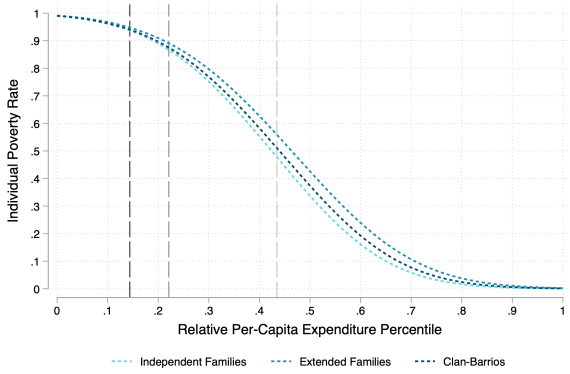
these children survive past the initial toddler stage, a gradually increasing share of resources is poured into them. Finally, gender differences between boys and girls are prevalent in societies that historically practiced bride-price transactions compared to other types of marriage transactions. Although the overall coefficient is barely significant, Figure E1b shows that girls entirely drive this effect. There is about a 0.033 standard deviation difference in resource shares allocated to girls in bride-price societies compared to other types of transactions. In contrast, there is no statistically significant difference for boys.

Associations with Poverty Rates. Using the estimated per-child resource share and household expenditure, I consider a child as poor if their individual expenditure falls below the calorie-adjusted poverty line, based on the assumption that US$2.15/day is the average threshold for adults aged 15 to 45 (Brown et al., 2021). First, I explore the relationship between poverty and ancestral ethnic traits by showing the average marginal effects of being poor in Figure 3b. These results largely mirror those of the resource share allocation. Specifically, a child in a household with the ancestral trait of extended families is about 4 percentage points more likely to be classified as poor. Those with historically easily harvestable crops are 17 percentage points less likely to be poor. Similarly, children in societies that historically relied less on agriculture are about 10 percentage points more likely to be poor. Even though the effect is mainly driven by girls, children in ethnic groups with ancestral bride price transactions are 10 percentage points less likely to be poor. There is no statistically significant difference in poverty outcomes based on male circumcision practices and settlement patterns, although there is a strong hint that children in historically nomadic societies are more likely to be poor.

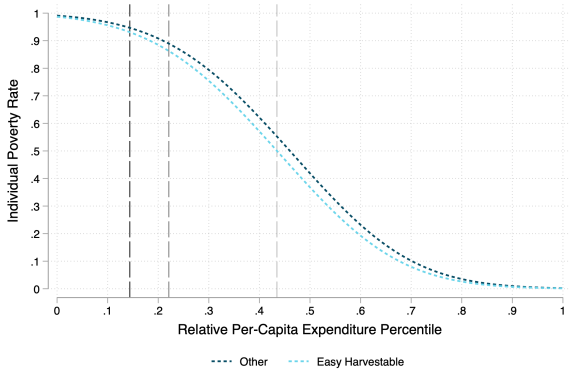
To compare children across these ancestral ethnic traits, I utilize logistic regressions (controlling for child age, child sex, household demographic composition and country fixed effects) on the relative within-country per-capita expenditure percentiles. Thus, Figure 4 compares the poverty outcomes of children who are in the exact same expenditure percentile within their respective countries. For example, around 32% of children from historically independent family hierarchies in households at the 50^{th} percentile of per-capita expenditure are poor. The dashed vertical lines represent the per-capita percentile corresponding to the extreme poverty line in Nigeria (dark grey), Ghana and Ethiopia (medium grey) and Malawi (light grey). Overall, these results confirm a well-established fact in the literature: poor children are not only found in poor households (Brown et al., 2021; Dunbar et al., 2013; Lechene et al., 2022; Penglase, 2021).

