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Point of Reference: A Multi-sited Exploration of African Migration and Fertility in France

Julia Behrman
Assistant Professor of Sociology and IPR Fellow
Northwestern University

Abigail Weitzman
Assistant Professor of Sociology
University of Texas at Austin

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ABSTRACT

Considerable literature explores whether the fertility of migrants from high fertility contexts converges to levels of women in lower fertility destinations. Nonetheless, most research compares the reproductive outcomes of migrants to those of native-born women in destination countries. Drawing on literature that takes a transnational perspective, the researchers standardize and integrate data collected in France (the destination country in our study) and data collected in six high-fertility African countries (the senders). Through descriptive and multivariate analyses with entropy weights, they show that there is much more evidence of migrant fertility adaptation in the first generation when migrant women are compared to women in origin countries rather than destination countries. The authors also discuss and analyze the role of selection into migration and disruption of family formation processes upon migration to provide a fuller understanding of processes surrounding migrant fertility.

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Introduction

Demographers have long been interested in the association between migration and fertility—two predominant components of social and demographic change. The topic has generated particular attention when migrants from low-income high fertility countries move to high-income low fertility countries (Hervitz 1985; Kulu 2005; Milewski 2007, 2010). Some scholars have argued that higher migrant fertility could help address the low fertility that has characterized many high-income countries in recent decades (Billari and Dalla-Zuanna 2013; Wilson et al. 2013), while others have asserted that the ethnic and racial ancestry of destination countries is radically altered by incoming migrants (Coleman 2006). Underlying these discussions are assumptions about migrants' fertility adaptation (or lack thereof), which raises an important question: do migrants from high fertility contexts adjust their fertility to more closely resemble women in lower fertility destination contexts, or do they continue to have fertility and reproductive patterns that are more similar to women in their country of origin?

To date, most of our understandings of migrant fertility are based on analyses where researchers compare migrants to native-born women in the destination country (Kulu et al. 2019). Compared to native-born destination-country populations, migrants from high fertility settings may appear not to have adapted to local fertility norms because they have much higher fertility. However, this may not be the case if migrants are compared to women in countries of origin with whom they share a common background. At the same time, migrant fertility patterns could also be explained by other factors, including differential selection into migration or disruption of fertility and family processes due to migration. With a few important exceptions, empirical explorations of migrant fertility that include information on *both* origin and destination countries have been limited. As a result, our understandings of migrant fertility may be colored

by the choice of reference group and whether migrants are compared to women in origin or destination contexts.

In this paper, we standardize and integrate nationally representative micro-data from two different sources—first, the *Trajectories et Origines* (TeO) survey collected in France (the destination country in our study)—and second the *Demographic and Health Surveys* (DHS) collected in six high fertility sub-Saharan African countries (the senders). Sub-Saharan African migration to France provides an interesting case because most African migrants come from high-fertility countries with TFRs well above replacement. For example, the most recent TFRs in Senegal and Mali—two countries in our sample—are 4.7 and 6 respectively (World Bank 2017). In contrast, in the United States—which has received considerable attention in the literature on migration and fertility— the largest migrant origin groups come from Latin American countries that have already undergone the fertility transition. France also provides an interesting case because it has what has been referred to as a "state-sponsored model of assimilation" (Brubaker 1992: 77), which means that there is a strong policy orientation towards prioritizing French identity over other types of identity (i.e. religious or ethnic) in interactions with the state and public sphere. Questions of migration and fertility adaptation are particularly pertinent in such a context given that migrant's fertility and family behaviors might be viewed as indicators of integration (Favell 1998).

The first aim of this study is to understand how contemporary understandings of migration and fertility adaptation may differ depending on whether migrants are compared to women in origin countries versus women in destination countries. To this end, we use nationally representative micro-data to compare migrant fertility to non-migrant women in *both* origin and destination countries. Given that selection in migration is not random and migrants may be pre-

disposed to different fertility norms, we then focus on understanding selection processes by providing a descriptive overview of how migrants differ on observed characteristics from women in origin contexts and conducting multivariate analyses using entropy weights where women in origin contexts are weighted to resemble migrants on observed characteristics. This provides important insight into whether the association between migration and fertility differs when controlling for observed factors that predict selection into migration. Finally, we conduct several additional multivariate analyses where we stratify by age, childbearing prior to arrival in France, and reasons for migration to provide additional insight into disruption, adaptation, and selection processes.

