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The Effect of Rural-to-Urban Migration on Fertility Ideals in Ethiopia and Nigeria

Master's Thesis

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submitted by

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Abstract
This thesis aims to answer the question, "*What effects does rural-to-urban migration in Ethiopia and Nigeria have on the fertility ideals of women?"*. As fertility intentions and birth rates remain high in Sub-Saharan Africa, significant research attention has been granted to the fertility transition and the continued uncertainty about the future trajectories of fertility and population dynamics of countries in this region. However, less research has focused on the interplay between internal migration, fertility, and urbanization. This research uses comparative descriptive analysis and multinomial logistic regression analysis to explore the effect of migration status, individual characteristics, economic factors, and dimensions of female empowerment on fertility ideals in Ethiopia and Nigeria. The countries were selected as they have large and growing populations and represent heterogeneity in sub-regional characteristics concerning the fertility transition, internal migration, and urbanization. Fertility ideals were chosen as the focus of the study as they can be used as an indicator for future fertility behavior. Data used for the analysis were obtained from the Demographic and Health Standard Surveys. The analysis reveals mixed results. Differences in fertility ideals across migration status are not statistically significant in Ethiopia; however, in Nigeria, rural-to-urban migrants appear to adhere to the social norms of their upbringing. Determinants of fertility, such as educational attainment, wealth, and female empowerment, moderate the relationship between ideal fertility and internal migration in both countries. The regression further reveals significant differences in fertility ideals across cultural groups.

Keywords: *Ideal Fertility, Fertility Transition, Rural-to-Urban Migration, Urbanization, DHS, Sub-Saharan Africa, Nigeria, Ethiopia, Multinomial Logistic Regression*

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List of Abbreviations

Conf. Interval	Confidence Interval
DF	Degrees of Freedom
DHS	Demographic and Health Survey
DTM	Demographic Transition Model
LR	Likelihood Ratio
Obs.	Observations
Pr.	Probability
RRR	Relative Risk Ratios
SD	Standard Deviation
Sig	Significance
St. Dev.	Standard Deviation
Std. Error	Standard Error

Introduction

While most areas around the globe have experienced a significant fertility decline as part of their demographic transitions, Sub-Saharan Africa (SSA) continues to stand out as having both high fertility intentions and high birth rates (Bongaarts, 2020). High birth rates and population momentum contribute to continued population growth in the region, with estimates suggesting that while in 2000, approximately one billion people or less lived in SSA, the population could grow to four billion by 2100 (Casterline, 2017). However, it would be erroneous to perceive fertility in SSA countries as homogenous, as fertility rates and patterns differ significantly across but also within countries' urban and rural areas (Lerch, 2019a). Current high fertility rates do not inevitably imply continuity – demographic transitions have taken place in diverse socio-economic contexts, such as Latin America and Asia (Bongaarts, 2020). While some authors have challenged the application of frameworks such as the demographic transition to Africa altogether (Defo, 2014), others have argued that fertility patterns and preferences differ from those of other countries in the early transition stages (Bongaarts & Casterline, 2013).

Historically, economic development, urbanization, rural-to-urban migration, and fertility are closely interlinked and jointly determine countries' trajectories as they follow the demographic transition. However, in the context of SSA, some scholars emphasize the uniqueness of the region's development compared to other developing world regions, especially concerning fertility (Bongaarts, 2017; Shapiro & Hinde, 2017) and urbanization patterns (Barrios et al., 2006); yet others emphasize the similarities between the region's pathway and other developing areas (Henderson et al., 2013). This thesis explores these different perspectives, and the analysis highlights challenges associated with research on urbanization and internal migration in SSA, such as a lack of available data, inconsistent definitions across space and time, and cross-country heterogeneity (de Brauw et al., 2013). The complexity of possible drivers of rural-to-urban migration (Barrios et al., 2006) and their links to fertility outcomes and ideals add further challenges to the analysis.

Within SSA, countries' development, urbanization, rural-to-urban migration, and demographic transition trajectories are heterogeneous. This research focuses on two countries - Ethiopia and Nigeria - to achieve significant depth in the analysis while also acknowledging intra-regional diversity. A comparison of these two countries is insightful for several reasons: first, both have begun the demographic transition and experienced fertility declines, yet total fertility rates remain far above replacement level (United

Nations, Department of Economic and Social Affairs, 2019); second, Nigeria and Ethiopia are, respectively, the largest and second-largest African country by population size and due to population momentum, both countries' populations will grow significantly in the decades to come; third, Nigeria is a regional economic and political power in Western Africa, whereas Ethiopia represents Eastern Africa, and fourth, the linkages between rural-to-urban migration and fertility are expected to be quite distinct in each of the countries, given their divergence in urbanization, economic activities, and culture; hence, the countries illustrate the regional heterogeneity and associated complexities well.

A key characteristic of fertility in SSA is a stark divide between rural and urban areas, with the former commonly having much higher fertility rates than the latter (Lerch, 2019a; Schoumaker & Sánchez-Páez, 2020). This pattern can be associated with a complex range of interlinked factors, such as educational and occupational differences, infrastructure needs, and cultural differences. Internal migration is another demographic dynamic that contributes to uncertainty about the future of fertility in SSA (Gyimah, 2006). A growing body of literature focuses on spatial differences in fertility, yet less attention has been paid to the fertility behavior of rural-to-urban migrants in SSA.

Furthermore, little is known about the interplay between the characteristics of internal migrants and the determinants of their fertility ideals (Gyimah, 2006; Banougnin, 2019). However, in light of increasing ecological pressures, an improved understanding of the drivers and determinants of fertility in SSA is crucial from research and policy perspectives (Eissler et al., 2019). Therefore, this research explores the determinants of fertility ideals of rural to urban migrants, such as individual characteristics, cultural aspects, and educational and occupational factors. It also examines migration decisions in the context of urbanization and reliance on agriculture (Barrios et al., 2006).

Understanding the spatial differences in fertility can provide essential insights into the demographic change in SSA, yet rural-urban fertility differences and the role of migration in the context of regional fertility gradients in SSA are not well-researched (Lerch, 2019a; 2019b). To the best of my knowledge, no study currently explores the effect of rural-to-urban migration on fertility ideals in Ethiopia and Nigeria. Therefore, this study aims to contribute to the existing literature by examining the relations between fertility decline, rural-to-urban migration, and urbanization in these two countries.

Literature Review

The following literature review will present theoretical perspectives and research on the fertility transition, the migration-fertility nexus, and the links between urbanization and demographic processes. The research findings will be discussed in the context of the demographic developments in Nigeria and Ethiopia. The literature review will highlight a research gap concerning the migration-fertility nexus in SSA and outline how this thesis contributes to filling the gap. The literature review will provide the foundation for this study's theoretical framework, conceptual model, and research design.

Fertility Transition in Sub-Saharan Africa

Despite agreement that fertility rates decline with continuous development, there have been significant differences concerning the world regions' pathways of fertility decline, both in terms of timing and speed (Bongaarts, 2017). In particular, the fertility decline in SSA has been noted to be distinct from the transitions in other developing regions. Bongaarts and Casterline (2013) emphasize that differences go beyond lower levels of development in Africa compared to other world regions. Instead, they argue that discrepancies in the "trends and patterns in fertility, family size preferences, and preference implementation" (Bongaarts & Casterline, 2013: 165) can be registered.

Furthermore, the authors mention as an example of such differences that fertility decline in several African countries has been slower than in other regions at the same stage of the demographic transition. Moreover, they point out that fertility decline has stagnated in several African countries, whereas fertility decline, once initiated, continued rather rapidly in other world regions. Other differences are longer birth intervals in Africa compared to other areas and a persistent pronatalist culture contributing to a larger ideal family size when comparing Africa to other regions during their early transition stages (Bongaarts & Casterline, 2013).

Despite the onset of the demographic transition in SSA, total fertility remains higher than elsewhere in the world, with a TFR of 4.7 births per woman in the 2015-2020 period (Bongaarts, 2020). While, in some cases, a fertility transition occurred without links to the socio-economic development of the respective country (Kirk, 1996), it is essential to note that several indicators of development in SSA have remained behind those of other regions when entering the transition (Bongaarts, 2017). Hence, due to the stalled fertility

transition in SSA, population momentum poses significant challenges, as population size in the region will continue to grow, even as population growth rates decline or stabilize. Population pressure in SSA is expected to rise, leading to questions about countries' socio-economic trajectories and population well-being.

In this thesis, the links between the demographic transition and economic development are particularly relevant due to the connections between the population growth associated with the early stages of the transition and rural-to-urban migration. As countries develop, their economic dependence on the agricultural sector declines, with a new emphasis on the industrial and service industries. Hence, labor tends to migrate from rural areas to developing urban agglomerations in search of employment opportunities (de Brauw et al., 2013). Social changes are assumed to occur based, for instance, on advancements in health and education and improvements in infrastructure and communication that are closely linked to fertility preferences and behavior. The question is how rural-to-urban migration will affect fertility ideals in countries, especially in instances when the gradient between urban and rural fertility is still substantial.

As has been argued by Lerch (2019a; 2019b), studying fertility trends by type of residence is crucial, particularly in developing countries where the rural population still makes up a significant part of the population. Rural-to-urban migrants can be perceived as a bridge between the rural and urban regions and heterogeneous trends within a country, as both social settings influence them. Hence, studying the fertility of rural-to-urban migrants in high fertility countries can reveal insights into the diffusion of behavior and allow for a more detailed analysis of regional fertility than possible based on national trends.

Fertility Transition and Urban-Rural Fertility Differences

During the fertility transition, one can observe differences in fertility by type of place of residence that change during the different phases. Lerch (2019b) finds evidence for an inverted U-shaped development over time regarding the difference in rural-to-urban fertility. In other words, fertility excess in rural areas is low at the beginning of the fertility transition. However, urban areas adopt new behaviors due to social diffusion, and fertility drops rapidly, contributing to a pronounced rural-urban fertility gradient.

Compared to rural areas, children in urban areas do not contribute to household income, as they do not engage in agricultural activities. At the same time, higher housing costs and access to family planning services limit family size in urban areas (Gries & Grundman, 2018). Parents may also focus their resources on fewer children to allow them to participate in educational opportunities provided in urban areas because education is associated with increasing returns (Gries & Grundman, 2018). Children in urban areas in several SSA countries included in a study by Flückiger and Ludwig (2017) have a higher probability of attending school and completing primary education than their counterparts in rural areas, and they tend to attend school longer.

As countries undergo a fertility transition and decrease their reliance on agriculture, fewer children are needed in rural areas, and the opportunity costs associated with having children increases. The increased educational attainment of women and the access to family planning services and contraceptives will spread, thereby reducing rural fertility. Thus, the rural-urban fertility gradient declines towards the end of the fertility transition (Lerch, 2019b). In other world regions, the fertility transition was closely interlinked with economic growth and structural change, shifting from a predominantly agriculture-based economy to an industry-based one. Yet, as Büttner et al. (2022: 3) point out, the structural change observed in many African countries differs in that it "has been largely based on an extension of agriculture, natural resource extraction, and the informal sector." Hence, the observed structural change is less technology-based but instead still reliant on labor-intense activities, despite positive trends in economic growth, poverty reduction, urbanization, and education.

The structural change associated with development often leads to smaller families as children represent an economic tradeoff for mothers, who can now choose to participate in the labor market instead of motherhood. However, children in the often-informal economic SSA context still promise social protection for their parents at older ages and potential income from child labor (Büttner et al., 2022). Thus, fertility rates and ideals in SSA may remain high without increases in non-agricultural female employment, brought about by structural change.

Regarding SSA, it is evident that the fertility transition significantly lags in rural areas compared to urban ones. Lerch (2019a) further argues that in urban areas, the fertility

transition in SSA follows the pathway of other developing regions, with fertility rates dropping rapidly and continuously. Thus, differences in the fertility transition in SSA compared to other world regions may be caused by the fertility rates in rural areas. With continuing urbanization, increasing numbers of people migrating from rural to urban areas could contribute to changing fertility dynamics in the region. However, future urbanization and rural-to-urban migration are somewhat uncertain, with some authors finding that rural-to-urban migration in several SSA countries has become less attractive in recent years due to declining or stagnating economic growth (Menashe-Oren & Stecklov, 2018).

As a result, some countries have even experienced deurbanization rather than urbanization (de Brauw et al., 2013). Additionally, Gries and Grundman (2018: 503) argue, based on recent research, "that urbanization may well take place without the modernization characteristics often attributed to it." Urbanization, driven in part by rural-to-urban migration, can occur even if industrialization or structural changes associated with economic development remain absent. This development poses a significant challenge to countries' fertility transitions, implying that rural-urban fertility differences could persist longer than expected. Rural-to-urban migration is a crucial part of the economic development process; hence a decline or reversal of such migration flows could be an indicator (and driver) of economic weakening, which could further hamper the fertility transition in SSA.

Fertility Behavior of Migrants

The link between internal migration and fertility in SSA remains scarcely studied, with most of the literature focusing on the determinants and types of migration rather than on the effect migration events may have on fertility (Gyimah, 2006). However, significant rural-urban fertility gradients emphasize intra-country heterogeneity in the fertility transition (Lerch, 2019b) that remains understudied in SSA (Lerch, 2019a), especially in relation to other drivers of demographic changes. As highlighted by Gyimah (2006: 235), "[a]lthough studying migration per se brings attention to the spatio-temporal aspects of population redistribution, a better understanding of population dynamics, in general, may be gained if the links between migration and the other components of population change are examined in unison." Hence, this study aims to acknowledge the interconnectedness between migration and fertility.

Several hypotheses are available in the literature concerning the possible effects of moving from rural to urban areas, namely the socialization, adaptation, selectivity, and disruption hypotheses, which have been characterized as being "competing but often complementary" (Gyimah, 2006: 236). The socialization hypothesis proposes that fertility preferences are developed early in life and thus the result of exposure to the cultural and social setting in one's childhood. Based on this argument, the hypothesis suggests that rural-to-urban migrants will follow the fertility behavior witnessed in the rural areas of their upbringing and are unlikely to adopt the lower fertility preferences of urban residents (Gyimah, 2006).

According to Gyimah (2006), the adaptation hypothesis partially contradicts the socialization hypothesis by postulating that migrants who spend more time in urban areas will adapt to prevailing urban norms and consequently lower their fertility (preferences). The argument is based on the transformations in the economic setting due to migration and the higher (opportunity) costs of having children in urban areas compared to rural ones.

The selectivity hypothesis suggests that migrants have specific characteristics and thus, cannot be understood to be randomly sampled from the population of rural residents. Instead, they are selected based on factors such as age or socio-economic status that contribute to their fertility behavior. The decision to migrate may also follow the wish to leave behind pronatalist or more traditional norms, further supporting the argument that migrants should not be viewed as a random sample of an area's population (Gyimah, 2006). Thus, fertility preferences and behavior can constitute critical selectivity criteria for migration. Existing children may inhibit the migration of women, for instance, due to care obligations. On the one hand, they could also motivate migration to an urban area to improve access to urban amenities, such as education, or increase career opportunities and the economic well-being of the family (Brockerhoff & Eu, 1993). On the other hand, for mothers with fewer or no children, migrating to an urban area can provide economic opportunities, and migration may be more manageable for women with fewer or no dependents (Brockerhoff & Eu, 1993).

Lastly, the disruption hypothesis postulates that migration is a disruption in one's life course trajectory, affecting the "natural progression of demographic events in the lives of migrants" (Gyimah, 2006: 237). Therefore, fertility is affected by migration events as it may mean that migrants anticipate or postpone births. The fertility rate of migrants could be higher once the migration process has been concluded as births are recuperated. Still, the fertility of migrants may be lower compared to the rural or urban population if the migration took place very recently, as births are being postponed (Gyimah, 2006). As noted by Lerch (2019a; 2019b), in areas where recent rural-to-urban migrants make up a large share of the urban population, the urban TFR can be biased by the changed timing of births resulting from a migration event.

Brockerhoff and Yang (1994), in their study on the links between migration and fertility in six SSA countries, found support for the disruptive effect of migration on the timing of births. However, temporary spousal separation, as a consequence of one partner migrating before or without the other, could be a driver of the disruptive effect rather than the migration effect itself (Brockerhoff & Yang, 1994). Nonetheless, temporal spousal separation could be part of migration's disruption of the timing of life-course events.

As several of these hypotheses focus on fertility behavior at different points in time, they are not mutually exclusive but complementary in explaining the fertility behavior of rural-to-urban migrants. Rural-to-urban migrants in SSA are often young adults who move in search of economic opportunities (Menashe-Oren & Stecklov, 2018); thus, having children after the migration event could conflict with other life course goals.

Lerch (2019a; 2019b) proposes social diffusion theory to understand rural-urban fertility differences better. Proponents of this theory argue that urban areas have lower fertility because of their characteristics, which enable the adaptation and diffusion of new behaviors and values (Lerch, 2019b: 302). For instance, they interact more, compared to rural areas, with other countries, thereby adopting norms and practices of countries more advanced in the fertility transition (Lerch, 2019b), such as family planning practices. Once these new norms, practices, and behaviors are established in urban areas, they "spread through the settlement hierarchy into remote rural areas via established communication and transport networks" (Lerch, 2019b). Rural-to-urban migrants could potentially play a crucial role in the diffusion of fertility behavior and the reduction in regional fertility

differences if they adapt to the urban environment but continue to travel and communicate with their social network in rural areas. Even if rural-to-urban migrants do not adapt quickly to the norms at the destination, their children will be socialized in an urban area and likely have fewer children than if born in rural areas (Lerch, 2019b).

Urbanization in Sub-Saharan Africa

Urbanization in SSA, according to the UN World Urbanization Prospects, can be "defined as the share of population living in cities to the total population living in the country" (UN World Urbanization Prospects in: Barrios et al., 2006). Compared to other developing regions, urbanization in SSA remains low, with approximately 36 percent of the population living in urban areas (Lerch, 2019a) – up from around 18 percent in 1970 (Henderson et al., 2013). However, significant intra-regional heterogeneity can be noted. The assessment of urbanization in SSA is further complicated by frequent changes in the definition and classification of rural areas, complicating the study of developments over time (de Brauw et al., 2013). Urbanization is closely linked with the demographic transition, economic development, and rural-to-urban migration. The latter is estimated to have accounted for around 50 percent of Africa's urban growth between 1960 and 1990 (Barrios et al., 2006).

Urbanization is often attributed to changes in a country's economic structure, as observed in Nigeria following the oil boom of the 1970s (de Brauw et al., 2013) and rapidly increasing population size (Menashe-Oren & Stecklov, 2018). Urbanization in SSA increased rapidly for several decades, with estimated average urban growth rates of 7 percent in the 1960s and 3.4 percent in the 1990s (de Brauw et al., 2013). Henderson et al. (2013) estimate that between 1970 and 2010, the annual urban growth rate was around 2.09 percent, nearly double that of other developing regions. However, urbanization in SSA appears to be less closely related to per capita GDP, which grew at a rate of 0.53 percent annually between 1970 and 2010, compared to 2.40 percent in the rest of the world (Henderson et al., 2013).

From 2010-2014, the annual rate of urbanization in SSA declined further to around 1.4 percent (Menashe-Oren & Stecklov, 2018). This decline, according to Menashe-Oren and Stecklov (2018), can be explained by several interrelated factors: (1) a decline in the urban-rural wage gap; (2) a decoupling of urbanization and income growth; and (3) a decline in

the rural-urban migration flows. The authors argue that continued rapid urban growth in some SSA countries may be a sign of push factors for internal migration, such as agricultural stress (Menashe-Oren and Stecklov, 2018). Other authors have further emphasized the role of climate change and conflict as drivers of population movements toward urban areas (Barrios et al., 2006).

Andersson Djurfeldt (2015) notes that African urbanization rates have been overestimated due to a lack of reliable data availability and ongoing changes in the definition of rural and urban areas. The author suggests that urbanization in SSA is situated in the context of food security by highlighting empirical evidence that points to the disconnect between urban and industrial growth in the region. Consequently, the region faces the risk of simultaneous urban and rural poverty and food insecurity due to a lack of urban demand and purchasing power, which influences and is influenced by demographic processes, such as rural-to-urban migration and fertility levels (Andersson Djurfeldt, 2015). Additionally, the analysis highlights the importance of closely analyzing the characteristics of urbanization when attempting to assess the links to demographic processes. For instance, the shift of the population distribution in urban areas toward larger cities may affect the rural-urban fertility divide if fertility rates in smaller metropolitan areas remain closer to that of rural ones due to a lack of internal migration and behavioral diffusion (Andersson Djurfeldt, 2015).