Figure 4a highlights how children in ancestral extended families are more likely to experience poverty across all per-capita expenditure levels. At the 42^{nd} percentile of per-capita expenditure, extended families have a child poverty rate about 8 percentage points higher than other structures. Figure 4b shows that societies with easily harvestable principal crops have a child poverty rate approximately 5 percentage points lower than societies relying on other crops, particularly from the 20^{th} to the 60^{th} percentiles. One of the most substantial differences is seen in Figure 4c.

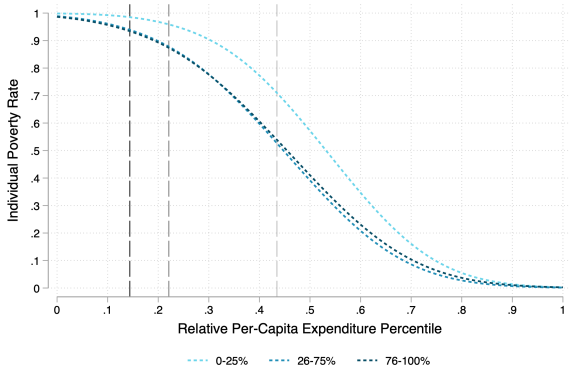
Figure 4: Poverty Prevalence by Expenditure Percentile



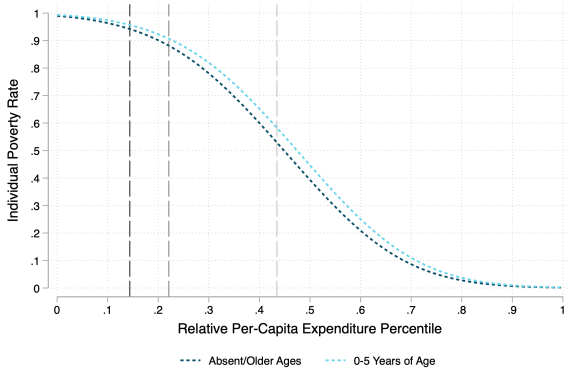
(a) Jurisdictional Hierarchy



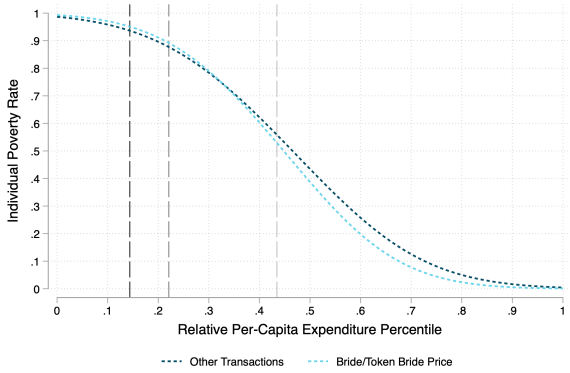
(b) Principal Type of Crop



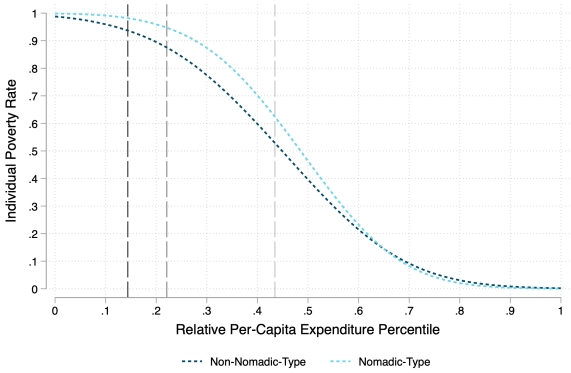
(c) Dependence on Agriculture



(d) Male Circumcision



(e) Transactions at Marriage



(f) Settlement Patterns

Note: These figures depict the predicted individual poverty rates for children across household per-capita expenditure percentiles, stratified by ethnic characteristics. Estimates are derived from a logistic regression model controlling for household composition (number and average age of men, women and children), the proportion of boys, the gender education gap, urban/rural residence, country fixed effects and the child's age and sex. Poverty status is calculated using estimated resource shares and calorie-based adjustments, assuming a reference threshold of US$2.15/day for adults aged 15–45 (Brown et al., 2021). Vertical dashed lines indicate the relative percentile of the extreme poverty line in Nigeria (dark grey), Ghana and Ethiopia (medium grey) and Malawi (light grey).