International Migration from Higher to Lower Fertility Settings: Theories and Evidence on Migrant Fertility

Classic sociological and demographic theories of migration and fertility (Hervitz 1985; Kulu 2005; Milewski 2007, 2010) emphasize that migration is a social process that may be associated with fertility in important dimensions. Four hypotheses are often used to help explain fertility of women who migrate from higher to lower fertility settings: (1) socialization; (2) adaptation; (3) selection; and (4) disruption. These different hypotheses have different predictions about whether and why migration will be associated with fertility. In what follows we discuss existing empirical evidence on migration and fertility and expand upon these four perspectives in greater detail.

Considerable literature has explored whether migrant fertility levels converges with that of native-born women in destination contexts. In contemporary European contexts, first-generation migrants from high-fertility countries in Africa and Asia have been shown to have

higher fertility than non-migrant populations in Germany, France, the UK, and Sweden (Afulani and Asunka 2017; Andersson 2004; Coleman and Dubuc 2010; Dubuc 2012; Héran and Pison 2007; Milewski 2007, 2010; Toulemon 2004). In the US, some research suggests first generation Mexican migrants have significantly higher fertility than native-born Caucasian populations (Bean, Swicegood, and Berg 2000; Frank and Heuveline 2005), although other scholarship suggests this empirical finding is largely a function of measurement (Parrado 2011). In spite of these broader trends, there is variation in fertility across migrant descendant groups within the same destination countries, which has been attributed to factors such as differences in religiosity and socio-cultural norms related to the family (Kulu et al. 2017).

The fact that, in the first-generation, migrant women's fertility is often higher than native born women has lent support to the socialization hypothesis, which is the idea that socialization prior to migration is essential to shaping values, preferences, and beliefs about reproduction (Barber 2001; Carter 2000; Milewski 2010). According to this perspective, because adult migrants have already been influenced by the (usually higher fertility) norms of their country of origin, migrants from high fertility contexts may not adjust their fertility behaviors upon migration. At the same time, transnational linkages via friends and family, migrant communities, return visits, or media in home countries allow women to maintain active contact with the norms in destination countries that may also reinforce preferences for high fertility (Levitt and Glick Shiller 2019; Portes, Guarnizo, and Landolt 1999; Vertovec 2004).

In contrast to the socialization perspective, the adaptation perspective suggests that migrants adopt customs, norms, and values of their new home societies (Alba & Nee, 1997), meaning that migrants from high fertility settings should adopt the lower fertility norms of such destination contexts. Support for the adaptation perspective comes from studies showing that

migrant women's fertility behavior increasingly resembles that of women in destination countries the longer they are in the destination context (Ford 1990) and from studies that show that the fertility of second-generation migrants often more closely resembles that of native-born populations in destination countries (Kulu et al. 2017; Milewski 2010; Pailhé 2017; Parrado and Morgan 2008). There are several important exceptions to trends of fertility declines in the second generation, with some groups continuing to exhibit high fertility even in the second generation (for example, second-generation Turkish women in Sweden and second generation Pakistani and Bangladeshi women in the United Kingdom) (Andersson 2004; Kulu et al. 2017).

The selection perspective emphasizes that the decision to migrate is not random, and those who select into migration may be systematically different in family background, education, values, and ambition among other things (Feliciano 2005; Ichou 2014; Rendall and Parker 2014; Spörlein and Kristen 2019). This could mean that migrants would have had differential fertility behaviors from women in origin countries irrespective of whether they ever left their country of origin (Hervitz 1985; Lindstrom and Giorguli Saucedo 2002; Milewski 2007).