In the context of SSA, urbanization processes are not coupled to structural changes observed in other world regions. High-quality, formal employment opportunities associated with agglomerations have not kept up with urbanization processes, resulting in "low-quality urbanization" (Gries & Grundman, 2018). In other words, urbanization in SSA has not (yet) brought about the positive implications in socio-economic well-being as expected. In fertility research, established links between urbanization, development, rural-to-urban migration, and fertility decline may differ in SSA compared to other regions. As urbanization continues, employment opportunities, public and health services, education, and infrastructure must be provided for an increasing number of people. Thus, improving the understanding of how rural-to-urban migration and the fertility of internal migrants shape urbanization processes and population growth is substantial from a sustainable development perspective.

Fertility, Urbanization, and Internal Migration in Nigeria and Ethiopia

Nigeria and Ethiopia have entered the demographic transition and have experienced slight declines in fertility rates. The fertility transition onset is commonly defined as "the time when the TFR [total fertility rate] has declined 10 percent below its pre-transitional maximum" (Bongaarts, 2017). The total fertility rate (TFR) in Nigeria declined from its peak of 6.76 in 1980-1985 to 5.24 in the period from 2015-2020. In Ethiopia, the TFR decreased in the same period from 7.42 to 4.3 (United Nations, Department of Economic and Social Affairs, Population Division, 2019). However, while the national trend suggests a significant fertility decline over time, both countries' TFRs remain far above replacement level, and the drops have been slower compared to the fertility transitions of Asia and Latin America (Bongaarts, 2017). Moreover, significant differences in fertility between urban and regional areas can be observed.

DHS data shows that the fertility rate in rural Nigeria in the three years before 2018 was 5.9 and in urban Nigeria 4.5, suggesting a TFR difference by type of residence of 1.4 children per woman. (National Population Commission – NPC/Nigeria and ICF, 2019). The DHS reported the first trends in fertility by residence in 1990; the TFR in rural and urban Nigeria were 6.3 and 5.0, respectively (National Population Commission – NPC/Nigeria and ICF, 2019). Thus, the fertility decline by residence was similar across rural and urban areas. However, significant differences exist across regions. The TFR is substantially higher in the North West with 6.6 children per woman, compared to 3.9 children per woman in the South West (National Population Commission – NPC/Nigeria and ICF, 2019).

Furthermore, differences in family size and ideals exist across other indirect and direct determinants of fertility in Nigeria, such as education or ethnicity. Adebowale (2019) finds, based on the 2013 DHS, that average fertility in Nigeria is 1.7 times higher for women belonging to the Hausa/Fulani ethnic group compared to women of the Igbo or Yoruba groups. The Hausa/Fulani group is the most populous ethnic group. Thus, the highest proportion of women with five or more children belongs to this group, leading to a stark increase in the national fertility rate (Adebowale, 2019). Some ethnic groups of Nigeria can be linked clearly to one main religion – members of the Hausa/Fulani group are mainly Muslims. In contrast, members of the Igbo group are predominantly Christians. People from the Yoruba group are split between Christianity and Islam (Adebowale, 2019).

As the Hausa/Fulani people live primarily in Northern Nigeria and the other groups in the South, the fertility distinctions across ethnic groups can be connected to the fertility differences across regions (Adebowale, 2019; National Population Commission – NPC/Nigeria and ICF, 2019). Moreover, dissimilarities in age at first birth and contraceptive use further influence the observed patterns, as Hausa/Fulani women marry earlier and are less likely to have used any contraceptive methods compared to women from the other main ethnic groups (Adebowale, 2019). Education divides across ethnic groups may be relevant in this context, as women belonging to the Hausa/Fulani group are more likely to have not received a formal education than those belonging to the Igbo and Yoruba groups (Adebowale, 2019; National Population Commission – NPC/Nigeria and ICF, 2019). Adebowale (2019) argues that fertility similarities between women from the Igbo and Yoruba groups may be explained by similarities in socio-economic characteristics of these women compared to women from the Hausa/Fulani group.

The rural-urban fertility gradient is more pronounced in Ethiopia, where the TFR in urban areas was around 2.3 and 5.2 in rural areas in the three years before 2016 (Central Statistical Agency/CSA/Ethiopia and ICF, 2017). However, urbanization in Nigeria is much more advanced, with over 50 percent of the population living in urban areas (Aliyu & Amadu, 2017), compared to Ethiopia, one of the world's least urbanized countries, where only around 19.5 percent of the population lives in urban areas (Hailemariam, 2017). Beyond the rate of urbanization, differences in the type of urbanization between Nigeria and Ethiopia exist. In Nigeria, there are several cities with populations far above one million residents, with the capital Lagos having far more than 10 million residents and far more than 100 urban areas with more than 100,000 residents (Aliyu & Amadu, 2017). In Ethiopia, urban growth is centered, with more than 20 percent of urban residents living in the capital Addis Ababa, with a population of more than 5 million (Weldeghebrael, 2021), and only 11 agglomerations with more than 100,000 residents as of 2017 (Hailemariam, 2017).

Substantial differences in the TFR can be observed across regions, ranging from above 7 in the Somali Region to below replacement level in Addis Ababa (Central Statistical Agency/CSA/Ethiopia and ICF, 2017), which are partially tied to differences in the socio-economic status of women across the type of place of residence (Hailemariam, 2017).

However, even beyond diversity in socio-economic characteristics of women and proximate determinants of fertility, there appears to be a persistent regional effect on fertility in Ethiopia (Eyasu, 2015), potentially linked to the broader structural context and links between rural, agricultural regions and higher fertility.

Distinguishing fertility patterns by ethnic or linguistic belonging is even more complex in Ethiopia than in Nigeria due to the ethnic and linguistic diversity of the country's population. The country has more than 80 indigenous groups speaking more than 80 distinct languages (Hailemariam, 2017). Christianity and Islam are the dominant religious groups in the country, with the former divided into Orthodox Christianity, Protestantism, and Catholicism (Hailemariam, 2017). Limited population data availability for Ethiopia further complicates the analysis of population dynamics in the country, and the DHS in 2000 was the first nationally representative survey conducted (Hailemariam, 2017).

Social and educational changes in recent years have contributed to an overall reduction in fertility (Chicoine, 2016). This reduction was faster compared to other SSA countries and resulted in a national TFR below the regional average (Hailemariam, 2017). Removing school fees has led to the prolonged enrollment of girls and women in school, thereby contributing to a delay in family formation and improving female labor market outcomes (Chicoine, 2016). Additionally, increased use of contraceptives and changing norms are drivers of the decline in TFR (Hailemariam, 2017).

The flows and numbers of internal migrants differ substantially between Nigeria and Ethiopia; however, determinants of internal migration appear to be similar. In Ethiopia, internal migration remains rare, with fewer than 10 percent of people changing their zone of residence, a number that has been stable between 1999 and 2013 (Bundervoet, 2018). Many internal migrants – around 40 percent – in Ethiopia move towards the capital; thus, internal migrants in Ethiopia are predominantly rural-to-urban ones (Bundervoet, 2018). Critical drivers of internal migration are the quest for educational and occupational opportunities and the motivation to leave behind traditional norms and customs (Bundervoet, 2018). Internal migrants are, on average, younger and better-educated than those living in rural areas, and they tend to originate in regions with relatively high population density and poverty rates (Bundervoet, 2018).

Migration is far more common in Nigeria than in Ethiopia, with estimates suggesting that nearly a quarter of Nigerians are internal migrants, with 60 percent of internal migrants moving from rural to urban areas (Rigaud et al., 2021). However, rural-to-rural migration is common in some areas, as people move following agricultural seasons across rural regions, as well as urban-to-rural migration due to a lack of employment opportunities in urban areas (Rigaud et al., 2021). According to Rigaud et al. (2021: 14), Nigerian "women typically migrate to improve their educational status, expand employment opportunities, marry and reunite with family, or avoid a marriage they did not sign for." Thus, the rationales for migration appear to be similar across Ethiopia and Nigeria, with economic reasons dominating Nigeria (Oyeniyi, 2013). Future increases in internal migration are projected for Ethiopia and Nigeria as a response to climate change (Clement et al., 2021; Rigaud et al., 2021).

The high national fertility rates and pronounced differences in fertility across rural and urban areas highlight that both countries included in the study are still in the early stages of the fertility transition. Furthermore, the relatively slow decline in fertility over time demands further analysis of the determinants of fertility in both countries. At the same time, increased urbanization, partly driven by rural-to-urban migrants, may influence fertility preferences and behaviors. As fertility behavior is inevitably slower to adapt to changes than ideals, this study focuses on fertility ideals as a proxy of future behavior and a potential indicator of adaptation upon relocation. As outlined in the following sections, fertility ideals are chosen for methodological reasons. Thus, this research aims to explore the rural-urban fertility gradient and consider the role of rural-to-urban migration in shaping fertility ideals. Focusing on two countries allows to acknowledge and analyze intra-regional heterogeneity in SSA with respect to the migration-fertility nexus.

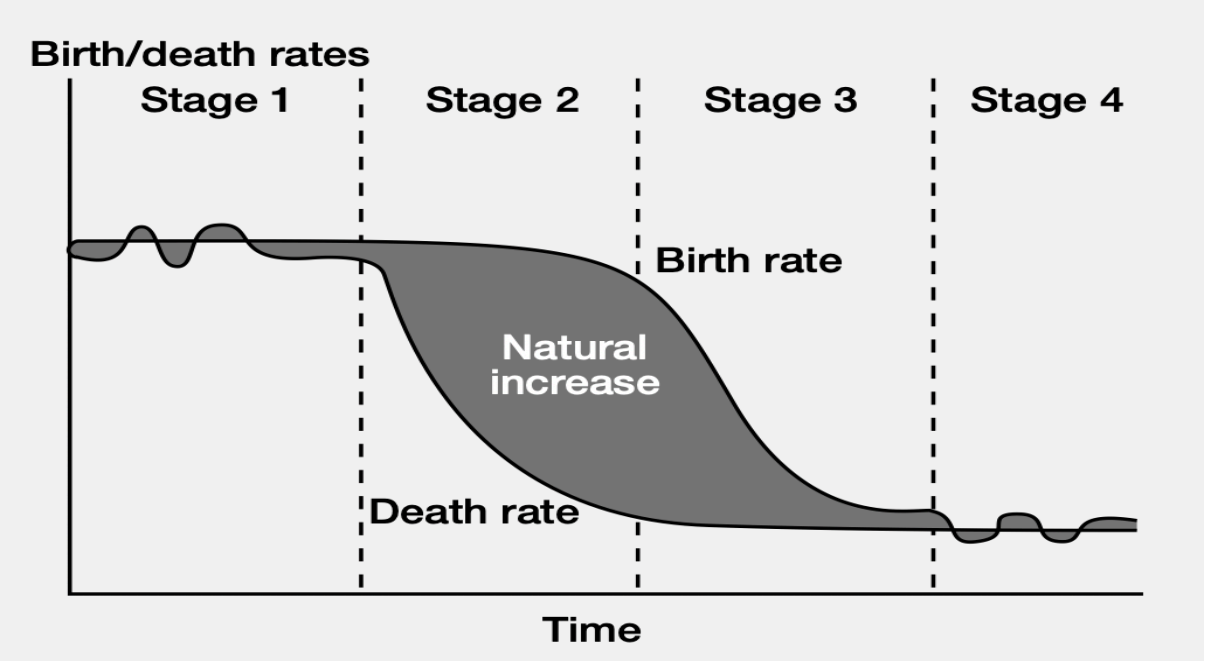
Theoretical Framework

The theoretical framework for this study is embedded in the Demographic Transition Model (DTM), which postulates fertility decline as part of the demographic transition countries undergo during their development process. Moreover, the theoretical framework focuses on the determinants of fertility, as well as the conceptualization of fertility preferences.

Demographic Transition Model

The DTM refers to a commonly used approach to generalize the changes in the demographic drivers of population structure and size as countries develop (Kirk, 1996). As shown in Figure 1, the DTM usually consists of four stages. Although countries do not follow identical demographic pathways, the model posits similar developments across societies and time (Kirk, 1996).

Figure 1. Demographic Transition Model



Note. Image obtained from "Population Reference Burau (2004). Transitions in World Population. Population Bulletin 59(1). Washington, DC. https://assets.prb.org/pdf04/59.1TransitionsinWorldPop.pdf The image shows the four phases of the demographic transition model, which describes the core demographic dynamics, such as mortality, fertility, and population growth, during the development process.

The first stage of the DTM refers to a pre-industrial society with low or negligent population growth, a small total population, and high birth and death rates. At this stage, the natural rate of population increase is either stable or very slow. The second stage refers to populations that begin industrialization, and due to improved hygiene and nutrition, mortality rates – especially infant and under-five – drop rapidly. Fertility rates, however, remain high at this stage in the transition, leading to a rapid increase in the population size. During the third stage, mortality rates decline slower than in the previous step. Fertility rates begin to fall, attributed to declining child mortality,

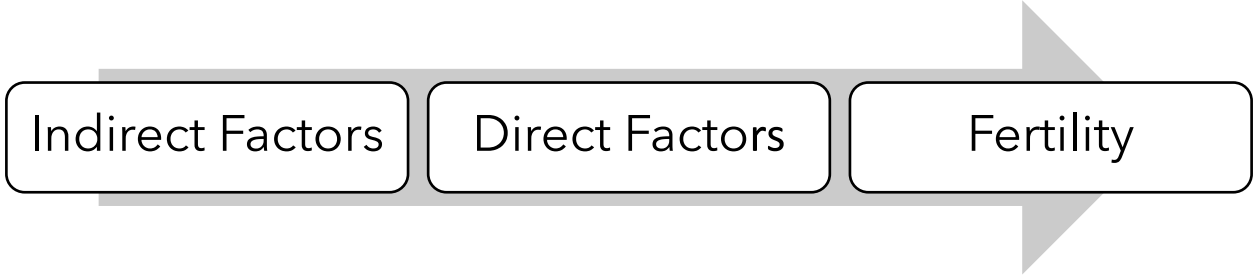
improved access to family planning services, and educational advancement, among other factors. The population growth during this stage is continuous, yet the growth rate begins to slow down. The fourth stage of the DTM is characterized by low birth and death rates and a falling rate of natural increase. Thus, population size grows only slowly or stabilized (Bongaarts, 2009; Kirk, 1996).

A fifth stage has been proposed to adequately reflect the trends observed in several highly developed countries, where fertility rates have been at or below replacement rates, thus contributing to aging and declining populations (Blue & Espenshade, 2011). This stage is called the Second Demographic Transition (Lesthaeghe, 2014). However, as Nigeria and Ethiopia are still in the early stages of the demographic transition, the prospects of a second demographic transition in these countries are outside the scope of this research.

Determinants of Fertility

As postulated by Bongaarts (1978; 2015), the determinants of fertility can be distinguished between indirect determinants – or background factors – and direct determinants – or proximate factors. The model can be estimated using DHS surveys.

Figure 2. Indirect and Proximate Determinants of Fertility.



Note. Figure based on Bongaarts (1978; 2015).

Indirect Factors

The indirect determinants include the social, environmental, and economic context in which individuals are embedded, such as income, education, or culture (Bongaarts, 1978; 2015). While these factors shape fertility outcomes on the individual and macro-level, their impact on the variation in fertility levels may sometimes be challenging to estimate, partly because they can be closely related.

Direct Factors

According to Bongaaarts (1978; 2015), the direct determinants of fertility directly influence fertility, and variations in fertility, holding other factors constant, can explain changes in the variation of the proximate determinants of fertility. The original model states that direct factors consist of three categories, which contain eight individual factors (Bongaarts, 1978). In this model, the total observed fertility rate (TFR) was conceptualized as a multiplicative equation of the marriage, contraception, postpartum infecundability, and abortion indices, as well as the total fecundity rate of a population at any given point in time (Bongaarts, 1978). However, due to critique, social changes, and new empirical evidence, several aspects of the original model were revised. In the revised model, TFR is a multiplicative equation of the sexual exposure, contraception, postpartum infecundability, and abortion indices, as well as the total fecundity rate, which is adjusted to the contraception index (Bongaarts, 2015).

Sexual Exposure: The sexual exposure index accounts for the fact that sexual activity occurs outside formal unions. It includes an index for the sexual activity of women at risk of pregnancy within a marriage or partnership and women "who have had sex in the last month or are pregnant or abstaining postpartum or are contraceptive users" (Bongaarts, 2015: 542).

Contraception: The contraception index accounts for the contraceptive prevalence of women exposed to the risk of pregnancy and is adjusted for overlaps with postpartum infecundability and average effectiveness of contraceptives and fecundity (Bongaarts, 2015).

Postpartum Infecundability: The postpartum infecundability index accounts for the average duration of postpartum infecundability of women in the population. After pregnancy, women remain infecundable for a period that depends on breastfeeding and restoring the menstrual cycle (Bongaarts, 1978).

Abortion: The abortion index provides information about the abortion rate in the population (Bongaarts, 1978; 2015).

Fecundity Rate: The fecundity rate is a hypothetical fertility rate, which, according to the model, would be the fertility rate if all other direct factors that limit fertility, such as

contraception, are absent. This value cannot be observed but needs to be estimated (Bongaarts, 2015).

Fertility Preferences

Fertility preferences can indicate the number of children an individual wants to have, and they reflect the societal context that influences the formation processes of preferences. As outlined by Bhrolcháin and Beajouan (2019), in everyday language fertility expectations can cover a wide array of words, such as intentions, preferences, ideals, or desires, which are used as concepts in fertility research, although with differing definitions and interpretations. Furthermore, the concepts are associated, to differing degrees, with uncertainty, as they refer to behavior and circumstances in the future. Commonly, fertility intentions are used as an indicator of fertility outcomes, as empirical evidence suggests that fertility intentions, despite their limitations (see, for instance, Bachrach & Morgan, 2013), are generally reliable predictors of fertility behavior (Miller & Pasta, 1994; 1995; Vignoli et al. 2020). However, because the DHS surveys only contain questions concerned with fertility ideals or desires rather than intentions, the focus of this study will be on fertility ideals.

Desires are often conceptualized as a foundation of intentions, as in Miller's Traits-Desires-Intentions-Behaviors Motivational Sequence (Miller, 2011). They cannot predict fertility behavior due to their characteristics. Desires are conceptually closer to ideals or likes rather than expectations and goals, meaning they may not adequately reflect potential factors that limit the fertility behavior of individuals, such as external constraints or considerations of what family size is realistically achievable (Miller, 2011). Thus, desires differ from the contraceptive and proceptive behaviors individuals exhibit, and they may be disconnected from the factors determining such behaviors (Miller & Pasta, 1995). According to Miller (2011), individuals can hold several competing fertility desires simultaneously; hence, other indicators of behavior, such as ideals, are preferable in the context of this study.

Fertility ideals are positioned between desires, which are more uncertain and ambiguous ideas about one's future family, and intentions, which "are the most proximate component of the motivational stream that leads to behavior" (Miller, 2011: 760). Fertility ideals are, therefore, a potential indicator of future behavior. They can change over time,

for instance, upon exposure to a new environment or due to changes in the life-course trajectory. Thus, a clear distinction is being made between fertility intentions, which are not covered within the DHS surveys or this study, fertility ideals as a proxy of preferences as the focus of the analysis, and fertility desires, which are covered in the DHS but not in this research. It should be noted that in the context of this study, the words ideal and preference are used synonymously, as fertility ideals are conceptualized as a fertility preference.

Fertility preferences depend on life course events, social structures, and individual characteristics. Bhrolcháin and Beajouan (2019) use insights from psychology, behavioral science, and economics to analyze and conceptualize preference construction in the context of reproductive goals. According to the authors, preferences can be grouped into effective and stated preferences, with the former linked to childbearing. In contrast, the latter may be influenced by how they are elicited (Bhrolcháin & Beajouan, 2019). Effective preferences are at the core of this theoretical framework; however, acknowledging that stated preferences may differ from an individual's actual preferences is an essential part of considering limits to the link between survey responses and effective preferences.