Children in societies that relied heavily on subsistence agriculture are less likely to be poor than children in societies with minimal agricultural dependence. At its peak, there is about a 20 percentage point difference in the child poverty prevalence rate.

In societies where male circumcision rituals historically occurred at young ages (0–5 years), children experience slightly higher poverty rates across the per-capita expenditure percentiles, as seen in Figure 4d. Although marginal, Figure 4e presents an interesting crossover phenomenon. It shows that children in the poorest households (the bottom 30 percentiles) with ancestral bride price practices have slightly higher poverty rates. However, in households above the 30^{th} percentile, this trend reverses and children in these societies are less likely to be poor. Lastly, Figure 4f demonstrates that nomadic-type societies, especially those in the lower to middle expenditure brackets (1^{st} to 60^{th} percentiles), have a consistently higher poverty prevalence rate than historically non-nomadic societies.

Associations with Undernutrition Prevalence. Similarly, Appendix Figure E2 illustrates undernutrition prevalence across relative individual child expenditure percentiles. As expected, a clear income effect is present. That is, children in higher-expenditure percentiles are less likely to be undernourished, regardless of their ancestral ethnic traits. Nevertheless, the baseline for stunting remains remarkably high, persisting at approximately 30% even among households in the highest expenditure bracket. Ancestral jurisdictional hierarchies correlate with this risk as children from societies historically characterized by extended families are more prone to undernutrition, while those from clan-barrio structures are the least likely to be affected. Additionally, a high historical dependence on agriculture and the cultivation of easily harvestable crops are both associated with lower undernutrition prevalence. Interestingly, we see another crossover effect regarding male circumcision. In the poorest households, children in early-age circumcision societies are more likely to be undernourished, but this trend reverses for those in the top 70% of the expenditure distribution. Finally, ancestral bride-price practices continue to serve as a trait that protects child welfare.[17]

4.4 Robustness

Two primary concerns regarding the validity of these correlations need to be addressed. First, given the spatial nature of matching households to ethnic societies, other spatial factors correlated with ethnicity (such as infrastructure or climate) may drive these results. To address this, I test whether the distribution of per-child resource shares differs among children living near the borders of different ethnic groups. If unobserved spatial characteristics were the true drivers, we

[17] Interestingly, no statistically significant differences exist between boys' and girls' undernutrition rates when comparing male circumcision and bride price characteristics, respectively.

would expect no significant difference in resource shares for children living in close proximity but exposed to different ancestral traits. I test this across seven distance thresholds, from $1km$ to $50km$. As shown in Table F3, the Kolmogorov-Smirnov tests reject the null hypothesis of equal distributions across all distances and characteristics at the 1% significance level.

Second, ethnic groups may experience varying socioeconomic outcomes, suggesting that disparities in resource allocation might be attributable to contemporary wealth indicators rather than ancestral culture. To account for this, I utilize various indicators of socioeconomic status available in the LSMS, ranging from employment and home ownership to asset clusters. I separate the sample into groups based on these indicators and a principal component analysis (PCA) index. As reported in Table F5, the KS tests consistently reject the hypothesis of equal resource share distributions across all socioeconomic groupings. Therefore, I conclude that the observed differences in resource allocation distributions are robustly linked to historical ethnic characteristics rather than contemporary socioeconomic stratification.