Finally, the disruption perspective emphasizes that there may be disruption of reproductive processes and family formation in the post-migration period due to spousal separation, and/or psycho-social stress that could (at least temporarily) depress fertility (Kulu 2005). Nonetheless, evidence of disruption has been mixed (Baykara-Krumme and Milewski 2017). Indeed, many scholars find disruption is often temporary and is offset in later periods with accelerated patterns of childbearing once migrants have become settled in their new communities (Choi 2014; Lübke 2014).

Data on Migration and Fertility: The Importance of a Multi-Sited Perspective

Though scholars of migration emphasize the importance of taking a transnational perspective to fully understand migration as a social process (Feliciano 2005; Jiménez and Fitzgerald 2007; Massey 1987), the vast majority of studies that have assessed migrants' fertility have compared migrants to native-born women in destination contexts (see a review in: Kulu et al. 2019). A more complete understanding of migrant fertility processes requires comparing migrants to individuals remaining in their country of origin. For example, migrants might have higher fertility than women in destination contexts (which supports socialization), but lower fertility than women in origin contexts (which could reflect adaptation, selection, or disruption). Better understanding these processes requires a "multi-sited perspective" that necessitates data on individuals in *both* sending *and* receiving countries.

While most datasets include information on only one context or the other, there have been two important types of exceptions. The first are transnational datasets with information on women in both sending and receiving countries, including the Mexican and Latin American Migration Projects (MMP and LAMP), Migrations Between Africa and Europe Project (MAFE), and 2000 Families Study (''Migration Histories of Turks in Europe"). Though fertility has not been the focus of these surveys, they have yielded findings of relevance on the topic. For example, analyses conducted using MMP suggest that Mexican women who migrate to the US have lower birth probabilities and lower total births while in the US compared to women in Mexico (Lindstrom and Giorguli Saucedo 2002, 2007). Likewise, using MAFE, researchers have shown that Ghanaian migrants to the UK and the Netherlands have fewer total children than non-migrant Ghanaian women (Wolf and Mulder 2019).

The second type of study that includes information on both origin and destination countries combines data sources from the two, although research that takes this approach is

relatively limited due to the difficulties of finding and standardizing appropriate data. Studies that take this approach typically construct aggregated measures of total fertility and compare TFRs of migrants and natives of origin and destination contexts (Choi 2014; Frank and Heuveline 2005; Toulemon 2004). For example, Toulemon shows that at the aggregate level the Total Fertility Rates (TFRs) of migrants in France are often between those of their origin country and that of native-born French women (Choi and Frank and Heuveline focus on Mexican migrants to the US and find more heterogeneous results). Nonetheless, these macro-level estimates do not address how migrants might be different than non-migrants on observed characteristics. In two exceptions to the aggregate focus, Singley and Landale (1998) and Lübke (2014) combine micro-data from both origin and destination contexts to explore fertility outcomes at the individual level of Polish migrants to the UK and Puerto Rican migrants to New York respectively.

Our analyses build on and enhance this important transnational work on migration and fertility in a few key dimensions. First, we combine nationally representative micro-data from both origin and destination contexts, thus allowing us to move beyond macro-level comparisons and explore how migrants are different from women in origin countries on observed characteristics at the micro-level. This approach also allows us to compare migrant fertility to non-migrant women in *both* sending and receiving contexts using representative data, thus revealing how point of reference matters for understandings of migrant fertility. In contrast to past work, which has typically focused on one migrant group, we are able to observe the experiences of migrants from several different nationalities, thus providing a fuller portrait of the diversity of migrant experiences. Our unique combination of data sources also allows us to

explore a range of outcomes related to fertility preferences, timing of marriage, and experiences of migration incorporation that are often not available in existing work.

International Migration in Contemporary France

France provides an interesting case of a high-income country with a large and diverse migrant population. As of 2014, about 9% of the French population was foreign-born (INSEE 2016; Pew Research Center 2016), while the children of foreign-born groups constituted about an additional 10 percent of the population (INSEE 2012). For the purposes of this paper we focus on international migration from sub-Saharan Africa since many African migrant women come from countries with fertility well above replacement levels (among the highest in the world), whereas migrants to France from other major sending regions such as Southern/Eastern Europe, North Africa, and Turkey come from countries with fertility that is below or comparable to France.