Effective fertility preferences are constructed throughout an individual's life and subject to changes in life course stages, socio-economic circumstances, experiences, partners, and the social environment. Bhrolcháin and Beajouan (2019) postulate that preferences at younger ages are more reflective of social norms compared to preferences at older ages, which are likely to be more diverse due to the individuality of one's life course. Important for this study is the indirect and direct influence on fertility preferences through background factors and individual characteristics, as well as the observation that preferences, and thus behavior, can change over time (Bhrolcháin & Beajouan, 2019). Similarly, Trinitapoli and Yeatman (2018) note that young adults face more significant uncertainty concerning their future; hence their fertility preferences might be more flexible compared to older adults who face a relatively certain life-course trajectory.

Stated fertility preferences refer to answers given by individuals in response to a question about preferences, for instance, in a social survey. Research suggests that individuals who do not yet have a clear answer to such a question, for example, because they have not developed a clear idea about their future childbearing plan, will nonetheless provide an

answer (Guzzo & Hayford, 2020). Thus, they construct a preference in response to a question rather than giving an insight about an effective preference. Moreover, if individuals are unfamiliar with the concept of fertility preferences that require numeric, or at the very least, rather specific answers, they may construct a stated preference (Bhrolcháin & Beajouan, 2019). Consequently, while numeric responses to questions about fertility preferences often reflect effective preferences, they should be understood to be "changeable, context-dependent, and subject to framing effects" (Bhrolcháin & Beajouan, 2019: 40). Lastly, evidence suggests that individuals tend to adjust their preferences in response to their past fertility behavior, and the current family size influences the stated preference (Bhrolcháin & Beajouan, 2019).

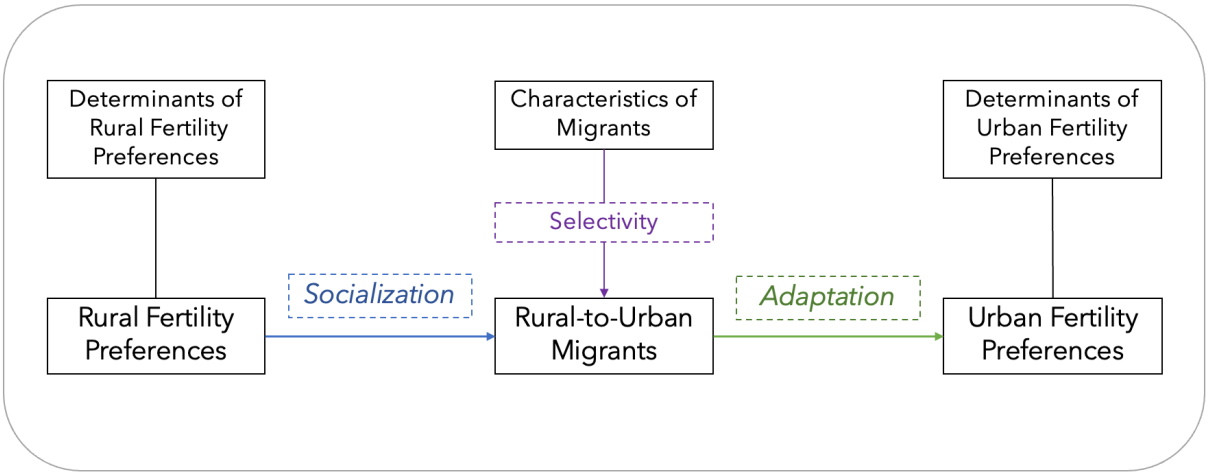
Trinitapoli and Yeatman (2018) suggest that researchers should not view fertility preferences as an executable plan but rather as a reflection of ongoing processes on the micro and macro levels and considerable uncertainty as part of preferences. Nonetheless, the authors also suggest that numeric conceptualization of future family planning has become more prevalent in SSA by pointing out that non-numeric responses in SSA to questions about fertility preferences have declined (Trinitapoli & Yeatman, 2018). This study does not aim to produce a projection of regional differences in fertility but rather to improve the understanding of how migration and fertility preferences are interlinked. Thus, the shortcomings of fertility preferences as a predictor of fertility behavior are less relevant in this research context; however, awareness of such limitations is crucial for interpreting the results.

Conceptual Model

The conceptual model (Figure 3) combines theoretical and empirical evidence concerning the link between rural-to-urban migration and fertility differences in rural and urban areas. Moreover, it considers the demographic processes observed in SSA as embedded in the DTM. The determinants of rural and urban fertility preferences are conceptualized based on Bongaarts (1978; 2015) and incorporate indirect and direct determinants of fertility. The determinants in this model are linked to fertility preferences, which serve as a proxy for fertility behavior rather than observed or predicted fertility rates.

The conceptual model accounts for the individuality of the life course by including individual characteristics of migrants, such as age, socio-economic status, educational attainment, and religion, as these factors are understood to shape their fertility preferences. These characteristics may establish rural-to-urban migrants as a selective group with distinct features compared to other internal migrants or non-migrants. Rural-to-urban migrants in the model are situated between the rural and urban contexts to reflect their position in different social spheres, which are tied to these individuals' fertility preferences. Figure 3 further highlights how different social processes linked to internal migration affect fertility preferences. On the one hand, socialization and upbringing in a rural context can connect individuals to the demographic behavior of rural areas, even after leaving them. On the other hand, adaptation to urban fertility behaviors is likely, due to socio-economic constraints in urban areas and different prevailing norms concerning family size and family formation.

Figure 3. Conceptual Model



Note. The figure shows the conceptual model that guides the analysis. Socialization, adaptation, and selectivity refer to the hypotheses of possible scenarios regarding the fertility ideals of rural-to-urban migrants. The hypotheses are understood to be complementary, rather than mutually exclusive. Determinants of fertility preferences are broadly constructed and concern commonly determinants of fertility as outlined in the literature review. Characteristics of migrants refer to demographic, cultural, and economic characteristics, as well as dimensions of female empowerment. The conceptual model is embedded in the framework of the fertility transition as outlined in the demographic transition model.

Research Questions and Hypotheses

Based on the literature review, the identified research gap, and the previously outlined theoretical framework, the following primary research question emerges:

- What effects does rural-to-urban migration in Ethiopia and Nigeria have on fertility ideals of women?

Moreover, two sub-questions were derived from the main research question:

- What are the key differences in fertility ideals across migration statuses in Ethiopia and Nigeria?
- What are the determinants of differences in ideals across migration statuses in both countries?

Based on the existing literature, empirical evidence, and the research questions, the following hypothesis can be stated:

(1) Socialization Hypothesis: Rural-to-urban migrants maintain the fertility preferences of their upbringing in rural areas (Gyimah, 2006).

(2) Adaptation Hypothesis: Rural to urban migrants adapt to the fertility preferences of urban areas (Gyimah, 2006).

i. With increasing time spent in urban areas, the preferences of rural-to-urban migrants become indistinguishable from those of women born in urban areas.

(3) Selectivity Hypothesis: Rural-to-urban migrants have specific characteristics that distinguish them from the population of rural residents and thus, determine their fertility preferences (Gyimah, 2006).

Research Design

Type of Research

This research investigates links between rural-to-urban migration and ideal fertility in Ethiopia and Nigeria. The study seeks to explore determinants of ideal fertility across women with different migration histories. Although significant attention has been paid to fertility in SSA, less research focuses on the link between internal migration and fertility and differences in ideal fertility by type of residence (Lerch, 2019b). The cross-country comparison of Nigeria and Ethiopia, two of the most populous countries in SSA that to some extent represent the western and eastern regions of SSA, highlights the intra-regional heterogeneity concerning internal migration and fertility. The type of research is explorative, as the study focuses on improving the understanding of the effects of rural-to-urban migration on fertility ideals (Babbie, 2010).

The study employs a quantitative research design, as it explored the relationship between several variables and compared phenomena at hand in two different countries. Quantitative research allows for quantifying available information (Babbie, 2010), and researchers can apply statistical analysis to explore the relationships between other variables and the statistical significance thereof. In the context of the study, this approach is particularly suitable as it allows for comparison across different groups and countries, which is in line with the research objective. Based on the literature review, several hypotheses were established, which can be tested through statistical methods.

Data

The datasets used in this study were obtained from the Demographic and Health Surveys (DHS) for Nigeria and Ethiopia. Thus, the analysis will be cross-sectional. The most recent standard DHS surveys were conducted in Nigeria in 2018 and Ethiopia in 2016 (Central Statistical Agency/CSA/Ethiopia and ICF, 2017; National Population Commission – NPC/Nigeria and ICF, 2019). Topics of standard DHS surveys include various questionnaires covering multiple topics, such as health, population dynamics, socio-economic indicators, and female empowerment. The DHS conducts the sampling, and the data is representative of the sampled population (DHS, 2012). Standard DHS surveys are ideally undertaken in 5-year intervals, with smaller interim DHS surveys providing additional information. The DHS program receives funding from the United States Agency for International Development (USAID) and other donors (DHS, 2022). The DHS survey process consists of four stages: (1) Survey Design and Preparation; (2) Training and Data Collections; (3) Data Editing, Tabulation, and Report Writing; and (4) Dissemination, Use, and Analysis (DHS, 2022a).

The survey is performed by local agencies that receive support from the DHS program (DHS, 2022a). The DHS program aims for large sample sizes based on probability and two-stage cluster sampling, where a cluster refers to a grouping of households. Initially, a stratified sample of enumeration areas is selected, from which a specific number of households is selected in the second stage of the questionnaire (DHS, 2012). Benefits of this sampling approach include representativity of the target population, improved coverage of the people, and reduced sampling errors, among others (DHS, 2012). The DHS datasets are publicly accessible and free to download after online registration to ensure purposeful usage (DHS, 2022b).

Study Population

The study population is women in Nigeria and Ethiopia aged 15-49, which roughly corresponds to the female reproductive years. Thus, women in this age group are at risk of having a child, and their fertility ideals can impact fertility behavior. Both countries' relatively large populations are expected to grow in future decades. Subsequently, the UN (United Nations Department of Economic and Social Affairs, 2019) estimates that Nigeria will become the second-most populous country on earth by 2100, and Ethiopia the eighth-most populous. Table 1 shows an overview of the different DHS surveys used for this research and the corresponding sample sizes.

Table 1. DHS Waves used in this Study

Country	Year	Sample Size	Obs. Incl.
Ethiopia	2016 EDHS	15,683	15,317
Nigeria	2018 NDHS	41,821	41,186

Note. All DHS data were obtained from the DHS database.

Population projections for SSA are uncertain, as countries in this region are still in the process of the demographic transition. Thus, depending on different socio-economic, demographic, and ecological dynamics, the population outcomes in 2100 for this region could differ from current estimates. Understanding the underlying drivers and determinants of the links between internal migration and fertility could contribute to a better understanding of ongoing processes and reduce projection uncertainty (Lerch, 2019a). As a result of population momentum, small changes in fertility can have a magnified effect on the overall population size. Currently, a half a child difference above or below the medium variant projection in the region could result in a nearly 2 billion people difference by 2100 (United Nations Department of Economic and Social Affairs, 2019). The impact of internal migration, rural-to-urban migration in particular, on fertility outcomes in SSA is not well studied. However, with projected increases in internal migration due to environmental changes (Clement et al., 2021; Rigaud et al., 2021) and increased urbanization, better understanding the links between internal migratory flows and fertility outcomes is crucial from policy-making and research perspectives.

Operationalization

Dependent Variable

The dependent variable in the study is ideal fertility, captured as the "ideal number of children". The variable was constructed as a categorical variable with four

categories, as outlined in Table 2. Four categories allow for the analysis of non-numeric preferences and numeric preferences. Moreover, the categories correspond to the mean ideal number of children for married women in Ethiopia and Nigeria in the most recent survey, which equals 4.9 and 6.6, respectively (Central Statistical Agency/CSA/Ethiopia and ICF, 2017; National Population Commission – NPC/Nigeria and ICF, 2019). Thus, category 1 serves as the base category in models for both countries. The benefit of a categorical dependent variable is the possibility of the individual characteristics and determinants of fertility across women in the different categories.

The variable "ideal number of children" was chosen as the dependent variable, as fertility ideals may correspond faster to changes in circumstances and norms brought about by migration. However, ideal fertility might be biased to the number of children a woman already has, as they may include already existing children when considering one's preferences. The DHS aims to address this bias by asking women who already have living children "if you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" (DHS, 2022c: 58). Women who do not have living children are asked, "If you could choose exactly the number of children to have in your whole life, how many would that be?" (DHS, 2022c: 58). The mean ideal fertility is slightly lower for women who are not married and higher for married and unmarried men in both countries. Wanted births are lower than the total fertility rate, with an average difference of one child in Ethiopia and 0.5 children in Nigeria (Central Statistical Agency/CSA/Ethiopia and ICF, 2017; National Population Commission – NPC/Nigeria and ICF, 2019).

Table 2. Operationalization of the Dependent Variable

Dependent Variable	
Ideal Number of Children	*idealnum* - *0-4 (0)* - *5-6 (1)* - *7+ (2)* - *Non-numeric (3)* Based on available information about the ideal number of children (v613; v614).

Independent Variables

Several independent variables are included in the analysis and assigned to the following groups (1) individual characteristics; (2) economic status; and (3) dimensions of female empowerment. Table 3 offers an overview of the variables used in the analysis and the base variables from the DHS. Insights into the coding of variables allow for an improved understanding and interpretation of the analysis.

Table 3. Operationalization of the Independent Variables

Determinants of Fertility Preferences	Variable and Coding
Individual Characteristics	
Migration Status	*migstat3* - *Rural non-migrant (0)* - *Urban non-migrant (1)* - *Rural-rural (2)* - *Rural-urban (3)* - *Other (4) (includes urban-rural & rural-urban)* Based on available information about current and previous type of place of residence (v025, v105).
Years lived in current type of place of residence	*years* - *0-49* - *Numeric* Based on the available information about the years spent in the current type of place of residence (v104).
Age	*v012* - *Women's age in years* - *15-49* - *Numeric*
Highest Level of Educational Attainment	*v106* - *No education (0)* - *Primary (1)* - *Secondary (2)* - *Higher (3)*
Marital Status	mstat - *Never in a Union (0)* - *Married (1)* - *Cohabitating (2)* - *Other (3) (includes widowed and divorced women, and women living separate from a partner)*

	Based on available information about the current marital status (v501).
Religious Affiliation of Respondent	*Ethiopia:* *rel* - *Orthodox (0)* - *Christian (1) (includes Catholics and Protestants)* - *Muslim (2)* - *Other (3) (includes traditional religions)* *Nigeria:* - *Christian (0)* - *Islam (1)* - *Other (2) (includes traditional religions)* Based on available information about the respondent's religious affiliation (v130).
Native Language of Respondent	*Ethiopia:* *lang* - *Amarigna (0)* - *Tigrigna (1)* - *Oromigna (2)* - *Other* (3) *Nigeria:* - *English (0)* - *Hausa (1)* - *Yoruba (2)* - *Igbo* (3) - *Other (4)* Based on information about the respondents' native language (v045c) and the language of the questionnaire (v045a). Due to the lingual heterogeneity in Ethiopia, only the three groups with the most native speakers among the respondents were categorized individually. In Nigeria, five groups were created.
Economic Status	
Wealth Index	*WI* - *Poorer (0)* - *Middle (1)* - *Richer (2)* Based on the Wealth Index Combined (v190). For simplicity, the categories poor and poorer were combined, as where the categories rich and richer.

Current Employment Status	*empl* - *No (0)* - *Yes (1)*
Dimensions of Female Empowerment	
Contraceptive Use and Intention	*v364* - *Using modern method (1)* - *Using traditional method (2)* - *Non-user, intends to use later (3)* - *Does not intend to use (4)*
Age at first Birth	*aafb* - Not applicable (0) - <=15 (1) - 16-25 (2) - 26+(3)
Views on Wife Beating Index	*VWBI* *c_v744a: Beating justified if wife goes out without telling husband* - *Yes (0)* - *No (1)* *c_v744b: Beating justified if wife neglects the children* - *Yes (0)* - *No (1)* *c_v744c: Beating justified if wife argues with husband* - *Yes (0)* - *No (1)* *c_v744d: Beating justified if wife refuses to have sex with husband* - *Yes (0)* - *No (1)* *c_v744e: Beating justified if wife burns the food* - *Yes (0)* - *No (1)* Index constructed based on the five variables mentioned above. Index ranges from 0-1, where 0 = least empowered and 1 = most empowered.
Attitudes towards Refusing Sex Index	*ATRSI* *n_v850a: Respondent can refuse sex* - *No/No Response/Missing (0)* - *Yes (1)* *n_v850: Respondent an ask partner to use a condom* - *No/No Response/Missing (0)* - *Yes (1)* Index based on the two variables mentioned above. Index ranges from 0-1, where 0 = least empowered and 1= most empowered.

The primary independent variable included in the analysis is a categorical variable for migration status to account for different migration histories among women in the sample. The variable has five categories to distinguish between women residing in rural and urban areas who have never moved, those who moved between rural areas, those who move from rural to urban areas and are at the focus of the analysis, and women moving from or within urban areas. Due to the sample structure, women moving from or within urban areas could not be further distinguished as the observations per category would be too few, which could negatively impact the reliability of the model. Migration status for women who have moved is solely based on their most recent move, as the DHS survey only includes questions about the most recent previous and current residences (DHS, 2022c). A variable is included for the years women in the sample have lived in the current type of residence. This variable tests whether the amount of time spent in the urban environment after rural-to-urban migration affects ideal fertility.

Based on the literature review, several variables serve as control variables for ideal fertility. These variables are age, the highest level of educational attainment, and marital status. Age is included as a numeric variable, whereas the level of educational attainment and marital status are categorical variables. Marital status is an essential variable in this context, as it is a proximate determinant of fertility because women in a union are at a higher risk of conception than those without a partner or not in a partnership (Bongaarts, 2015). Additionally, based on the literature review, the model includes categorical variables for the religious affiliation and native language of women as proxies for ethnic, linguistic, and religious belonging to test and control for the impact of these characteristics on ideal fertility.

The analysis incorporates two variables to account for the economic status of women: a categorical variable for the wealth index constructed by the DHS and a dichotomous variable providing information about the current employment status of women. The wealth index is re-coded and includes three categories rather than the standard five to avoid issues associated with small cell counts during the regression analysis. Thus, the categories “poorest” and “poorer” were combined into one and the categories “richer” and “richest” into another category. The index is constructed based on responses to questions concerning the ownership of assets, access to water and sanitation facilities, and construction materials used for housing (DHS, 2020).

Four dimensions of female empowerment are part of the analysis. A categorical variable for contraceptive use and intention is part of the model as it is a proximate determinant of fertility (Bongaarts, 2015). Age at first birth can provide information about women's future life trajectory as women who have a child early in life may experience disruptions in their educational career, which can negatively affect future employment opportunities. This variable can indicate sexual activity and exposure risk to pregnancy. In a study of female empowerment, age at critical life events, such as first birth, is an essential dimension of empowerment (Mganga et al., 2021). Age at first birth is a categorical variable with four categories, ranging from "not applicable" for women who have not (yet) experienced the first birth to women above or equal to age 26. Categories are based on the frequency of births at different ages.

Based on the approaches of Upadhyay & Karasek (2010) and Mganga et al. (2021), female empowerment is conceptualized as a multi-dimensional concept. Both approaches use the DHS questions concerning women's attitudes towards wife-beating (VWBI) as one dimension. Upadhyay & Karasek (2010) consider attitudes toward the wife's right to refuse sex with her husband (ATRSI) as another crucial indicator of female empowerment. The third dimension established by Upadhyay & Karasek (2010) concerning women's decision-making power could not be included in this analysis, as only married women are asked. For the ATRSI, only women who respond "yes" in response to questions about the former and "no" to questions about the latter are coded as 1 (=most empowered). All other answers are coded as 0 (=least empowered). The VWBI was coded in a similar manner (1=most empowered).