Similarly, I test the robustness of the undernutrition results (HAZ scores) across spatial borders and socioeconomic status (see Tables F4 and F6). For most ethnic characteristics, the equality of HAZ distributions is rejected, particularly at distances beyond $10km$. This is economically intuitive since neighboring households share the same local disease environment and health infrastructure, which heavily dictate anthropometric outcomes. For socioeconomic groupings, the results are more nuanced. While the null hypothesis of equal distributions is strongly rejected for traits such as bride price and crop type, it fails to reach significance for male circumcision, settlement patterns and independent family structures within the PCA-based groups. Nevertheless, overall, the results remain broadly robust when accounting for both spatial and socioeconomic factors.

5 Discussion

To quantify the magnitude of the association between ancestral ethnic traits and child welfare, I perform a series of "back-of-the-envelope" calculations. Using the structural model while holding all other household characteristics constant, I simulate scenarios where specific ethnic traits are ever-present across the sample. This exercise allows for a descriptive comparison of how per-child resource shares and poverty rates diverge across different historical characteristics. The results, displayed in Table 3, provide a benchmark for the scale of these disparities. Importantly, these calculations are not intended to suggest that ancestral cultural traits should or can be changed through policy. Rather, they serve to illustrate the potential depth of the associations found in the data.

Table 3: Back-of-the-Envelope Calculations

	Resource Shares			Extreme Poverty		
	Estimated Per-Child η_c	Characteristics Ever-Present	T-Test	Calorie-Adjusted Poverty Rate	Characteristic Ever-Present	T-Test
	Mean (SD)	Mean (SD)	Difference (p-value)	Mean	Mean	Difference (p-value)
Jurisdictional Hierarchy						
2 - Independent Families	0.150 (0.081)	0.167 (0.080)	-0.017^{***} (0.000)	0.454	0.392	0.062^{***} (0.000)
3 - Extended families	0.150 (0.081)	0.149 (0.081)	0.001^{***} (0.002)	0.454	0.458	-0.004 (0.195)
4 - Clan-Barrios	0.120 (0.063)	0.117 (0.060)	0.004^{***} (0.000)	0.460	0.474	-0.014^{***} (0.000)
Principal Type of Crop						
Easy Harvestable	0.150 (0.081)	0.149 (0.082)	0.001^{***} (0.009)	0.454	0.458	-0.004 (0.133)
Dependence on Agriculture						
$0-25\%$	0.131 (0.074)	0.119 (0.070)	0.012^{***} (0.000)	0.457	0.515	-0.058^{***} (0.000)
$26-75\%$	0.120 (0.063)	0.120 (0.063)	-0.000 (0.460)	0.460	0.459	0.001 (0.685)
$76-100\%$	0.120 (0.063)	0.129 (0.075)	-0.009^{***} (0.000)	0.460	0.438	0.023^{***} (0.000)
Male Circumcision						
$0-5$ Years of age	0.120 (0.063)	0.114 (0.060)	0.006^{***} (0.000)	0.460	0.485	-0.024^{***} (0.000)
Transactions at Marriage						
Bride/Token Bride Price	0.150 (0.081)	0.150 (0.079)	0.001 (0.287)	0.454	0.453	0.001 (0.805)
Settlement Patterns						
Nomadic-Type Societies	0.131 (0.074)	0.116 (0.066)	0.015^{***} (0.000)	0.457	0.522	-0.064^{***} (0.000)

Note: Columns 2 and 3 report the average per-child resource share (η_c/N_c) and standard deviations (in parentheses) for the baseline sample and the scenario where the indicated ethnic trait is universal, respectively. Columns 5 and 6 display the corresponding calorie-adjusted poverty rates derived from these shares. Columns 4 and 7 report the difference in means (Baseline-Counterfactual) with the associated p-value from a two-sided t-test in parentheses. ***, **, * - indicates significance at a 1%, 5%, and 10% level.

The simulations reveal notable differences in per-child resources and the associated poverty rates across four ancestral ethnic traits. In a scenario where all children were associated with historically independent family structures, the average per-child resource share is simulated to be 1.7 percentage points higher, while the associated poverty rate is 6.2 percentage points lower than the sample estimates. Historical reliance on agriculture also shows a strong association with contemporary outcomes. A simulated shift to low ancestral dependence on agriculture ($0-25\%$) is linked to a 1.2 percentage point decrease in resource shares and a 5.8 percentage point increase in poverty. Conversely, a scenario of high agricultural dependence ($76-100\%$) is associated with re-

source shares that are 0.9 percentage points higher and poverty rates 2.3 percentage points lower. If the entire sample were characterized by societies where male circumcision historically occurred at young ages, the model predicts a slight resource deficit and a 2.5 percentage point increase in the poverty rate. Finally, if historically nomadic-type societies were universal, the model suggests that each child would receive 1.5 percentage points less in resource shares and the poverty rate would rise to 52.2% (a 6.5 percentage point increase).

A central question remains regarding the mechanisms through which ancestral ethnic characteristics correlate with contemporary child welfare. These mechanisms operate primarily through cultural persistence—the historical transmission of social norms, contracts and values across generations. Ancestral traits are not merely historical relics instead, they catalyze the formation of gender- and child-specific traditions that can endure for centuries. In this framework, the historical economic or social utility of a child within an ethnic group becomes enshrined in culture, dictating how modern households associated with these lineages perceive the value of children and how they prioritize the allocation of finite resources.

Jurisdictional Hierarchy. The resource advantage found in historically independent (nuclear) families over extended families can be explained through Caldwell's (1976) Intergenerational Wealth Flows Theory. Traditional extended family systems are often organized around "upward flows", in which resources flow from the young to the old to secure the status and safety of elders. Conversely, independent families are more frequently associated with "downward flows", concentrating investment in the health and development of their own children. This disparity is further driven by the "kinship tax", a social pressure within extended lineages that compels successful individuals to redistribute surplus resources to the wider clan rather than their own children (Jakiela & Ozier, 2016; Squires, 2024; Vollan et al., 2023). Furthermore, the presence of mothers-in-law or senior male patriarchs in an extended household can shift resource control and decision-making away from the mother (Fikadu et al., 2024; Ickes et al., 2018).

Beyond the immediate family unit, the benefit of village-level jurisdictional hierarchy (clan-barrios) is rooted in local institutional stability. As noted by Enke (2019), these village-level structures often foster "tight" kinship systems governed by moral frameworks that emphasize localized cooperation and trust. These arrangements create a predictable and supportive environment where communal expectations prioritize the collective health of the next generation. These moral structures serve as a primary mechanism for securing higher resource shares, explaining why ancestral village-level hierarchy remains a significant predictor of child welfare today compared to extended families.

Principal Crop Type and Agriculture Dependence. The association between ancestral agricultural practices and contemporary child welfare can be understood through the historical economic value of children in the household production unit. A potential concern is that ancestral

characteristics, such as principal crop type and agricultural dependence, are simply proxies for contemporary geography. However, the EA records the group's specialization and institutional knowledge (Murdock, 1967). These practices become internalized as cultural norms that persist across generations, regardless of shifts in the physical landscape (Alesina et al., 2013; Nunn, 2012). In this view, while geography determines what could grow, ethnic culture determines what is grown and how society is organized around those crops.

In many historical African contexts, children were integral to farming activities that were technically simple and physically accessible (Admassie, 2003). There are distinct differences in labor requirements between crop types. For instance, cereal grains often require synchronized, labor-intensive harvesting and complex processing, which may favor adult strength. Conversely, tree fruits, roots and tubers have lower physical entry barriers. In societies specialized in these "easy-harvestable" crops, children possessed a higher comparative advantage in labor. Because their contributions to the household's immediate sustainability were visible and effective, these ancestral societies likely developed "child-favoring" norms to ensure the health and productivity of young contributors.