Methodological Approach

The methodological approach of this study combines a literature review with descriptive analysis and multinomial logistic regression analysis. For the descriptive analysis, t-tests, cross-tabulation chi-square tests, and visualization tests compare the means, distributions, and properties of the variables of interest. Moreover, the statistical significance of differences ($p<0.05$) for the categories of the primary independent variable is tested. Multinomial logistic regression analysis is used for the central part of the analysis.

The multinomial logistic regression approach is applied, as the dependent variable of interest is a categorical variable with four categories. The categories are non-ordered as they include a category for women who state their fertility ideals in a non-numeric manner. An OLS approach is unsuitable as a linear association between X and Y cannot be assumed, and other assumptions of OLS regression would be violated (Mehmetoglu & Jakobsen, 2017). Multinomial logistic regression is an extension of ordinary binary logistic regression, with the advantage of investigating non-binary categorical dependent variables (Mehmetoglu & Jakobsen, 2017). In this type of regression, probabilities are predicted for each category of the dependent variable (Koehler & Kreuter, 2012). The base outcome in the regression is the dependent variable's category 5-6 children, which corresponds to the mean ideal number of children of married women in both countries (Central Statistical Agency/CSA/Ethiopia and ICF, 2017; National Population Commission – NPC/Nigeria and ICF, 2019). The regression output is presented as relative risk ratios (RRR). The three equations for a multinomial regression model for a dependent variable Y with four categories and n-number of covariates are defined as follows:

$$(1)\ L(1) = \left(\frac{P(Y=1)}{P(Y=0)} = \beta_{0_1} + \beta_{1_1}x_1 + \beta_{2_1}x_2 + \cdots + \beta_{n_1}x_n + \varepsilon_1\right)$$

$$(2)\ L(2) = \left(\frac{P(Y=2)}{P(Y=0)} = \beta_{0_2} + \beta_{1_2}x_1 + \beta_{2_2}x_2 + \cdots + \beta_{n_1}x_n + \varepsilon_2\right)$$

$$(3)\ L(3) = \left(\frac{P(Y=3)}{P(Y=0)} = \beta_{0_3} + \beta_{1_3}x_1 + \beta_{2_3}x_2 + \cdots + \beta_{n_1}x_n + \varepsilon_3\right)$$

The analysis utilizes different models for each country based on a hierarchical model-building approach to examine the effect of other variables on the dependent variable, the model fit, and its robustness. Additionally, several interaction variables were tested without significantly impacting the models' predictive power. Thus, the interaction variables were excluded from the final models.

The baseline model includes migration status and controls for individual characteristics of respondents. The complex model has, in addition to all covariates of the third model, covariates covering different dimensions of female empowerment. The hierarchical approach and the general construct of the models are identical for the data from Ethiopia and Nigeria; however, several variables are coded differently (see Table 3 for details).

Likelihood ratio tests confirm the improvement of each more complex model compared to the prior model in the hierarchical model-building process. Post-estimation robustness checks and sensitivity analyses test the models' specification and predictive power, as well as the sensitivity of the models to the independent variables.

A core assumption of multinomial logistic regression is the independence of irrelative alternatives (IIA) assumption (DeMaris, 1995). The IIA states that "if A is preferred to B out of a choice set of A and B, the introduction of a third alternative C must not make B preferable to A" (Mehmetoglu & Jakobsen, 2017: 182). Thus, the categories of the dependent variable must be exhaustive and mutually exclusive. This assumption is tested with the Hausman-McFadden test (Mehmetoglu & Jakobsen, 2017). Test results for the Hausman-McFadden test and Wald tests can be found in Appendix 3 and Appendix 4, respectively.

Furthermore, predictive margins and probabilities calculated based on the multinomial logit models estimate the effect of the primary independent variable on the dependent variable (Williams, 2012). The predictive probabilities are plotted to allow for the visualization of the regression results. The descriptive and regression analyses were conducted using the Stata 17 software (StataCorp, 2021).

Results

Descriptive Statistics

An overview of the variables used in the analysis, including means for continuous variables, as well as standard deviations can be found in tables 4 and 5.

Table 4. Summary Table Ethiopia

Variable	Obs.	Categorical	Mean	Std. Dev.	Min	Max
idealnum	15317	X	.911	1.067	0	3
migstat3	15317	X	1.238	1.45	0	4
years	15317		34.622	19.505	0	49
v012	15317		28.02	9.177	15	49
v106	15317	X	.838	.931	0	3
mstat	15317	X	.945	.826	0	3
rel	15317	X	1.014	.918	0	3
lang	15317	X	1.23	1.234	0	3
WI	15317	X	1.11	.927	0	2
empl	15317	X	.362	.481	0	1
v364	15317	X	3.015	1.12	1	4

aafb	15317	X	1.257	.976	0	3
VWBI	15317		.631	.396	0	1
ATRSI	15317		.245	.373	0	1

Table 5. Summary Table Nigeria

Variable	Obs.	Categorical	Mean	Std. Dev.	Min	Max
idealnum	41186	X	1.058	.88	0	3
migstat3	41186	X	1.353	1.306	0	4
years	41186		32.491	20.195	0	49
v012	41186		29.181	9.724	15	49
v106	41186	X	1.256	1.044	0	3
mstat	41186	X	.878	.692	0	3
rel	41186	X	.521	.516	0	2
lang	41186	X	2.386	1.365	0	4
WI	41186	X	1.015	.888	0	2
empl	41186	X	.647	.478	0	1
v364	41186	X	3.298	.942	1	4
aafb	41186	X	1.405	.981	0	3
VWBI	41186		.8	.35	0	1
ATRSI	41186		.341	.427	0	1

The relationship between the dependent and primary independent variables was analyzed through crosstabulation and chi-square tests (Tables 6 and 7) and correlation analysis for each country. All relationships of covariates with the dependent variable were statistically significant ($p<0.05$). Correlation matrices can be found in Appendix 2.

Table 6. Tabulation Dependent Variable and Migration Status Ethiopia

Ideal Number of Children	Migration Status					
	rural non-migrant	urban non-migrant	rural-rural	rural-urban	other	Total
0-4	3034	1398	865	1121	1333	7751
	39.14	18.04	11.16	14.46	17.20	100.00
5-6	1591	301	504	241	254	2891
	55.03	10.41	17.43	8.34	8.79	100.00
7+	1783	332	502	138	207	2962
	60.20	11.21	16.95	4.66	6.99	100.00
non-numeric	1022	171	324	96	100	1713
	59.66	9.98	18.91	5.60	5.84	100.00
Total	7430	2202	2195	1596	1894	15317
	48.51	14.38	14.33	10.42	12.37	100.00

Pearson Chi2 = 1124.14 Prob = 0.0000

Note. First row has *frequencies* and second row has *row percentages*

Table 7. Tabulation Dependent Variable and Migration Status

Ideal Number of Children	Migration Status					
	rural non-migrant	urban non-migrant	rural-rural	rural-urban	other	Total
0-4	3520	3767	2129	2426	1840	13682
	25.73	27.53	15.56	17.73	13.45	100.00
5-6	4157	2844	2664	1913	972	12550
	33.12	22.66	21.23	15.24	7.75	100.00
7+	6812	2187	3418	1007	398	13822
	49.28	15.82	24.73	7.29	2.88	100.00
non-numeric	410	201	248	151	122	1132
	36.22	17.76	21.91	13.34	10.78	100.00
Total	14899	8999	8459	5497	3332	41186
	36.17	21.85	20.54	13.35	8.09	100.00

Pearson Chi2 = 3406.11 Prob = 0.0000

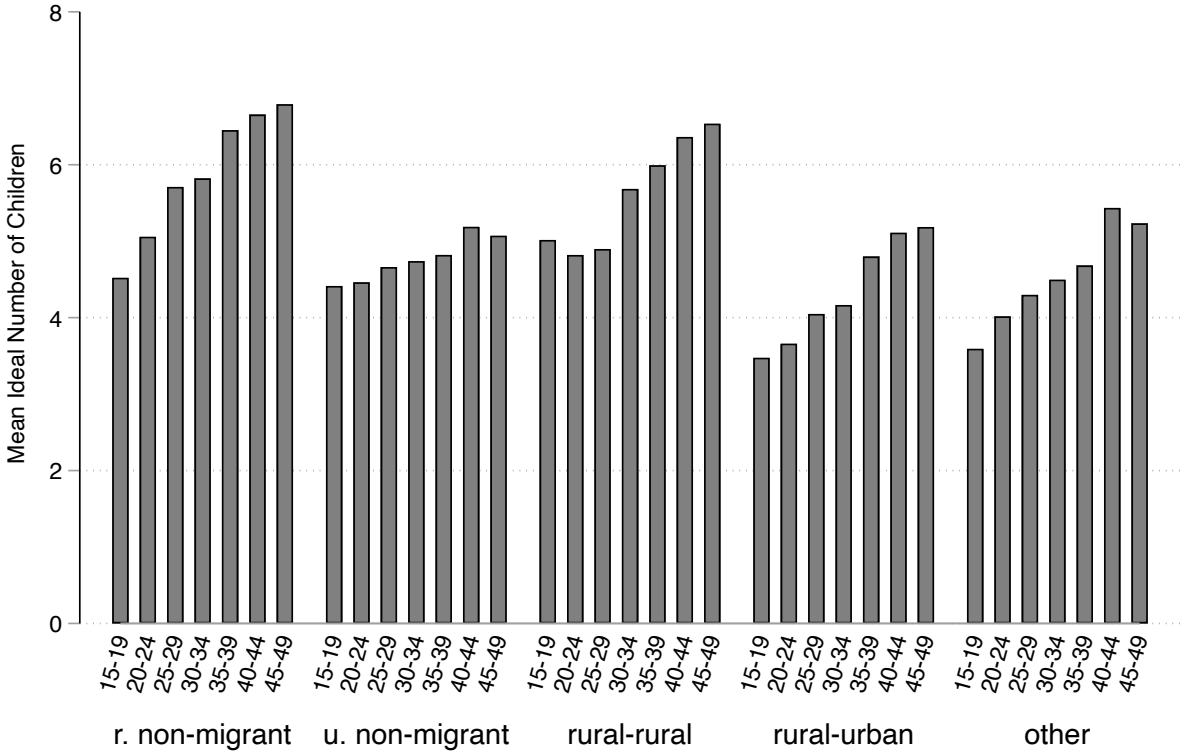
Note. First row has *frequencies* and second row has *row percentages*

The differences in fertility ideals were explored visually to answer the sub-question "What are the key differences in fertility ideals across migration statuses in Ethiopia and Nigeria?" (Figures 4 and 5). In Ethiopia, fertility ideals are highest for non-migrant women living in rural areas (mean of 5.5) and women who migrate between rural areas (mean of 5.51). Urban non-migrant women have a mean ideal fertility of 4.6, slightly higher than those of women migrating from urban areas to rural and urban areas (mean of 4.33). Rural-to-urban migrants have the lowest mean ideal fertility (mean of 4.05). In Nigeria, fertility ideals are also highest for non-migrant women who reside in rural areas (mean of 6.85) and women who migrate between rural areas (mean of 6.65). Women migrating from and between urban areas have a mean ideal fertility of 4.78, and thus the smallest ideal family size. Rural-to-urban migrants in Nigeria have ideal fertility of 5.26 on average, which is lower than that of rural and urban non-migrant women.

Fertility ideals in both countries differ substantially across age groups, with younger women across all migration statuses stating lower fertility ideals. However, the higher fertility ideals of older women could be tied to a higher number of living children. Thus, a bias towards the existing living children may be visible in the stated ideal number of children. In Ethiopia, slightly more than 50 percent of women in the overall sample state that their ideal number of children is between 0 and 4. Non-numeric fertility ideals are

indicated by 11.18 percent of women, most of whom are rural non-migrants (59.66 percent).

Figure 4. Mean Ideal Number of Children by Migration Status and Age in Ethiopia

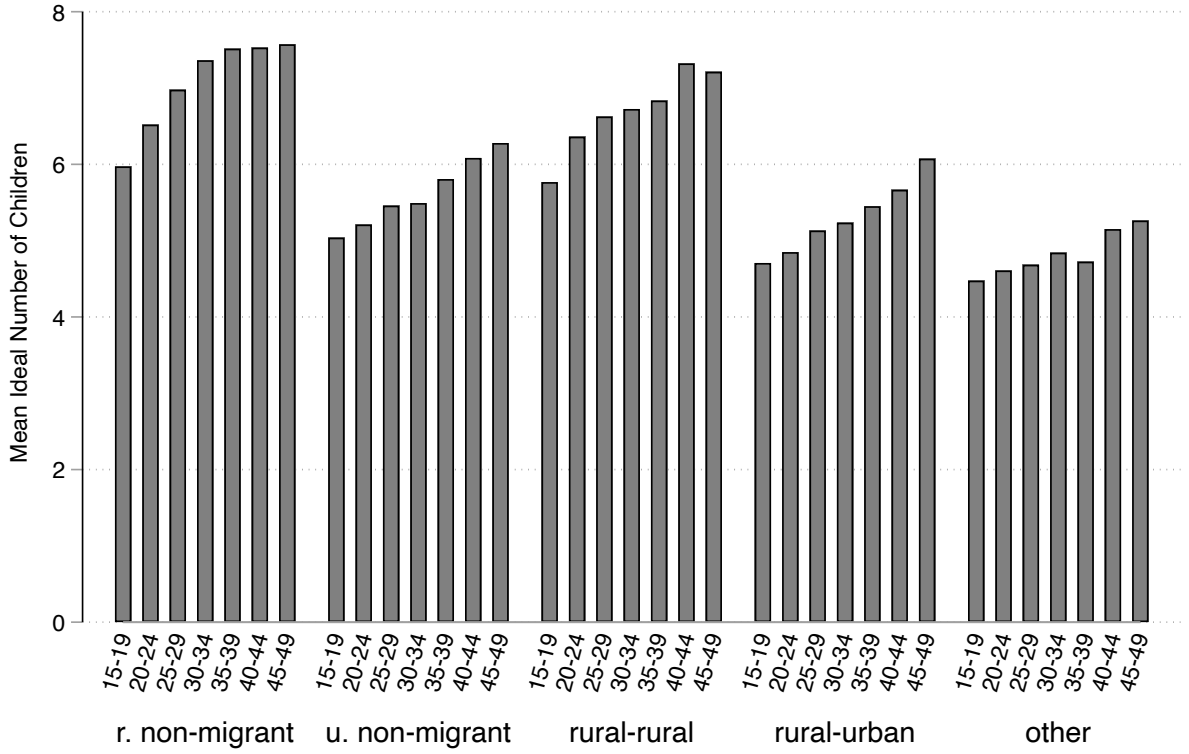


Note. The figure shows the mean ideal number of children by migration status and age group for Ethiopia based on data from the 2016 EDHS. The mean ideal number of children displayed excludes non-numeric fertility ideals and very high fertility ideals equal or above to 30 children. The category other for the migration status includes women migrating from and between urban areas.

In Nigeria, ideal fertility, as shown in Figure 4, is higher on average than ideal fertility in Ethiopia. Nonetheless, similar patterns are observable. Younger women have, on average and across all migration statuses, smaller ideal family sizes than older women. However, Nigeria's youngest age group for each migration category does not have the lowest mean ideal fertility. Tables 8 and 9 further highlight that ideal fertility is higher in Nigeria compared to Ethiopia. In Nigeria, only one-third of women state that their ideal fertility is between zero and four children, compared to more than half in Ethiopia. Rural-to-urban migrant women state that a smaller family, meaning 0-4 children, is ideal

compared to non-migrant women in rural and urban areas. There are similar proportions of women across all migration statuses stating fertility ideals non-numerically.

Figure 5. Mean Ideal Number of Children by Migration Status and Age in Nigeria



Note. The figure shows the mean ideal number of children by migration status and age group for Nigeria based on data from the 2018 NDHS. The mean ideal number of children displayed excludes non-numeric fertility ideals and very high fertility ideals equal or above to 30 children. The category other for the migration status includes women migrating from and between urban areas.

The characteristics of the women across the categories were analyzed to identify potential factors determining the distinctions in fertility ideals. Women in the sample for Ethiopia who are rural-to-urban migrants have a mean age of 26.99 compared to a mean age of rural non-migrants of 27.54 and a mean age of 27.17 for urban non-migrants. Hence, the age differences are only marginal. In the sample for Nigeria, the mean age of rural-to-urban migrant women is 31.13, therefore higher than rural-non migrant women (28.04) and urban-non migrant women (28.1). According to several other individual characteristics, economic indicators, and indicators of female empowerment, rural-to-

urban migrant women vary from their non-migrating counterparts in rural and urban areas.

In the data for Ethiopia, as shown in Table 8, there are differences in educational attainment for the three groups. Most rural non-migrants have no education, and fewer than one percent have completed higher education. Among the urban non-migrants, the distribution by educational attainment is different, as most have completed secondary or higher education. Rural-to-urban migrants are between the two non-migrant groups, with the relatively largest group being those women who have completed primary education. Thus, rural-to-urban migrant women in Ethiopia appear to be, on average, more educated than rural non-migrants but not as educated as urban non-migrants.

Given the similarities in the mean age, differences in marital status could indicate differences in norms shaping the family formation processes. Most rural non-migrant women in the Ethiopian sample are married, compared to fewer than half of women in the urban non-migrant category. Nearly 40 percent of rural-to-urban migrant women in the sample are those who have never been in a union, and fewer than half are married. Interestingly, rural-to-urban women have the highest proportion of women cohabiting with their partners. Although this is a small group overall, it could suggest that women are more often living with a partner due to housing constraints or because they seek to overcome traditional norms concerning partnership, cohabitation, and marriage. Two-thirds of rural-to-urban migrant women in Ethiopia are Orthodox Christian, a stark difference in the distribution of religious affiliation among the other groups.

Over 95 percent of women who migrate from rural to urban areas belong to the richer Ethiopians according to the DHS wealth index, a distribution similar to the urban non-migrant women. On the other hand, two-thirds of rural non-migrant women are poorer, according to the index. Thus, women who migrate from rural-to-urban areas appear to be financially better off than their rural counterparts. Women who migrate to urban areas or have always lived there are more likely to participate in the labor market compared to women residing in rural areas.

Rural-to-urban migrants in the sample are more users of modern contraceptive methods than rural and urban residents. They also have the smallest proportion of women not

intending to use contraception. Rural residents appear to have children earlier than urban residents and rural-to-urban migrants, who have relatively larger proportions of women not (yet) having a child. Rural residents are also more likely to have children below or at age 15 than the other groups. The VWBI covers attitudes towards the acceptance of wife-beating. Urban non-migrant women are the most empowered, with nearly 70 percent of women not agreeing that wife-beating is acceptable in any cases inquired about. According to the index, almost 60 percent of women among the rural-to-urban migrants rank most empowered. Rural non-migrants are less empowered in terms of attitudes towards domestic violence. Regarding the ATRSI, which covers women's ability to refuse sex and ask a partner to use a condom, the groups are somewhat similarly distributed, with around 70 percent of women in each migration group stating that they can neither refuse sex nor ask a partner to use a condom. However, the proportion of women who can refuse sex and ask a partner to use a condom is nearly double the size for rural-to-urban migrants compared to rural non-migrants.

Overall, the descriptive analysis highlights that in Ethiopia, rural-to-urban migrants differ from rural non-migrants, as they are more likely to be wealthier, better educated, and more empowered. Thus, differences in fertility ideals across migration statuses are mitigated by the outlined dissimilarities.

Table 8. Determinants of Fertility by Migration Status Ethiopia

	Migration Status (migstat3)		
Covariates	**Rural non-migrant**	**Urban non-migrant**	**Rural-to-urban migrant**
Educational Attainment (v106)			
No education	57.81	14.17	26.75
Primary	33.80	28.38	45.94
Secondary	7.52	34.74	17.67
Higher	0.87	22.71	9.65
Total	**100.00**	**100.00**	**100.00**
Marital Status (mstat)			
Never	24.78	46.00	39.35
Married	66.10	40.24	44.42
Cohabiting	0.87	1.68	1.88
Other	8.25	12.08	14.35
Total	**100.00**	**100.00**	**100.00**
Religion (rel)			
Orthodox	29.00	49.18	60.21
Christian	22.84	14.17	12.84

Muslim	46.50	36.33	26.75
Other	1.66	0.32	0.19
Total	**100.00**	**100.00**	**100.00**
Native Language (lang)			
Amarigna	31.60	65.21	59.77
Tigrigna	11.18	6.68	10.71
Oromigna	25.11	14.53	18.98
Other	32.10	13.58	10.53
Total	**100.00**	**100.00**	**100.00**
Wealth Index (WI)			
Poorer	57.74	5.36	2.57
Middle	18.73	1.82	1.00
Richer	23.53	92.82	96.43
Total	**100.00**	**100.00**	**100.00**
Employment Status (empl)			
No	72.92	56.95	42.11
Yes	27.08	43.05	57.89
Total	**100.00**	**100.00**	**100.00**
Contraceptive Use and Intent (v364)			
Using modern	16.03	18.94	25.19
Using traditional	0.13	1.14	0.94
Non-user - intends	36.37	37.87	39.85
Does not intend	47.47	42.05	34.02
Total	**100.00**	**100.00**	**100.00**
Age at First Birth (aafb)			
Not Applicable	30.78	51.50	48.43
<=15	11.27	6.77	8.15
16-25	55.06	34.33	39.60
26+	2.89	7.40	3.82
Total	**100.00**	**100.00**	**100.00**
Views on Wife Beating Index (VWBI)			
0 (least empowered)	26.26	6.04	6.89
.2	11.83	3.45	5.70
.4	10.58	4.50	6.58
.6	10.03	6.77	9.90
.8	9.99	10.35	13.22
1 (most empowered)	31.32	68.89	57.71
Total	**100.00**	**100.00**	**100.00**
Attitudes toward Refusing Sex Index (ATRSI)			
Cannot Refuse	70.23	72.66	67.86
0.5	19.34	9.76	13.85
Can Refuse	10.43	17.57	18.30

Total	**100.00**	**100.00**	**100.00**

Note. The table shows the relative frequency distribution of women according to their migration status and the determinants of fertility included in the analysis. The labels of the covariates, according to the names used in the analysis and elaborated on in the operationalization table are included in parentheses.

Table 9 shows the relative frequency distribution of women in Nigeria who are rural non-migrants, urban non-migrants, and rural-to-urban migrants for the categorical covariates included in the analysis. First, one can notice substantial differences in educational attainment across the groups. Most women who migrated from rural to urban areas and women who are urban non-migrants either have completed secondary education or higher. However, most rural non-migrants either have no formal education or only finished primary education.

Thus, women who are rural-to-urban migrants in Nigeria share educational similarities with women in urban areas. The vast majority of all women across the groups are married or not in a union. Among the women in the sample, rural and urban non-migrants are mostly Muslims, although large proportions are Christian. However, among the rural-to-urban migrants, 67 percent are Christian. The relative frequency distribution by language groups suggests that most rural non-migrants are Hausa speaking, a predominantly Muslim group.

Table 9. Determinants of Fertility by Migration Status Nigeria

	Migration Status (migstat3)		
Covariates	**Rural non-migrant**	**Urban non-migrant**	**Rural-to-urban migrant**
Educational Attainment (v106)			
No education	50.80	18.22	16.08
Primary	14.95	13.71	15.24
Secondary	30.22	53.05	50.23
Higher	4.03	15.01	18.45
Total	**100.00**	**100.00**	**100.00**
Marital Status (mstat)			
Never	26.57	39.57	22.08
Married	67.23	51.61	68.51
Cohabiting	1.67	2.38	2.71
Other	4.53	6.45	6.69
Total	**100.00**	**100.00**	**100.00**
Religion (rel)			
Christian	38.92	46.12	67.00
Islam	60.12	53.35	32.29

Other	0.95	0.53	0.71
Total	**100.00**	**100.00**	**100.00**
Native Language (lang)			
English	4.91	4.58	5.08
Hausa	43.56	33.29	18.99
Yoruba	5.40	23.75	18.77
Igbo	5.72	18.50	31.62
Other	40.41	19.88	25.54
Total	**100.00**	**100.00**	**100.00**
Wealth Index (WI)			
Poorer	60.29	13.62	12.37
Middle	21.12	21.77	19.27
Richer	18.60	64.61	68.36
Total	**100.00**	**100.00**	**100.00**
Employment Status (empl)			
No	40.28	37.17	30.65
Yes	59.72	62.83	69.35
Total	**100.00**	**100.00**	**100.00**
Contraceptive Use and Intent (v364)			
Using modern	6.28	10.80	15.94
Using traditional	1.41	2.99	6.93
Non-user - intends	31.15	39.53	32.20
Does not intend	61.16	46.68	44.93
Total	**100.00**	**100.00**	**100.00**
Age at first birth (aafb)			
Not Applicable	29.57	40.68	24.29
<=15	13.62	6.93	7.55
16-25	52.69	44.02	54.14
26+	4.13	8.37	14.03
Total	**100.00**	**100.00**	**100.00**
Views on Wife Beating Index (VWBI)			
0	17.11	6.29	4.53
.2	4.94	3.37	1.87
.4	5.48	4.06	2.93
.6	6.00	3.96	3.44
.8	5.21	4.73	4.69
1	61.27	77.60	82.54
Total	**100.00**	**100.00**	**100.00**
Attitudes Toward Refusing Sex Index (ATRSI)			
Cannot Refuse	65.51	62.70	46.12
0.5	15.67	13.17	17.81
Can Refuse	18.83	24.14	36.07

Total	**100.00**	**100.00**	**100.00**

Note. The table shows the relative frequency distribution of women according to their migration status and the determinants of fertility included in the analysis. The labels of the covariates, according to the names used in the analysis and elaborated on in the operationalization table are included in parentheses.

The distribution by the wealth index suggests that rural-to-urban migrants are more often among the wealthier group than rural non-migrant women. However, the differences in employment status across groups are less pronounced compared in Ethiopia. Thus, female labor market participation appears to be common in rural areas. The large proportion of poorer women in the rural non-migrant group may indicate large numbers of working poor in rural areas. Overall, the economic variables indicate that rural-to-urban migrants differ from non-migrants in the sample.

A smaller proportion of women in Nigeria across all three groups use modern contraceptives compared to Ethiopia. Nonetheless, similar to Ethiopia, a more significant proportion of rural-to-urban migrant women use modern contraceptives compared to rural and urban non-migrants. The relative frequency distribution for age at first birth indicates that a larger proportion of rural-to-urban migrants have experienced their first child late for the given context (age 26+) compared to women from other groups.

Similarities exist in the other groups, as around 50 percent of women experienced a first birth between the ages of 16 to 25. Many non-migrant women in rural areas appear to not (yet) have experienced childbirth compared to women from the other groups. More than 80 percent of rural-to-urban migrants rejected wife-beating in all instances as inappropriate. Additionally, more women in this group can refuse sex and ask a partner to use a condom. The VWBI and the ATRSI indicate that rural-to-urban migrant women in Nigeria are more empowered than non-migrating women and rural-to-urban migrant women in Ethiopia.

The characteristics outlined can provide insights concerning hypothesis 3 (Selectivity Hypothesis). Potential differences in the characteristics of women across migration statuses allow for the exploration of possible differences regarding the determinants of fertility between women who migrate from rural-to-urban areas and those who are rural non-migrants. In Ethiopia, this study descriptively finds support for hypothesis 3, meaning there are differences in the analyzed characteristics of women who migrate from

rural-to-urban areas compared to their rural counterparts. Nevertheless, the differences are less pronounced for urban non-migrant women. In Nigeria, dissimilarities between rural-to-urban migrants and non-migrants were identified based on the relative frequency distributions. Chi-square tests based on crosstabulations indicated statistical differences for all variables discussed. Correlation matrices show significant relationships ($p<0.05$) between the covariates and the primary independent variable. However, while the descriptive statistics reveal areas of interest, further exploration is needed to answer the research questions and test the hypotheses.

Multinomial Logistic Regression Analysis

The following section includes each country's baseline and complex models. The baseline model provides an overview of the impact of migration status, individual characteristics of respondents, and years spend living in the current type of place of residence on ideal fertility. The multinomial logistic regression results are shown in three different logistic regressions for each of the dependent variable's categories, excluding the base category (5-6 children). The complex model is an extension of the baseline model and includes economic factors and indicators of female empowerment.

Regression Results Nigeria

Baseline Model

The baseline model (Table 10) reveals statistically significant relationships between the migration status of women in Nigeria and their fertility ideals. Moreover, the likelihood ratio chi-square test indicates that the model predicts the dependent variable better than a model without independent variables. The p-value of 0 indicates that at least one of the model's coefficients is not equal to zero. While the pseudo R-squared interpretation is not the same as the R-squared in OLS regression, one can cautiously use it to interpret the model fit and compare the model fit across hierarchical models.

Table 10. Baseline Model Nigeria

Multinomial logistic regression

Ideal Number of Children	RRR	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
0-4							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.179	.045	4.33	0	1.095	1.271	***

rural-rural	.531	.063	-5.38	0	.421	.668	***
rural-urban	.62	.074	-3.98	0	.491	.785	***
other	.792	.099	-1.88	.061	.62	1.01	*
Age	.992	.002	-4.16	0	.988	.996	***
Years since Mig.	.983	.003	-6.26	0	.978	.988	***
Education	1	.	.	.	.	.	
primary	.948	.046	-1.10	.273	.862	1.043	
secondary	1.325	.056	6.65	0	1.219	1.439	***
higher	2.325	.125	15.73	0	2.093	2.583	***
Marital Status	1	.	.	.	.	.	
married	.584	.022	-14.17	0	.542	.629	***
cohabiting	.575	.046	-6.94	0	.492	.673	***
other	.743	.049	-4.49	0	.653	.846	***
Religion	1	.	.	.	.	.	
Islam	.567	.022	-14.89	0	.527	.611	***
other	1.319	.175	2.09	.037	1.017	1.711	**
Native Language	1	.	.	.	.	.	
Hausa	.719	.05	-4.70	0	.627	.825	***
Yoruba	2.718	.187	14.51	0	2.375	3.111	***
Igbo	.676	.045	-5.93	0	.594	.77	***
other	.882	.055	-1.99	.046	.78	.998	**
Constant	3.713	.547	8.90	0	2.782	4.957	***
5-6 (Base)							
7+							
migstat3	1	.	.	.	.	.	
Mig. Status	.729	.03	-7.75	0	.673	.79	***
u. non-migrant	1.72	.189	4.93	0	1.386	2.135	***
rural-rural	1.143	.133	1.15	.25	.91	1.437	
rural-urban	.962	.121	-0.31	.76	.752	1.232	
other	1.027	.002	14.11	0	1.023	1.031	***
Age	1.019	.003	6.81	0	1.013	1.024	***
Years since Mig.	1	.	.	.	.	.	
Education	.628	.026	-11.32	0	.58	.681	***
primary	.389	.015	-23.71	0	.36	.42	***
secondary	.285	.02	-17.71	0	.248	.328	***
higher	1	.	.	.	.	.	
Marital Status	1.337	.061	6.34	0	1.222	1.463	***
married	1.508	.165	3.75	0	1.217	1.87	***
cohabiting	.965	.073	-0.47	.637	.831	1.12	
other	1	.	.	.	.	.	
Religion	3.574	.153	29.81	0	3.287	3.886	***
Islam	1.65	.251	3.29	.001	1.225	2.223	***
other	1	.	.	.	.	.	
Native Language	1.038	.079	0.50	.619	.895	1.205	
Hausa	.143	.016	-17.91	0	.115	.176	***
Yoruba	.825	.069	-2.28	.022	.7	.973	**
Igbo	.799	.059	-3.03	.002	.691	.924	***

Constant	.16	.024	-12.07	0	.119	.215	***
Non-numeric							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	.819	.079	-2.06	.039	.677	.99	**
rural-rural	1.957	.437	3.01	.003	1.263	3.032	***
rural-urban	2.113	.498	3.17	.002	1.331	3.354	***
other	3.118	.758	4.68	0	1.937	5.021	***
Age	1.021	.004	4.81	0	1.012	1.029	***
Years since Mig.	1.019	.006	3.35	.001	1.008	1.03	***
Education	1	.	.	.	.	.	
primary	.704	.065	-3.82	0	.588	.843	***
secondary	.52	.046	-7.33	0	.437	.619	***
higher	.376	.057	-6.48	0	.28	.505	***
Marital Status	1	.	.	.	.	.	
married	.76	.076	-2.75	.006	.625	.924	***
cohabiting	.521	.118	-2.87	.004	.334	.813	***
other	.694	.113	-2.24	.025	.504	.956	**
Religion	1	.	.	.	.	.	
Islam	1.532	.124	5.27	0	1.307	1.795	***
other	.535	.247	-1.35	.176	.216	1.323	
Native Language	1	.	.	.	.	.	
Hausa	.867	.177	-0.70	.484	.581	1.293	
Yoruba	3.113	.635	5.57	0	2.087	4.643	***
Igbo	.614	.138	-2.16	.031	.395	.955	**
other	1.881	.366	3.25	.001	1.285	2.755	***
Constant	.022	.007	-11.67	0	.011	.041	***

Mean dependent var	1.058	SD dependent var	0.880
Pseudo r-squared	0.204	Number of obs.	41186
Chi-square	20090.095	Prob > chi2	0.000
Akaike crit. (AIC)	78327.596	Bayesian crit. (BIC)	78819.270

*** p<.01, ** p<.05, * p<.1*

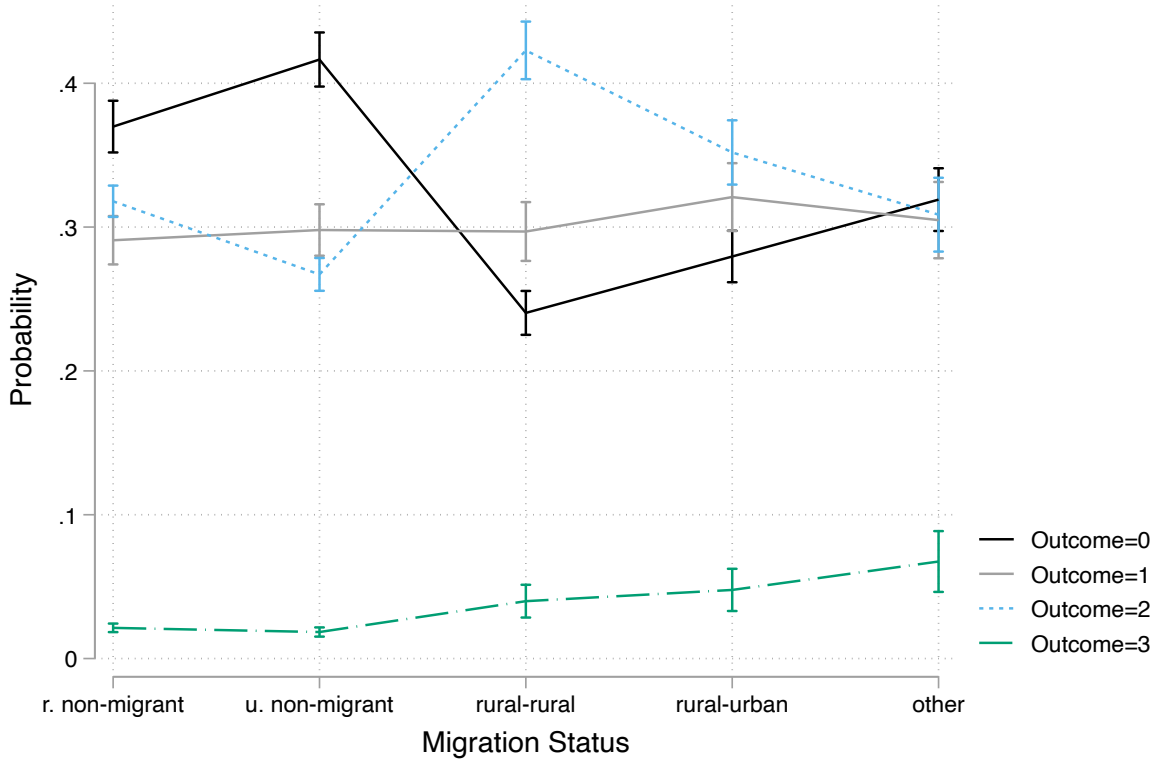
The estimates should always be interpreted with respect to the base category. In this analysis, the base category is women whose ideal number of children is 5 or 6. For relative risk ratios (RRR), a value larger than one indicates that the risk of the outcome increases relative to the reference group. A value smaller than one indicates that the risk of the outcome, relative to the reference group, decreases. For the outcome that the ideal number of children is between 0 and 4, all categories of migstat3, except for the category other, are statistically significantly different from the reference category (rural non-migrant) at the 99 percent significance level. Only urban non-migrants have a RRR>1; for all other categories, the RRRs are <1. For the outcome that the ideal number of children is 7+, only the category urban non-migrant is statistically significantly different from the

reference category. For the outcome that women state non-numeric fertility ideals, all categories of the migration status variable are statistically significantly different from the reference category.

The control variables for age and years living in the current type of residence are statistically significant at the 99 percent significance level for all outcomes. However, the direction of the effect of these variables differs across outcomes relative to the reference outcome. For the outcome 0-4, the effect of each additional year of age and years spent living in the current type of residence decreases the relative risk of outcome 0-4 compared to the base outcome 5-6. However, for the outcome 7+ and the outcome non-numeric, the effect of each additional year of age and years spent living in the current type of residence increases the risk of the respective outcome compared to the base outcome 5-6. There are other statistically significant differences across the other control variables, which are discussed in the context of the complex model.

Figure 6 shows the predicted probabilities for each outcome of the dependent variable by each category of the primary independent variable, holding all other factors constant, according to the baseline model. Surprisingly, rural-to-urban migrants have a lower predicted probability of having a smaller ideal family size (Outcome 0) than rural non-migrants. However, compared to women migrating between rural areas, rural-to-urban migrants have a higher predicted probability of having a smaller ideal family size. Rural-to-urban migrant women have a higher probability of having a large ideal family size (Outcome 2), although the probability is smaller than that of rural-to-rural migrants. The predicted probabilities for rural-to-urban migrant women for the first three outcomes are similar, suggesting potentially less heterogeneity among this group than urban non-migrants. Women who moved from or within urban areas (Category: other) have similar probabilities for outcomes 0, 1, and 3 but a higher probability than women across all other migration statuses to state their ideal fertility in a non-numeric manner.

Figure 6. Predictive Margins of Migration Status (Baseline Model Nigeria)



Note. The figure shows predictive margins for the main independent variable migstat3 concerning the different outcomes of the dependent variable for the baseline model for Nigeria. Outcome 0 refers to the low fertility outcome (0-4 children), Outcome 1 to the base outcome (5-6 children), Outcome 2 to the high fertility outcome (7+ children), and Outcome 3 to non-numeric ideals.

Complex Model

The complex model is an extension of the baseline model. In addition to variables included in the baseline model, it incorporates economic indicators and dimensions of female empowerment (Table 11). The complex model, as indicated by a likelihood-ratio test, is a better statistical fit compared to the baseline model (LR chi2(33) = 1586.10; Pr > chi2 =0.00). Moreover, the pseudo R-squared increased from 20.4 percent to 22.1 percent. Thus, the added variables improve the statistical fit of the model. The direction of the effects of the independent variables remains overall constant in the complex model compared to the baseline model, suggesting robustness. The similarity of the predicted probabilities for the baseline and the complex model further indicates robustness (Figure 6 and Figure 7).