Similarly, the degree of ancestral dependence on agriculture dictates the importance of child labor in a family's survival strategy. In societies where agriculture was the primary mode of subsistence, children were seen as necessary contributors to household welfare rather than mere dependents. This necessity is often amplified during agricultural shocks, which historically led to increased reliance on child labor (Beegle et al., 2006). Much like the argument that plough agriculture created persistent male-favoring norms by devaluing female labor (Alesina et al., 2013), a high historical dependence on child-accessible agriculture may have instilled a persistent cultural "valuation" of children. Today, this valuation manifests as higher intrahousehold resource shares and a lower likelihood of undernutrition.

Male Circumcision. Male circumcision rituals, often performed on religious or cultural grounds, fulfill deep-seated social and political needs beyond the procedure itself (Pollack, 2011). One underlying mechanism is the formation of "age-sets", which are cohorts of youths bound by social mandates to share food, provide loans and offer political backing to one another for life (Moscona & Seck, 2024). In these societies, children may initially receive fewer resources because adult household members are culturally obligated to prioritize their own age-set peers over their immediate kin. This structural loyalty creates a competitive claim on household resources, often at the expense of children.

However, the narrowing resource gap as children age suggests a life-cycle mechanism of "entry costs" followed by long-term "social dividends" (Power, 2017; Sosis et al., 2007). The ritual is frequently a major communal event involving expensive feasts, sacrifices and gift-giving. For households near the subsistence margin, these "lump-sum" expenditures represent a significant

temporary strain, which is linked to lower resource shares for younger children and to a higher proportion of undernourished children in poor households. As children grow, this deficit shrinks as they accumulate social capital and recognized status within the group. Once the ritual is complete, the child is viewed as a full stakeholder in the lineage, unlocking access to communal safety nets and cultural protections that lead to more robust welfare outcomes as they mature (Berman, 2000; Iannaccone, 1992).

Bride Price Transactions. The association between ancestral bride price practices and modern child welfare is primarily characterized by a gender-specific increase in resource shares. Ashraf et al. (2020) highlight how these practices create a direct link between a daughter's human capital and the "return" her family receives when she marries. Since healthy, well-nourished and educated daughters command a higher bride price in the marriage market, households in these societies have a clear incentive to prioritize their development (Becker, 1981). This mechanism shifts the perception of girls from a potential economic liability to a productive asset, instilling persistent girl-favoring norms that ensure they have access to a greater share of household resources.

Furthermore, these investments in girls are often reinforced by maternal bargaining power. In societies where bride price is the norm, a mother's own "value" was established by a similar transaction, which often cements her status and security within her husband's family (Gaspart & Platteau, 2010; Mbaye & Wagner, 2017). This social standing gives mothers greater influence over how resources are shared. Consistent with the "like mother, like daughter" patterns identified in the literature, mothers typically direct these resources toward the health and nutrition of their daughters, who represent the next step in this social and economic cycle (Thomas, 1990, 1994). This explains why girls drive the positive association with resource shares, while the impact on boys in these same groups remains limited.

Settlement Patterns. Nomadic societies (including pastoralists) are historically defined by a clear power gap between men and women. In these systems, a person's influence is usually linked to their control over livestock. Across most nomadic groups in SSA, men have near-exclusive ownership and management of the herds, giving them the final word on how household resources are used (Dyson-Hudson & Dyson-Hudson, 1980). Women and girls are often excluded from important roles and are confined to time-consuming, "traditionally female" household chores that prevent girls from attending school and women from social occasions where community-wide decisions are made (Onyima, 2021). Furthermore, they are often raised to submit to male leadership, may be subject to female genital mutilation and are frequently married at young ages (Flintan, 2008; Flintan & Eba, 2023; Kipuri & Ridgewell, 2008). Because mothers are typically the strongest advocates for their children's nutrition, their lack of bargaining power means that children's needs are often deprioritized (Hoddinott & Haddad, 1995). Finally, nomadic societies are often characterized by patrilocality, which further limits women's influence and social standing

(Aminjonov et al., 2024; Holden & Mace, 2003).