Table 11. Complex Model Nigeria

Multinomial logistic regression

Ideal Number of Children	RRR	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
0-4							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.08	.043	1.93	.053	.999	1.167	*
rural-rural	.609	.072	-4.18	0	.482	.769	***
rural-urban	.634	.077	-3.76	0	.5	.804	***
other	.813	.102	-1.65	.099	.635	1.04	*
Age	.989	.002	-5.10	0	.985	.993	***
Years since Mig.	.986	.003	-5.01	0	.981	.992	***
Education	1	.	.	.	.	.	
primary	.925	.046	-1.57	.117	.84	1.02	
secondary	1.163	.053	3.30	.001	1.063	1.272	***
higher	1.796	.106	9.96	0	1.6	2.015	***
Marital Status	1	.	.	.	.	.	
married	.679	.04	-6.49	0	.604	.763	***
cohabiting	.681	.062	-4.20	0	.569	.815	***
other	.915	.069	-1.18	.237	.79	1.06	
Religion	1	.	.	.	.	.	
Islam	.548	.021	-15.53	0	.508	.592	***
other	1.346	.18	2.22	.026	1.036	1.751	**
Native Language	1	.	.	.	.	.	
Hausa	.77	.055	-3.67	0	.67	.886	***
Yoruba	2.887	.201	15.20	0	2.518	3.31	***
Igbo	.692	.046	-5.54	0	.607	.788	***
other	.958	.061	-0.67	.502	.846	1.085	
Wealth Index	1	.	.	.	.	.	
middle	1.029	.041	0.73	.468	.952	1.113	
richer	1.362	.054	7.77	0	1.26	1.473	***
Currently Employed	1	.	.	.	.	.	
yes	.845	.027	-5.36	0	.794	.898	***
Contraceptive Use	1	.	.	.	.	.	
using traditional	1.094	.082	1.21	.226	.946	1.266	
non-user - intends	.893	.04	-2.54	.011	.818	.975	**
does not intend	.906	.04	-2.25	.024	.832	.987	**
Age at first Birth	1	.	.	.	.	.	
<=15	.848	.059	-2.35	.019	.739	.973	**
16-25	.812	.042	-3.99	0	.733	.9	***
26+	1.235	.084	3.12	.002	1.081	1.41	***
VWBI	1.138	.053	2.77	.006	1.039	1.247	***
ATRSI	.984	.042	-0.38	.706	.905	1.07	
Constant	3.48	.558	7.78	0	2.542	4.765	***
5-6 (Base)							
7+							
Mig. Status	1	.	.	.	.	.	

u. non-migrant	.968	.042	-0.76	.448	.889	1.054	
rural-rural	1.484	.166	3.52	0	1.191	1.848	***
rural-urban	1.306	.155	2.24	.025	1.034	1.649	**
other	1.099	.141	0.74	.46	.855	1.414	
Age	1.028	.002	13.12	0	1.024	1.032	***
Years since Mig.	1.014	.003	5.07	0	1.009	1.02	***
Education	1	.	.	.	.	.	
primary	.746	.032	-6.89	0	.686	.811	***
secondary	.574	.025	-12.73	0	.527	.625	***
higher	.522	.04	-8.53	0	.45	.606	***
Marital Status	1	.	.	.	.	.	
married	1.334	.087	4.40	0	1.173	1.516	***
cohabiting	1.501	.179	3.41	.001	1.188	1.895	***
other	.776	.067	-2.95	.003	.656	.919	***
Religion	1	.	.	.	.	.	
Islam	3.317	.146	27.19	0	3.043	3.617	***
other	1.419	.221	2.25	.024	1.047	1.925	**
Native Language	1	.	.	.	.	.	
Hausa	.986	.078	-0.18	.859	.845	1.151	
Yoruba	.155	.017	-16.73	0	.125	.193	***
Igbo	.801	.07	-2.55	.011	.675	.95	**
other	.751	.058	-3.72	0	.645	.873	***
Wealth Index	1	.	.	.	.	.	
middle	.669	.025	-10.56	0	.621	.721	***
richer	.515	.022	-15.47	0	.473	.56	***
Currently Employed	1	.	.	.	.	.	
yes	1.164	.038	4.69	0	1.093	1.24	***
Contraceptive Use	1	.	.	.	.	.	
using traditional	.691	.082	-3.12	.002	.548	.872	***
non-user - intends	.944	.054	-1.01	.313	.844	1.056	
does not intend	1.313	.072	4.98	0	1.18	1.462	***
Age at first Birth	1	.	.	.	.	.	
<=15	1.414	.096	5.12	0	1.238	1.615	***
16-25	1.234	.071	3.65	0	1.102	1.382	***
26+	.766	.068	-3.01	.003	.644	.911	***
VWBI	.681	.027	-9.63	0	.629	.736	***
ATRSI	.731	.029	-7.80	0	.675	.791	***
Constant	*.22*	*.037*	*-9.06*	*0*	*.159*	*.306*	***
Non-numeric							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.058	.109	0.55	.584	.865	1.294	
rural-rural	1.799	.406	2.60	.009	1.156	2.801	***
rural-urban	2.342	.561	3.55	0	1.465	3.745	***
other	3.437	.852	4.98	0	2.115	5.587	***
Age	1.016	.005	3.38	.001	1.007	1.025	***
Years since Mig.	1.016	.006	2.83	.005	1.005	1.027	***
Education	1	.	.	.	.	.	

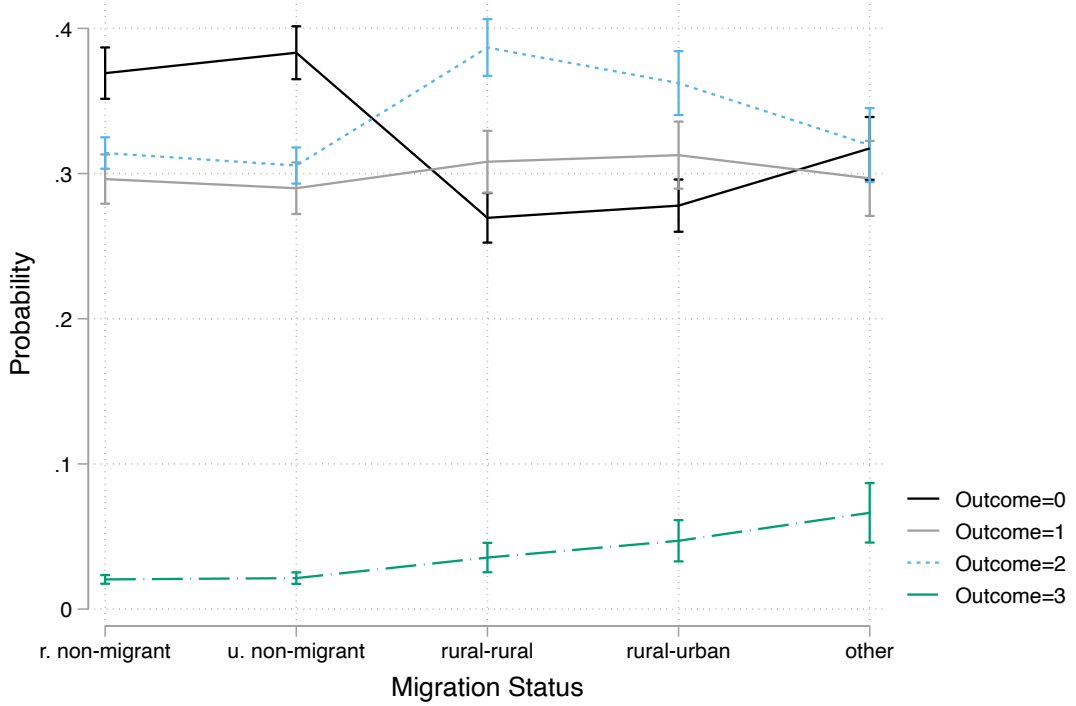
primary	.872	.083	-1.44	.151	.723	1.051	
secondary	.754	.074	-2.88	.004	.622	.913	***
higher	.627	.103	-2.85	.004	.455	.864	***
Marital Status	1	.	.	.	.	.	
married	.916	.133	-0.60	.546	.69	1.217	
cohabiting	.591	.148	-2.11	.035	.362	.964	**
other	.6	.112	-2.75	.006	.417	.864	***
Religion	1	.	.	.	.	.	
Islam	1.372	.115	3.79	0	1.165	1.616	***
other	.489	.227	-1.54	.123	.198	1.213	
Native Language	1	.	.	.	.	.	
Hausa	.745	.154	-1.43	.153	.497	1.116	
Yoruba	2.933	.604	5.23	0	1.959	4.392	***
Igbo	.495	.112	-3.10	.002	.317	.772	***
other	1.553	.305	2.24	.025	1.057	2.281	**
Wealth Index	1	.	.	.	.	.	
middle	.642	.057	-5.01	0	.54	.764	***
richer	.595	.056	-5.54	0	.496	.715	***
Currently Employed	1	.	.	.	.	.	
yes	.999	.076	-0.01	.989	.86	1.16	
Contraceptive Use	1	.	.	.	.	.	
using traditional	1.424	.233	2.16	.031	1.033	1.962	**
non-user - intends	.297	.036	-10.06	0	.234	.376	***
does not intend	.91	.088	-0.97	.33	.753	1.1	
Age at first Birth	1	.	.	.	.	.	
<=15	1.257	.198	1.46	.145	.924	1.711	
16-25	1.097	.148	0.68	.495	.842	1.429	
26+	1.02	.187	0.11	.916	.711	1.461	
VWBI	.624	.057	-5.20	0	.522	.745	***
ATRSI	.552	.051	-6.43	0	.46	.661	***
Constant	.07	.025	-7.55	0	.035	.139	***

Mean dependent var	1.058	SD dependent var	0.880
Pseudo r-squared	0.221	Number of obs.	41186
Chi-square	21676.191	Prob > chi2	0.000
Akaike crit. (AIC)	76807.500	Bayesian crit. (BIC)	77583.827

*** p<.01, ** p<.05, * p<.1*

For the base category of rural-to-urban migrants, the relative risk of having a small ideal family size is statistically significantly lower than that of rural non-migrant women ($p<0.01$), holding all other variables constant. The relative risk of having a larger family size ideal, compared to a fertility ideal of 5-6 children, is statistically significantly higher ($p<0.05$), holding all other variables constant. The relative risk of stating non-numeric fertility ideals rather than a fertility ideal of 5-6 children is statistically significantly higher ($p<0.01$) for rural-to-urban migrant women compared to women residing in rural areas.

Figure 7. Predictive Margins of Migration Status (Complex Model Nigeria)



Note. The figure shows predictive margins for the main independent variable migstat3 concerning the different outcomes of the dependent variable for the complex model for Nigeria. Outcome 0 refers to the low fertility outcome (0-4 children), Outcome 1 to the base outcome (5-6 children), Outcome 2 to the high fertility outcome (7+ children), and Outcome 3 to non-numeric ideals.

Various covariates moderate the effects of migration status on ideal fertility. Age and years lived in the type of residence are statistically significantly different from zero across all outcomes for the dependent variable, relative to the base outcome ($p<0.01$). Both variables decrease the relative risk of having a smaller ideal family compared to the base outcome but increase the relative risk of having a large ideal family or stating non-numeric fertility ideals. The effects of the educational variable are in line with the literature. Compared to women with no education, women with higher education are statistically significantly more likely to have a fertility ideal of 0-4 children, relative to the base outcome and holding all other variables constant. Married and cohabitating women are less likely to have lower fertility ideals than a fertility ideal of 5-6 children compared to women who are not in a union.

Cultural characteristics, such as language and religion, affect ideal fertility, in line with expectations of higher ideal fertility for Muslim women of the Hausa ethnic group.

Comparisons within multinomial logistic regression can only be made via the reference category. However, compared to women whose native language is English, women who speak Yoruba have statistically significantly higher risks of lower fertility ideals ($p<0.01$). The differences across language are less pronounced and of lower statistical significance when comparing higher fertility ideals (7+) to the base category.

The wealth index and the current employment status appear to impact ideal fertility in Nigeria. Women who are richer according to the wealth index, compared to those who are poorer, are significantly more likely to have smaller fertility ideals than the base outcome. However, the effect of employment status on ideal fertility is unexpected, as working appears to reduce the relative risk of having smaller ideal family sizes. Thus, women's wealth and employment status have opposing effects on ideal fertility.

Women who do not use contraceptives – both with and without intention for future use – are less likely than women who use modern contraceptives to have smaller ideal family sizes compared to the reference category. In line with expectations, women who do not intend to use contraceptives are more likely to have larger ideal fertility over the base outcome than women who use modern methods of contraception. However, the effects of contraceptive use are not consistently statistically significant across the different outcomes. The VWBI is statistically significantly different from one for the low-fertility ideal outcome. Thus, more empowered women have a relatively higher risk of having lower fertility ideals, compared to the base outcome, than women who are less empowered. The effects of the ATRSI are not statistically significant for the low-fertility ideal outcome. Both the high fertility ideal outcome and the non-numeric fertility ideal outcome are statistically significant ($p<0.01$). The direction of the effect suggests that more empowered women have lower relative risks of these outcomes compared to the base outcome.

Concerning the first hypothesis (Socialization) and the second hypothesis (Adaptation), the complex model indicates that being a rural-to-urban migrant in Nigeria, relative to a rural non-migrant, decreases the odds of having a small ideal family size (0-4 children) by 36 percent (100*(0.63-1)), holding all other variables constant. This difference is statistically significant ($p<0.01$). Being an urban non-migrant, relative to a rural non-migrant, increases the odds of having a small ideal family size (0-4 children) by 8 percent

(100*0.08)), holding all other variables constant ($p<0.1$). Rural-to-urban migrants do not appear to adapt to the lower fertility ideals of urban women in Nigeria; thus, we reject H2. Fertility ideals remain relatively high, even compared to the reference category, partially supporting H1.

Moreover, rural-to-urban migrants appear to be a selected group regarding fertility ideals, which supports H3 (Selectivity). The fact that the odds of stating a non-numeric fertility preference are 2.34 times higher for rural-urban migrants compared to rural non-migrants supports this finding. For H2.1, we can state that each additional year spent in the current residence location decreases the odds of having a small ideal family size by 10 percent. However, this effect is likely linked to increases in age and the fact that migrant women settle in and are more at risk of beginning the family formation process.

Overall, the model suggests that rural-to-urban migrants in Nigeria are more likely to have higher fertility ideals than urban and rural non-migrants. In response to the main research question, the model predicts that fertility ideals would overall increase in response to this type of migration. However, the model further indicates that fertility differences across migration status are moderated by individual characteristics, socio-economic factors, and dimensions of female empowerment. The descriptive statistics have shown that rural-to-urban migrants in Nigeria are overwhelmingly women who are richer and better educated than their non-migrant rural counterparts. The model suggests that these women would be more likely to have a small ideal family size, and the negative effect of these factors on fertility ideals outweighs the positive effect of migration status on fertility ideals.

Regression Results Ethiopia

Baseline Model

The baseline model (Table 12) indicates some differences between the migration status of women in Ethiopia and their fertility ideals; however, the results differ across outcomes. Also, not all categories have a statistically significantly different effect on the dependent variable. The likelihood ratio chi-square test shows that the model is statistically a better predictor of Y than an empty model. The p-value is equal to 0, a sign that at least one of the model's coefficients differs from 0. The pseudo R-squared suggests that the independent variables explain roughly 14.5 percent of the variation in Y.

Comparing the pseudo R-squared for the baseline models for Nigeria and Ethiopia suggests that the model for Nigeria appears to have higher predictive power.

For the outcome of small ideal family sizes (0-4) and large ideal family sizes (7+), only one category of the primary independent variable is statistically significantly different from the base category at the 99 percent significance level. Thus, there appears to be a difference in the relative risk of having a small ideal family size rather than the base outcome not across migration status but across the type of place of residence, with urban non-migrants having a higher relative risk of this outcome compared to the reference category and holding all other variables constant. Rural-to-urban migrants have a statistically significantly ($p<0.05$) lower relative risk of stating fertility preferences in a non-numeric manner rather than having a medium-large ideal family size (5-6) compared to rural non-migrants.

While the control variable age is statistically significantly different from 0 ($p<0.01$) across all outcomes, the years spent living in the current type of place of residence are only statistically significantly different from 0 for the large ideal family size outcome ($p<0.05$). The level of education is highly significant for all outcomes across all educational categories $p<0.01$), with relatively strong effects. According to the model and in line with the literature, higher educated women are more likely to have lower fertility ideals, rather than the base category of women with no education. Union status affects ideal fertility sizes, and the effects are in line with expectations based on the literature, as married women are significantly less likely to have small ideal family sizes over the base outcome than women who have never been in a union.

Furthermore, the cultural indicators of language and religion suggest differences in fertility ideals across linguistic and religious groups in Ethiopia. Compared to the reference category Orthodox, women from other Christian or Muslim religious groups have a statistically significantly lower relative risk of holding lower fertility ideals over the base outcome ($p<0.01$).

Table 12. Baseline Model Ethiopia

Multinomial logistic regression

Ideal Number of Children	RRR	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig

0-4							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.316	.108	3.33	.001	1.12	1.546	***
rural-rural	.855	.162	-0.82	.41	.59	1.24	
rural-urban	1.332	.266	1.43	.152	.9	1.971	
other	1.475	.307	1.87	.062	.981	2.216	*
Age	.982	.003	-5.32	0	.975	.988	***
Years since Mig.	.995	.005	-1.14	.256	.986	1.004	
Education	1	.	.	.	.	.	
primary	1.459	.084	6.60	0	1.304	1.633	***
secondary	2.147	.183	8.96	0	1.817	2.537	***
higher	2.376	.271	7.59	0	1.9	2.97	***
Marital Status	1	.	.	.	.	.	
married	.563	.038	-8.53	0	.493	.643	***
cohabiting	1.045	.23	0.20	.843	.678	1.609	
other	.813	.078	-2.15	.031	.673	.981	**
Religion	1	.	.	.	.	.	
Christian	.745	.046	-4.72	0	.659	.842	***
Muslim	.453	.027	-13.42	0	.403	.508	***
other	.563	.136	-2.38	.018	.35	.904	**
Native Language	1	.	.	.	.	.	
Oromigna	1.027	.065	0.42	.675	.907	1.162	
Afarigna	2.257	.356	5.17	0	1.657	3.074	***
other	.556	.031	-10.40	0	.498	.621	***
Constant	8.119	1.828	9.30	0	5.221	12.624	***
5-6 (Base)							
7+							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.4	.141	3.34	.001	1.149	1.706	***
rural-rural	1.39	.308	1.49	.137	.9	2.147	
rural-urban	1.11	.27	0.43	.669	.689	1.788	
other	1.573	.393	1.81	.07	.964	2.568	*
Age	1.034	.004	8.57	0	1.026	1.042	***
Years since Mig.	1.011	.006	2.01	.045	1	1.023	**
Education	1	.	.	.	.	.	
primary	.523	.037	-9.20	0	.456	.601	***
secondary	.49	.06	-5.87	0	.386	.622	***
higher	.479	.082	-4.32	0	.343	.669	***
Marital Status	1	.	.	.	.	.	
married	.814	.074	-2.27	.023	.682	.972	**
cohabiting	.773	.238	-0.84	.402	.423	1.412	
other	.583	.075	-4.21	0	.454	.75	***
Religion	1	.	.	.	.	.	
Christian	1.355	.117	3.52	0	1.144	1.604	***
Muslim	4.594	.34	20.63	0	3.975	5.311	***
other	3.194	.722	5.14	0	2.051	4.975	***
Native Language	1	.	.	.	.	.	

Oromigna	.739	.056	-3.96	0	.637	.859	***
Afarigna	1.461	.235	2.36	.018	1.066	2.002	**
other	1.831	.124	8.92	0	1.603	2.092	***
Constant	.116	.033	-7.55	0	.066	.203	***
Non-numeric							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.195	.14	1.52	.129	.95	1.503	
rural-rural	.765	.193	-1.06	.289	.467	1.255	
rural-urban	.573	.159	-2.01	.044	.333	.985	**
other	.606	.175	-1.74	.082	.344	1.066	*
Age	1.032	.005	7.19	0	1.023	1.041	***
Years since Mig.	.994	.006	-0.94	.345	.981	1.007	
Education	1	.	.	.	.	.	
primary	.639	.051	-5.62	0	.547	.747	***
secondary	.44	.065	-5.60	0	.33	.587	***
higher	.408	.085	-4.30	0	.271	.614	***
Marital Status	1	.	.	.	.	.	
married	.682	.07	-3.75	0	.558	.833	***
cohabiting	.696	.24	-1.05	.295	.354	1.37	
other	.641	.09	-3.17	.002	.487	.844	***
Religion	1	.	.	.	.	.	
Christian	.55	.056	-5.88	0	.451	.672	***
Muslim	1.714	.133	6.94	0	1.472	1.996	***
other	.806	.251	-0.69	.489	.438	1.484	
Native Language	1	.	.	.	.	.	
Oromigna	.748	.065	-3.33	.001	.631	.888	***
Afarigna	2.215	.373	4.72	0	1.592	3.083	***
other	1.197	.091	2.36	.018	1.031	1.389	**
Constant	.457	.146	-2.46	.014	.244	.853	**

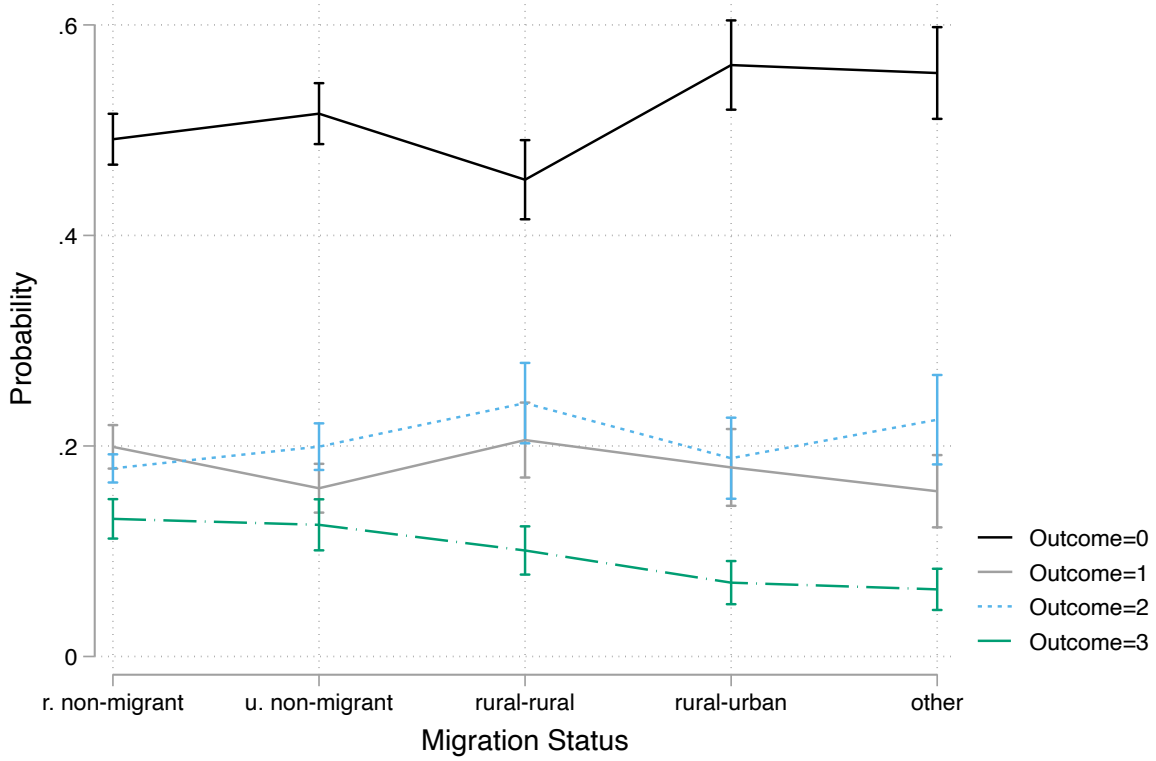
Mean dependent var	0.911	SD dependent var	1.067
Pseudo r-squared	0.145	Number of obs.	15317
Chi-square	5413.152	Prob > chi2	0.000
Akaike crit. (AIC)	32139.696	Bayesian crit. (BIC)	32574.989

*** p<.01, ** p<.05, * p<.1

Figure 8 shows outcome 0 as the one with the highest probability across all migration categories. This finding is in line with expectations, as the mean ideal fertility of women is slightly below the base category 5-6 and only for married women within the base category. Although the differences across migration statuses are not statistically significant, the graph nonetheless shows outcomes in line with the literature review. Hence, rural non-migrants and women migrating between rural areas have a relatively lower probability of the first outcome. Rural-to-urban migrants have a similar probability of having low fertility ideals compared to women migrating from and between urban

areas and slightly higher than urban non-migrants. The graph supports the second hypothesis (adaptation), yet the findings are not statistically significant.

Figure 8. Predictive Margins of Migration Status (Baseline Model Ethiopia)



Note. The figure shows predictive margins for the main independent variable migstat3 concerning the different outcomes of the dependent variable for the baseline model for Ethiopia Outcome 0 refers to the low fertility outcome (0-4 children), Outcome 1 to the base outcome (5-6 children), Outcome 2 to the high fertility outcome (7+ children), and Outcome 3 to non-numeric ideals.

Complex Model

As tested by a likelihood-ratio test, the complex model has a better statistical fit than the baseline model (LR chi2(33) = 843.35; Pr > chi2 =0.00). The model R-squared increases to 16.7 percent, suggesting a better model fit. The direction of the predicted effects does not change compared to the baseline model, which indicates robustness, as does the similarity of the predicted probabilities for the baseline model and the complex model.

The model indicates that none of the differences among the categories of migration status relative to the base category are significant at the 95 percent significance level for the first outcome. For the third outcome, urban non-migrants have a statistically significantly ($p<0.01$) higher relative risk than rural non-migrants of finding a large family to be ideal, rather than a family with 5 or 6 children, holding all other categories constant. For the fourth outcome, urban non-migrants have a statistically significantly ($p<0.05$) lower relative risk than rural non-migrants to state fertility preferences non-numerically, compared to the base outcome. Thus, the model does not provide clear evidence for or against the first and second hypotheses but rather suggests that fertility differences across migration status are not statistically significant for the sample. Nonetheless, the direction of the RRRs for the different outcomes demonstrates that rural-to-urban migrants have relatively higher risks than rural non-migrants to prefer smaller families over the base outcome.

Table 13. Complex Model Ethiopia

Multinomial logistic regression

Ideal Number of Children	RRR	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
0-4							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.156	.103	1.62	.104	.97	1.377	
rural-rural	.937	.18	-0.34	.733	.643	1.364	
rural-urban	1.261	.261	1.12	.264	.84	1.893	
other	1.436	.307	1.70	.09	.945	2.182	*
Age	.983	.004	-4.36	0	.976	.991	***
Years since Mig.	.997	.005	-0.57	.571	.988	1.007	
Education	1	.	.	.	.	.	
primary	1.365	.08	5.28	0	1.216	1.533	***
secondary	1.884	.166	7.18	0	1.585	2.239	***
higher	1.91	.226	5.46	0	1.514	2.409	***
Marital Status	1	.	.	.	.	.	
married	.725	.074	-3.14	.002	.593	.886	***
cohabiting	1.266	.294	1.01	.311	.802	1.997	
other	1.007	.115	0.06	.95	.805	1.259	
Religion	1	.	.	.	.	.	
Christian	.774	.049	-4.06	0	.684	.876	***
Muslim	.472	.029	-12.22	0	.419	.533	***
other	.624	.152	-1.93	.053	.388	1.006	*
Native Language	1	.	.	.	.	.	
Oromigna	1.041	.067	0.62	.534	.918	1.18	
Afarigna	2.616	.421	5.97	0	1.908	3.586	***
other	.582	.034	-9.40	0	.519	.651	***

Wealth Index	1	.	.	.	.	.	
middle	1.046	.075	0.62	.534	.908	1.203	
richer	1.183	.078	2.54	.011	1.039	1.347	**
Currently Employed	1	.	.	.	.	.	
yes	1.09	.055	1.69	.091	.986	1.204	*
Contraceptive Use	1	.	.	.	.	.	
using traditional	1.864	.686	1.69	.091	.906	3.836	*
non-user - intends	.858	.055	-2.39	.017	.756	.973	**
does not intend	.779	.053	-3.69	0	.683	.89	***
Age at first Birth	1	.	.	.	.	.	
<=15	1.236	.094	2.77	.006	1.064	1.435	***
16-25	2.211	.316	5.56	0	1.671	2.924	***
26+	1.722	.191	4.90	0	1.386	2.141	***
VWBI	1.262	.078	3.75	0	1.117	1.425	***
ATRSI	.871	.063	-1.91	.057	.755	1.004	*
Constant	4.001	1.084	5.12	0	2.353	6.804	***
0-5 (Base)							
7+							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.516	.17	3.72	0	1.218	1.888	***
rural-rural	1.299	.293	1.16	.247	.834	2.022	
rural-urban	1.207	.306	0.74	.458	.734	1.985	
other	1.612	.415	1.85	.064	.973	2.671	*
Age	1.028	.004	6.46	0	1.019	1.037	***
Years since Mig.	1.009	.006	1.49	.136	.997	1.02	
Education	1	.	.	.	.	.	
primary	.632	.046	-6.27	0	.548	.73	***
secondary	.601	.075	-4.06	0	.47	.768	***
higher	.618	.109	-2.72	.007	.437	.875	***
Marital Status	1	.	.	.	.	.	
married	1.077	.147	0.54	.588	.824	1.408	
cohabiting	.91	.297	-0.29	.773	.48	1.726	
other	.552	.086	-3.79	0	.406	.75	***
Religion	1	.	.	.	.	.	
Christian	1.238	.109	2.42	.016	1.041	1.471	**
Muslim	3.187	.248	14.88	0	2.736	3.713	***
other	2.418	.555	3.85	0	1.542	3.792	***
Native Language	1	.	.	.	.	.	
Oromigna	.787	.062	-3.07	.002	.675	.917	***
Afarigna	1.073	.176	0.43	.668	.778	1.48	
other	1.68	.118	7.40	0	1.464	1.927	***
Wealth Index	1	.	.	.	.	.	
middle	.726	.063	-3.68	0	.613	.861	***
richer	.761	.062	-3.37	.001	.649	.892	***
Currently Employed	1	.	.	.	.	.	

yes	.903	.057	-1.60	.109	.797	1.023	
Contraceptive Use	1	.	.	.	.	.	
using traditional	1.381	.788	0.56	.572	.451	4.227	
non-user - intends	1.016	.093	0.17	.867	.848	1.216	
does not intend	2.671	.228	11.51	0	2.26	3.157	***
Age at first Birth	1	.	.	.	.	.	
<=15	.928	.077	-0.91	.364	.789	1.091	
16-25	.686	.119	-2.17	.03	.488	.964	**
26+	.984	.137	-0.11	.909	.75	1.292	
VWBI	1.122	.081	1.60	.109	.975	1.292	
ATRSI	.757	.066	-3.20	.001	.638	.898	***
Constant	.11	.037	-6.51	0	.056	.213	***
Non-numeric							
Mig. Status	1	.	.	.	.	.	
u. non-migrant	1.222	.158	1.55	.121	.948	1.573	
rural-rural	.713	.182	-1.32	.186	.432	1.177	
rural-urban	.55	.158	-2.08	.037	.313	.965	**
other	.575	.17	-1.88	.061	.322	1.025	*
Age	1.022	.005	4.57	0	1.013	1.032	***
Years since Mig.	.991	.006	-1.39	.165	.978	1.004	
Education	1	.	.	.	.	.	
primary	.742	.061	-3.64	0	.632	.871	***
secondary	.536	.081	-4.15	0	.399	.719	***
higher	.499	.107	-3.24	.001	.328	.76	***
Marital Status	1	.	.	.	.	.	
married	.905	.137	-0.66	.512	.672	1.219	
cohabiting	.825	.3	-0.53	.598	.405	1.683	
other	.61	.104	-2.90	.004	.437	.853	***
Religion	1	.	.	.	.	.	
Christian	.496	.051	-6.81	0	.405	.607	***
Muslim	1.256	.104	2.77	.006	1.069	1.476	***
other	.607	.191	-1.58	.114	.328	1.127	
Native Language	1	.	.	.	.	.	
Oromigna	.778	.069	-2.82	.005	.654	.926	***
Afarigna	1.637	.282	2.86	.004	1.168	2.294	***
other	1.136	.089	1.63	.103	.974	1.324	
Wealth Index	1	.	.	.	.	.	
middle	.746	.074	-2.96	.003	.614	.905	***
richer	.876	.08	-1.45	.147	.733	1.047	
Currently Employed	1	.	.	.	.	.	
yes	1.085	.077	1.15	.25	.944	1.246	
Contraceptive Use	1	.	.	.	.	.	
using traditional	1.458	.891	0.62	.537	.44	4.831	
non-user - intends	.826	.085	-1.86	.063	.675	1.011	*
does not intend	2.27	.215	8.66	0	1.886	2.733	***
Age at first Birth	1	.	.	.	.	.	

<=15	.925	.086	-0.84	.402	.772	1.11	
16-25	.822	.159	-1.01	.312	.563	1.202	
26+	1.01	.156	0.07	.947	.746	1.368	
VWBI	.855	.069	-1.92	.055	.73	1.003	*
ATRSI	.791	.079	-2.36	.018	.651	.961	**
Constant	.576	.217	-1.47	.143	.275	1.205	

Mean dependent var	0.911	SD dependent var	1.067
Pseudo r-squared	0.167	Number of obs	15317
Chi-square	6256.516	Prob > chi2	0.000
Akaike crit. (AIC)	31362.332	Bayesian crit. (BIC)	32049.637

*** p<.01, ** p<.05, * p<.1*

Several individual characteristics appear to determine fertility ideals. Age is statistically significantly different from 0 ($p<0.01$) for all outcomes compared to the base outcome. The direction of the effect indicates that with each additional year of age, the relative risk of having a small ideal family compared to a family size of 5-6 children decreases. However, the strength of the effect is relatively small, with a decrease in odds of 1.7 percent (100*(0.983-1)). The years spent living in the current type of place of residence do not have a statistically significant effect on ideal fertility relative to the base outcome. Therefore, the model does not provide evidence for Hypotheses 2.1. There are statistically significant ($p<0.01$) differences across all educational categories indicating that women with primary, secondary, or higher educational attainment have a higher relative risk of having low fertility ideals, rather than the base outcome, than women without education. Married women have lower relative risks than women not in a union to hold a low fertility ideal compared to the base outcome ($p<0.01$). The effects of religion and native language remain similar in the complex model compared to the baseline model.

Women in the richer and middle category of the wealth index have higher relative risks of having low fertility ideals compared to the base outcome and the reference group of poor women. However, the differences are only statistically significant ($p<0.05$) for women in the wealthier group. The effects and statistical differences are more pronounced for the large family ideal outcome than for the base. Women in the wealth index categories middle and richer have statistically significantly lower relative risks of this outcome compared to women in the category poorer. There are no statistically significant differences between women currently employed and unemployed for any outcome. However, the direction of the effects suggests that employment increases the relative risk, compared to non-employment, of having lower fertility ideals rather than

the medium outcome. Thus, the economic dimension indicates that employment status is not necessarily a good indicator of fertility ideals in Ethiopia, whereas wealth, or socio-economic status, might be. One interpretation could be related to the fact that employment status is not a good proxy for socio-economic status, as it provides no further information about the nature or quality of the employment, which may be more closely related to fertility ideals.

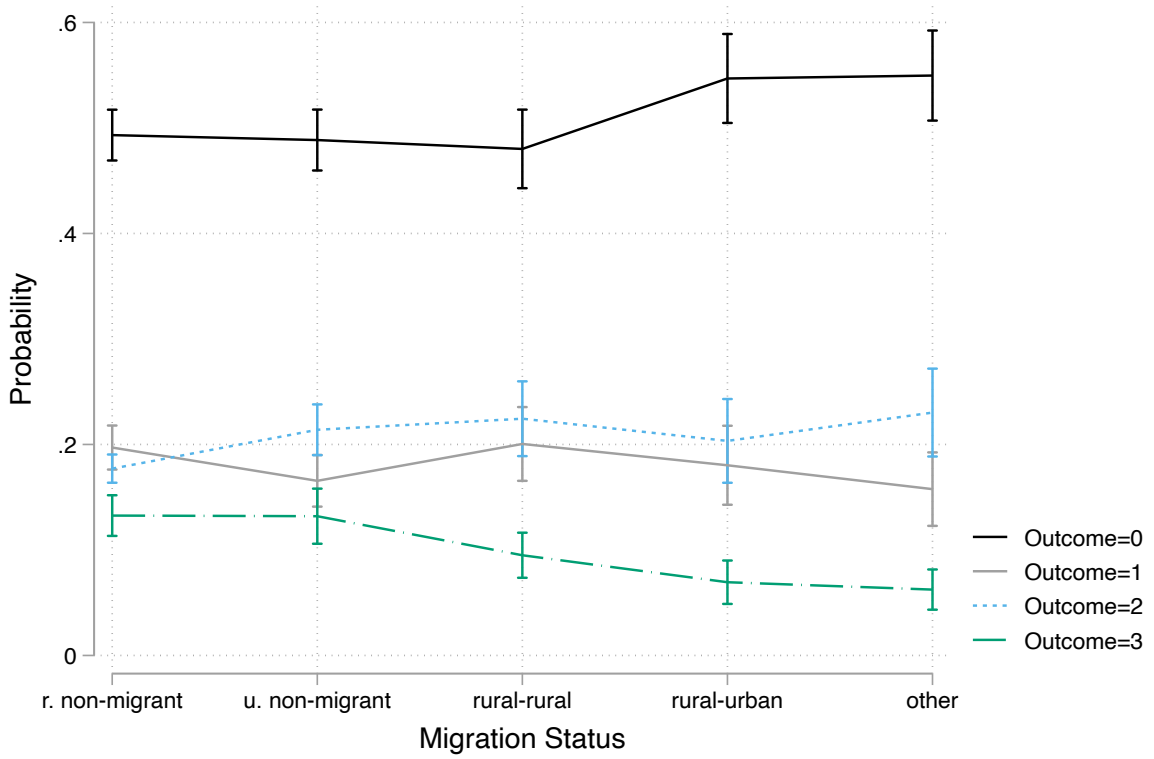
According to the four proxy variables, more empowered women are more likely to have lower fertility ideals than the base outcome and the respective reference categories. Not using contraceptives, whether intended for future use or not, decreases the relative risk of having a fertility ideal of 0 to 4 children rather than 5-6 children compared to women who use modern contraceptives. The differences are statistically significant at the 95 percent significance level for non-users with intent and at the 99 percent significance level for non-users without intent for future use. The effect of all categories of the variable age at first birth on holding a smaller ideal family size rather than the base outcome is statistically different compared to women who not (yet) have had a child ($p<0.01$). Any age at first birth suggests a higher relative risk of outcome 0 over outcome 1 compared to women who not (yet) have had a child. The effect is most substantial for women who experienced a first birth between the ages of 26 and 35, although the effects are strong overall. Moreover, the effect of the VWBI variable is statistically significantly different from 0, suggesting that for each one-unit increase in VWBI, meaning more empowerment according to the indicator, the relative risk of holding a smaller ideal family size.

For the other outcomes (7+; non-numeric), the effects and statistical significance of the differences across categories remain relatively stable, with age, level of educational attainment, religion, and language being important determinants of fertility ideals across all outcomes. Some economic indicators and dimensions of female empowerment are relevant in the context of the other outcomes. Thus, the model provides essential insights in response to the sub-research question, "What are the determinant of fertility differences across migration status in Ethiopia?".

Table 13 shows the critical differences in fertility ideals across migration statuses for Ethiopia in response to the question "What are the key differences in fertility ideals across migration statuses in Ethiopia?". Although most of the differences were not statistically

significant, the predicted probabilities of outcomes by migration status can nonetheless be informative (Figure 9). Rural-to-urban migrants are more likely to hold lower fertility ideals than rural non-migrants or rural-to-rural migrants. The probability of outcome 1 (5-6 children) is lower for rural-to-urban migrants than rural non-migrants. Overall, Figure 9 highlights that rural-to-urban migrants have predicted probabilities that are more similar to that of urban non-migrants than rural non-migrants. Hence, the model provides support for the second hypothesis (adaptation) over the first (socialization).

Figure 9. Predictive Margins of Migration Status (Complex Model Ethiopia)



Note. The figure shows predictive margins for the main independent variable migstat3 concerning the different outcomes of the dependent variable for the complex model for Ethiopia Outcome 0 refers to the low fertility outcome (0-4 children), Outcome 1 to the base outcome (5-6 children), Outcome 2 to the high fertility outcome (7+ children), and Outcome 3 to non-numeric ideals.