Beyond these decision-making structures, the practical demands of a mobile lifestyle create unique economic pressures. In nomadic environments, young children are often viewed as a "mobility cost". They require significant food and assistance to move, yet they cannot assist with the dangerous, high-stakes work of herding or protecting animals from predators (Galvin, 1992; Osman et al., 2020). This stands in sharp contrast to farming societies, where even young children can help with simple agricultural tasks. Furthermore, sedentary societies provide women with more opportunities to trade at local markets, which generally improves family income and the welfare of children (Fratkin & Smith, 1995; Fratkin et al., 1999). Together, these historical structures and mobile lifestyles may have fostered persistent norms that allocate the majority of household resources to men, helping to explain the significant resource deficit observed among children from nomadic societies.

6 Conclusion

The descriptive results presented in this study suggest that culture and ethnic characteristics matter for child poverty and undernutrition outcomes in sub-Saharan Africa. I address three primary questions: (1) Do intrahousehold distribution of resources and child nutrition outcomes differ across ethnic groups? (2) Which ancestral ethnic characteristics are most strongly associated with these differences? and (3) How do these characteristics correlate with contemporary child welfare outcomes? By integrating survey data from the World Bank's LSMS with ancestral data from Murdock's (1967) Ethnographic Atlas and Giuliano and Nunn's (2018) database, this study provides a broad overview of these relationships. Methodologically, I use the collective household model of Dunbar et al. (2013) to estimate intrahousehold resource shares. To identify six ancestral traits strongly associated with child welfare, I utilize a supervised machine learning technique.

The analysis highlights consistent associations between specific ancestral traits and the resources allocated to children. Ethnic groups historically specializing in "easy-harvestable" crops (tree fruits, roots or tubers) are associated with higher resource shares for children and lower observed rates of poverty and undernourishment. Similarly, children from independent families or village-level hierarchies exhibit higher per-child resource shares compared to those in extended families and show lower rates of poverty and undernutrition. Similar patterns are observed for ethnic groups historically characterized by high agricultural dependence and non-nomadic societies. Driven by girls, societies with ancestral bride-price practices correlate with higher resource shares and a lower likelihood of being poor. Societies with historically early male circumcision rituals pay an initial "entry cost" with a significant resource deficit. However, this difference narrows among older children and children in these societies have a lower prevalence rate of

undernutrition in non-poor households.

These differences are consistent with the presence of ancestral characteristics that may have fostered "child-favoring" norms—passed through generations—which correlate with the share of household resources directed toward children today. In turn, the data indicate that children receiving smaller resource shares are more likely to be poor and undernourished. While these results do not imply a causal link, the persistence of these correlations across spatial borders and socioeconomic strata suggests that ancestral traits are meaningful predictors of contemporary child welfare. These findings offer a framework for researchers and policymakers to better recognize how a household's cultural history relates to the efficiency of development strategies. As noted by Ashraf et al. (2020), these characteristics may not be the most intuitive (or only) predictors of welfare, but they demonstrate that a society's historical context is an important factor to consider in poverty and undernutrition alleviation policies.

Although this paper is descriptive in nature, it provides insights for causal studies seeking to explore the role of cultural traits in predicting children's welfare in low-income settings. Because these traits capture dimensions of social organization that have persisted over centuries, they suggest that policy effectiveness may be linked to how well interventions align with existing cultural frameworks. Rather than attempting to alter culture, policies should be tailored to function within these existing norms, ensuring that resources reach children as intended. These results improve our understanding of why certain societies lag in addressing welfare outcomes despite interventions. Ultimately, this study suggests that the Sustainable Development Goals (SDGs) of zero poverty and zero hunger are unlikely to be met with uniform, "one-size-fits-all" policies that overlook the underlying social and ethnic context.

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