Overall, the model reveals no statistically significant differences across migration statuses in Ethiopia. However, in response to the main research question, the model suggests that rural-to-urban migrants are more likely to hold lower fertility ideals than rural non-migrants. Thus, rural-to-urban migrants appear to adapt to their new circumstances and

increases in this type of migration could reduce fertility ideals. One possible explanation for the absence of statistically significant differences across migration is that rural-to-urban migration is not (yet) common in Ethiopia. Other factors, such as individual characteristics, economic indicators, and dimensions of female empowerment, appear to be more robust determinants of fertility ideals in Ethiopia.

Limitations

When interpreting the results of this study, several limitations should be considered. The DHS surveys only contain information about the most recent change of residence, and only the two categories for non-migrants can be determined with relative certainty. Hence, categorizing the sample into different migration groups likely underestimates the actual number of internal migrants and potentially misrepresents the migration status. Additionally, the DHS provides no information about the motivation for migration; however, it may be crucial in understanding why rural-to-urban migrants adapt or do not adapt to the fertility ideals of their new surroundings. Similarly, no information is available regarding the mobility of other household members. Hence, the survey does not allow for an analysis of temporal spousal separation and its potential impact on family formation processes.

Furthermore, the dependent variable refers to fertility ideals due to the absence of information regarding fertility intentions, which are generally a better indicator of fertility behavior (Vignoli et al., 2020; Bhrolcháin & Beajouan, 2019). Thus, the interpretation of the results does not directly allow for conclusions regarding fertility behavior but should be understood as an exploration of fertility preferences in the context of socialization and adaptation of behavior. Moreover, the definitions of rural and urban areas in the DHS are based on the country's definitions. Hence, there are potential differences concerning these definitions between Nigeria and Ethiopia that remain unexplored in this study.

Lastly, the analysis focuses on ideal fertility rather than actual fertility. Thus, the study does not account for the number of children respondents to the surveys already have. Consequently, the models do not account for potentially biased fertility ideals due to the inclusion of already existing children. As outlined in prior sections, the DHS surveys address this bias by asking women with and without children different questions

concerning their fertility ideals. However, this does not address the issue that rural-to-urban migrant women may be unable to adapt to new circumstances and the social norms of urban environments simply because their families exceed the smaller ideal family sizes in urban areas. These women are considered in the interpretation of the results to adhere to the fertility ideals of their socialization, although they may not have been exposed to different norms at the time of family formation. Due to possible endogeneity issues, the models did not include a variable for the actual number of children. The only group of women for which a bias toward existing children can be excluded is those that do not have children (yet) according to the age at first birth variable. Future research could further explore the links between internal migration and the timing of childbearing, as well as the number of children women have before and after migrating to an urban environment. Such a research project would not only be insightful for the adaptation and socialization hypotheses but also concerning the selectivity and disruption hypotheses. It could illustrate whether existing children constrain or motivate rural-to-urban migration and to which extent internal migration events disrupt family formation processes.

Discussion

This study shows that migration status affects women's fertility ideals in Nigeria, while the relationship between migration status and fertility ideals appears to be less pronounced in Ethiopia. Concerning common determinants of fertility, rural-to-urban migrants appear to be a highly selected group in both countries. Thus, comparisons to rural and urban non-migrants demand an analysis that considers various characteristics of women in addition to their migration status. Nigeria, a more urbanized SSA country with a long history of internal migration (Rigaud et al., 2021), represents an interesting case, as fertility ideals and family size continue to be relatively high. While the country remains in the early stages of the demographic transition, differences in fertility ideals across the type of residence are not as large as expected based on other regions. Lerch (2019b) emphasizes that urban fertility will drop first in the demographic transition as these regions adopt new behaviors quicker than rural areas. On the one hand, the relative similarities across the type of residence could indicate that urban areas in Nigeria are slow in adopting new fertility behaviors. On the other hand, the similarities in fertility across the type of residence could be evidence of Nigeria's traditionally highly mobile population (Rigaud et al., 2021) and subsequent diffusion of behaviors.

The analysis reveals that rural-to-urban migrants in Nigeria fail to adapt to the fertility ideals of urban areas and instead appear to adhere to the social norms of their upbringing. This evidence for the socialization hypothesis (Gyimah, 2006) suggests that studying the fertility behaviors of children of rural-to-urban migrations could be insightful. As Lerch (2019b) argued, the migrant generation might not adapt quickly to the behaviors at the destination, mainly because they may already have children. Thus, to explore the impact of rural-to-urban migration on long-term fertility trends in SSA, studies across generations could improve the understanding of the internal migration-fertility nexus.

Rural-to-urban migrant women in both countries appear to be a selected group regarding educational attainment and wealth. Thus, the question emerges to which extent the migration event contributes to the ideal fertility and to which extent these women would have lower fertility ideals, compared to rural non-migrants and urban non-migrants, due to other determinants of fertility. In this context, it is necessary to consider the characteristics of stated fertility preferences – such as ideals – and to consider that women may offer a stated preference even if they do not have a clear idea of their future family size (Guzzo & Hayford, 2020; Bhrolcháin & Beajouan, 2019). In Nigeria, rural-to-urban migrants have a higher probability of stating their preferences in a non-numeric manner than non-migrant women. As migration and the change of residence constitute disruptions in the life course (Gyimah, 2006; Brockerhoff & Yang, 1994), which adds uncertainty regarding future trajectory, the higher probability of offering on-numeric fertility ideals could indicate uncertainty regarding family formation processes. However, this argument does not appear to hold in Ethiopia, for rural-to-urban migrants have a lower probability of stating fertility ideals non-numerically.

While fertility ideals reflect women's societal context, they do not hold the predictive power of fertility intentions (Miller & Pasta, 1994). Hence, the behavior following these ideals could be quite different. Thus, the fact that rural-to-urban migrant women adhere to the ideals of their upbringing does not imply that their fertility behavior will not adapt to the new circumstances. In other words, women could still find large families ideal but have fewer children due to housing economic constraints, participation in higher education, or the labor market. As female empowerment is an essential determinant of fertility (Upadhyay & Karasek), empowered women may have more capabilities to use family planning methods to limit family size, even if they find a large family ideal.

In Ethiopia, migration status does not appear to be a statistically significant predictor of fertility ideals. However, rural-to-urban migration's effects on fertility ideals align with the expectation outlined in the adaptation and selectivity hypotheses (Gyimah, 2006). Rural-to-urban migrants in Ethiopia are more likely to be wealthier and better educated than non-migrants, which is in line with findings concerning internal migrants (Bundervoet, 2018). A possible explanation for the selectivity of migrants is the fact that internal migration in Ethiopia remains rare (Bundervoet, 2018). Thus, migration status could become a more prominent determinant of ideal fertility if mobility increases.

Despite low levels of urbanization and rural-to-urban migrants, fertility ideals are overall lower in Ethiopia compared to Nigeria. Nevertheless, the rural-urban-fertility gradient concerning fertility ideals is more pronounced. In other words, Ethiopia shows signs of demographic change observed in other world regions (Lerch, 2019b), yet not of the economic development or structural changes generally associated with these dynamics. Hence, on the one hand, the findings are in line with authors who emphasize the differences between SSA and other world regions (Bongaarts & Casterline, 2013) and, on the other hand, in line with the argument that demographic transitions can take place in a wide range of context. If the countries are to follow the inverted U-shaped development of fertility across the type of residence (Lerch, 2019b), this study reveals that both countries remain in the early stages of the demographic transition.

Exploring the disconnect between structural change and urbanization in the region (Büttner et al., 2022) could lead to a better understanding of the continuously high fertility ideals of urban non-migrants and rural-to-urban migrants in Nigeria. In particular, the role of informal employment and child labor, and the reliance on kinship at older ages, may explain the preference for larger families, even as urban contexts pose constraints to high fertility, such as higher housing costs and access to family planning services (Gries & Grundman, 2018). Exploring the quality of urbanization is beyond the scope of this study. Nonetheless, the links between low-quality and high-quality urbanization and fertility could be crucial in further analyses of rural-to-urban migration and fertility.

With projections indicating increases in internal migration in Ethiopia and Nigeria as a response to climate change (Clement et al., 2021; Rigaud et al., 2021), better

understanding the links between migration and fertility is crucial from a policy-making perspective. In this context, it will be necessary to understand how and why adaptation or socialization prevails in the fertility behavior of migrants. As the determinants of fertility, such as education, socioeconomic status, and female empowerment, were found to have substantial effects on fertility ideals, the analysis reveals significant potential for action. There is a strong need to improve the quality of education and employment opportunities in urban areas, through structural changes and a reduced prevalence of informal economic activities, in preparation for increased internal migration flows. However, policies should also target sustainable development in rural areas to avoid rapid "low-quality" urbanization (Gries & Grundman, 2018). Lastly, fertility ideals appear to differ across religious and ethnic groups in both countries, and policy responses must consider the cultural diversity of family formation processes and social norms.

Conclusion

This study aimed to identify the effects of rural-to-urban Migration in Ethiopia and Nigeria on fertility ideals. Ethiopia and Nigeria were chosen for the analysis to represent the heterogeneity of SSA concerning urbanization, rural-to-urban migration, and the fertility transition. Through a literature review and quantitative analyses consisting of descriptive analysis and multinomial logistic regression, the key differences in fertility ideals across migration statuses in Ethiopia and Nigeria were analyzed based on DHS data. Additionally, potential determinants of such differences were analyzed and contextualized. The analyses reveal mixed results, as statistically significant differences concerning fertility ideals were identified in the Nigeria sample but not in Ethiopia.

In Nigeria, the regression results suggested that rural-to-urban migrants adhere to the norms and ideals of their rural upbringing and continue to prefer larger families to smaller ones. Despite rapid urbanization, fertility ideals remain high in Nigeria, suggesting a potential disconnect between urbanization and socio-economic development. In Ethiopia, the regression indicates the opposite, as rural-to-urban migrants adapt to the fertility norms of urban areas, thus preferring smaller families to larger ones. The lack of statistically significant differences in Ethiopia may be tied to the limited rural-to-urban migration flows. Accordingly, Ethiopia's characteristics appear to distinguish the country's demographic development from other countries, namely declining fertility, and comparatively very low fertility in urban areas despite slow urbanization and little internal mobility. Descriptive analyses highlight that rural-to-

urban migrants in both countries are highly selected groups regarding educational attainment, ethnic belonging, wealth, and female empowerment. Overall, further research is needed to improve the understanding of the links between internal migration, fertility, and urbanization in SSA to inform policy-makers and address the challenges at hand.

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Appendix

Appendix 1

Ethical Considerations

Several ethical aspects must be considered when conducting data analysis. In the case of this study, the data used in the analysis is secondary, and the researcher does not have direct contact with the survey respondents. A review board must review and approve survey procedures and questionnaires. Additionally, participation has to be informed and voluntary. An informed consent statement is read to potential respondents, who are free to decline participation.

The DHS program takes additional steps to protect respondents' privacy and ensure confidentiality during the data collection and processing stages. Respondents are only identified by a series of numbers that are randomly reassigned, and geographic coordinates are displaced to ensure respondents cannot be identified. Due to the random sampling processes and the additional steps taken to anonymize responses, the traceability risk of observations is low. All interviews and biomarker tests are treated confidentially (DHS, 2022e). Lastly, when downloading DHS survey data, researchers must register and confirm that they abide by the ethical standards for data handling and analysis outlined by the DHS Program (DHS, 2022b).

Appendix 2

Correlation Matrix Nigeria

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) idealnum	1.000													
(2) migstat3	-0.190*	1.000												
	(0.000)													
(3) v012	0.132*	0.124*	1.000											
	(0.000)	(0.000)												
(4) years	0.129*	-0.858*	-0.046*	1.000										
	(0.000)	(0.000)	(0.000)											
(5) v106	-0.481*	0.260*	-0.123*	-0.147*	1.000									
	(0.000)	(0.000)	(0.000)	(0.000)										
(6) mstat	0.137*	0.073*	0.485*	-0.090*	-0.196*	1.000								
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)									
(7) rel	0.395*	-0.195*	-0.075*	0.182*	-0.486*	0.027*	1.000							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)								
(8) lang	-0.175*	0.064*	0.034*	-0.113*	0.226*	0.000	-0.411*	1.000						
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.928)	(0.000)							
(9) WI	-0.389*	0.321*	0.030*	-0.138*	0.587*	-0.087*	-0.292*	0.080*	1.000					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
(10) empl	-0.018*	0.095*	0.344*	-0.072*	0.064*	0.208*	-0.180*	0.134*	0.055*	1.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
(11) v364	0.181*	-0.150*	-0.003	0.114*	-0.261*	0.024*	0.201*	-0.080*	-0.209*	-0.098*	1.000			
	(0.000)	(0.000)	(0.568)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
(12) aafb	0.122*	0.125*	0.566*	-0.135*	-0.131*	0.546*	-0.001	0.006*	-0.036*	0.257*	-0.081*	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.919)	(0.238)	(0.000)	(0.000)	(0.000)			
(13) VWBI	-0.230*	0.169*	0.042*	-0.093*	0.262*	-0.014*	-0.224*	0.106*	0.260*	0.058*	-0.130*	0.015*	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)		
(14) ATRSI	-0.061*	0.170*	0.267*	-0.159*	0.098*	0.193*	-0.129*	0.062*	0.127*	0.173*	-0.167*	0.402*	0.115*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

** p<0.05*

Correlation Matrix Ethiopia

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) idealnum	1.000													
(2) migstat3	-0.192*	1.000												
	(0.000)													
(3) v012	0.235*	0.041*	1.000											
	(0.000)	(0.000)												
(4) years	0.139*	-0.885*	0.035*	1.000										
	(0.000)	(0.000)	(0.000)											
(5) v106	-0.363*	0.282*	-0.280*	-0.115*	1.000									
	(0.000)	(0.000)	(0.000)	(0.000)										
(6) mstat	0.104*	0.040*	0.435*	-0.036*	-0.230*	1.000								
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)									
(7) rel	0.302*	-0.206*	-0.032*	0.155*	-0.267*	0.000	1.000							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.996)								
(8) lang	0.175*	-0.186*	0.005	0.115*	-0.172*	0.040*	0.048*	1.000						
	(0.000)	(0.000)	(0.543)	(0.000)	(0.000)	(0.000)	(0.000)							
(9) WI	-0.299*	0.424*	-0.039*	-0.239*	0.467*	-0.085*	-0.265*	-0.303*	1.000					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
(10) empl	-0.109*	0.199*	0.113*	-0.136*	0.182*	0.122*	-0.162*	-0.042*	0.195*	1.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
(11) v364	0.237*	-0.135*	0.043*	0.136*	-0.138*	-0.006*	0.265*	0.085*	-0.204*	-0.092*	1.000			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.437)	(0.000)	(0.000)	(0.000)	(0.000)				
(12) aafb	-0.265*	0.060*	-0.548*	-0.023*	0.408*	-0.496*	-0.111*	-0.087*	0.213*	0.013*	0.108*	1.000		
	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.110)	(0.000)			
(13) VWBI	-0.161*	0.234*	-0.052*	-0.131*	0.316*	-0.052*	-0.131*	-0.135*	0.280*	0.100*	-0.055*	0.140*	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
(14) ATRSI	-0.026*	0.141*	0.166*	-0.115*	0.055*	0.067*	-0.116*	-0.042*	0.084*	0.038*	-0.269*	-0.260*	0.055*	1.000
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

** p<0.05*

Appendix 3

Hausman-McFadden Test for Independence of Irrelevant Alternatives Nigeria

	Coefficients			
	(b) Restricted	(B) Unrestricted	(b-B) Difference	Std. Err.
0-4				
migstat3				
1	0.4474001	4474001	6.93e-13	.
2	-0.578437	-.0578437	7.17e-13	.
3	0.4039038	.4039038	7.18e-13	.
4	0.8044977	.8044977	1.68e-10	.
_cons	-0.1663327	-.1663327	-6.89e-13	.
7+				
migstat3				
1	-.7565729	-.7565729	3.74e-13	.
2	-.2446653	-.2446653	4.47e-13	.
3	-1.135589	-1.135589	-1.39e-12	2.83e-08
4	-1.386796	-1.386796	-8.24e-09	4.20e-06
_cons	.4938921	.4938921	-3.88e-13	.

b = Consistent under H0 and Ha, obtained from mlogit

B = Inconsistent under Ha, efficient under H0; obtained from mlogit

Test of H0: Difference in coefficients not systematic

Chi2(10) = 0

Prob > Chi2 = 1.0

No evidence that the IIA assumption has been violated

Hausman-McFadden Test for Independence of Irrelevant Alternatives Ethiopia

	Coefficients			
	(b) Restricted	(B) Unrestricted	(b-B) Difference	Std. Err.
0-4				
migstat3				
1	.8901685	.8901685	-9.15e-12	.
2	-.1053659	-.1053659	-7.68e-14	.
3	.8916604	.8916604	9.23e-12	.
4	1.012334	1.012334	5.72e-12	1.71e-0708
_cons	.6455191	.6455191	6.14e-14	.

7+				
migstat3				
1	-.0159099	-.0159099	-9.52e-12	.
2	-.1179107	-.1179107	-2.58e-13	.
3	-.6714778	-.6714778	-2.26e-09	3.77e-06
4	-.3185501	-.3185501	3.86e-10	.
_cons	.1139346	.1139346	2.49e-13	.

b = Consistent under H0 and Ha, obtained from mlogit

B = Inconsistent under Ha, efficient under H0; obtained from mlogit

Test of H0: Difference in coefficients not systematic

Chi2(10) = 0

Prob > Chi2 = 1.0

No evidence that the IIA assumption has been violated

Appendix 4

Wald Test for Independent Variables Nigeria

N = 41,186

H0: All coefficients associated with given variable(s) are 0

Variable	Chi2	df	P>Chi2
1.migstat3	6.185	3	0.103
2.migstat3	50.952	3	0.000
3.migstat3	42.155	3	0.000
4.migstat3	32.679	3	0.000
v012	279.050	3	0.000
years	82.696	3	0.000
1.v106	48.711	3	0.000
2.v106	241.527	3	0.000
3.v106	275.231	3	0.000
1.mstat	94.025	3	0.000
2.mstat	46.526	3	0.000
3.mstat	13.780	3	0.003
1.rel	1432.017	3	0.000
2.rel	11.279	3	0.010
3.rel	16.011	3	0.001
1.lang	746.402	3	0.000
2.lang	36.190	3	0.000
3.lang	22.545	3	0.000
1.WI	146.679	3	0.000
2.WI	458.813	3	0.000
1.empl	76.933	3	0.000
2.v364	19.741	3	0.000
3.v364	102.345	3	0.000
4.v364	43.054	3	0.000
2.aafb	47.242	3	0.000
3.aafb	45.249	3	0.000
4.aafb	27.764	3	0.000
VWBI	153.120	3	0.000
ATRSI	94.891	3	0.000

Wald Test for Independent Variables Ethiopia

N = 15,317

H0: All coefficients associated with given variable(s) are 0

Variable	Chi2	df	P>Chi2
1.migstat3	13.994	3	0.003
2.migstat3	5.988	3	0.112
3.migstat3	10.921	3	0.012
4.migstat3	16.275	3	0.001
v012	139.455	3	0.000
years	8.383	3	0.039
1.v106	151.851	3	0.000
2.v106	173.193	3	0.000
3.v106	98.425	3	0.000
1.mstat	16.369	3	0.001
2.mstat	2.755	3	0.431
3.mstat	25.156	3	0.000
1.rel	84.442	3	0.000
2.rel	720.955	3	0.000
3.rel	45.686	3	0.000
1.lang	21.333	3	0.000
2.lang	59.253	3	0.000
3.lang	281.301	3	0.000
1.WI	26.272	3	0.000
2.WI	36.393	3	0.000
1.empl	12.209	3	0.007
2.v364	3.030	3	0.387
3.v364	8.939	3	0.030
4.v364	310.131	3	0.000
2.aafb	16.540	3	0.001
3.aafb	71.905	3	0.000
4.aafb	35.636	3	0.000
VWBI	31.891	3	0.000
ATRSI	11.387	3	0.010