Large-scale migration from outside of Europe to France started in the mid-twentieth century when foreign laborers from former colonies in North Africa were recruited as guest workers in manual and service jobs to assist in post-World War II reconstruction (Alba and Foner 2015). In the decades following de-colonization in the 1960s, migrants to France increasingly included those from former French colonies in Sub-Saharan Africa. While the guest worker period ended with the economic downturns of the 1970s—and the French government made active efforts to encourage return migration and discourage labor migration—many migrants opted to stay in France and were able to bring wives and extended family members through family reunification policies (Laurence and Vaisse 2006). Since the 1980s, there has been a rise in migrants claiming political asylum, including those fleeing conflict in Francophone

Central Africa (Alba and Foner 2015). At present, there is a sizeable sub-Saharan African population in France, with close to 1 million migrants in France born in sub-Saharan Africa as of 2016 (INED 2019).[1]

The French model of migrant incorporation is rooted in a Republican ideology that emphasizes that all French citizens are equal before the law (Brubaker 1992). In practice, this means that the French state does not officially recognize religious, racial, or ethnic differences because French identity is supposed to take the place of all other forms of identity (i.e. ethnic or religious background) in interactions between individuals and the state. This means that migrants—like all other citizens—are supposed to prioritize their "French" identity over other types of identities in the public sphere. While this position means that anyone can, in theory, become French, it has also led to conflict about whether religious, ethnic, and racial minorities should be able to acknowledge these aspects of their identities in the public sphere.

The success of migrant incorporation into mainstream French society has been mixed. On one hand, low-status migrants in France are less geographically, residentially, and educationally segregated, and are more likely to be in inter-racial relationships than their counterparts in the United States (Alba and Foner 2015; Quillian and Lagrange 2016; Wacquant, Wacquant, and Howe 2008). At the same time, migrants have worse labor market and educational outcome than non-migrant French and many reside in poorer neighborhoods (Ichou et al. 2017; Ichou and Hamilton 2013; Meurs, Pailhé, and Simon 2006). An ethnographic exploration of second generation non-European origin migrants indicates that even those integrated into the economic and legal structures of the country continue to face racial and ethnic

[1] Though difficult to measure, there are an estimate 200,000-400,000 migrants who came to France illegally (Alba and Foner 2015; page 39). The pathway to citizenship in France includes a substantial territorial component and the second generation is automatically granted citizenship at age 18 if born in France.

discrimination that denies their "cultural" citizenship (Beaman 2017).

Analytical Strategy

Data and Sample

Our analytic sample consists of a combination of TeO and DHS respondents. To achieve this, we create standardized variables that are consistent across the two data sources and then append these data sources to create a harmonized dataset. Doing so allows us to identify and compare respondents in origin countries who did not migrate to respondents in destination countries who did migrate but who are otherwise comparable on observed characteristics. In what follows we describe the two data sources and the sample creation.

The TeO is a cross-sectional survey of approximately 22,000 women and men ages 18-60 in metropolitan France. The central focus of the TeO is migrant integration processes. As such, the sample includes detailed information about migration status, religion, integration, discrimination, assimilation, fertility, reproductive health, and socioeconomic status. Migrant groups are oversampled in the TeO, but the dataset is representative of metropolitan France when sampling weights are applied. In total, the final TeO sample is comprised of five groups: (1) 9,600 migrants; (2) 9,600 second generation migrants; (3) 800 people from French overseas territories residing in France; (4) 800 people from French overseas territories; and (5) 3,200 native-born French who do not have migrant origins.

The DHS are nationally representative, cross-sectional surveys collected among women aged 15-49 in dozens of countries in sub-Saharan Africa. Like the TeO, the DHS provides detailed information about education, reproductive health, fertility, and intra-family dynamics. Importantly, DHS data are standardized across countries, thus allowing us to pool the data and to

make cross-national comparisons. We focus on DHS data from countries and time periods comparable to that of TeO (in approximately 2008/2009). For DHS surveys in countries with multiple waves collected within five years of the TeO we include both DHS survey waves. Appendix Table 1 provides a list of the countries and years for the TeO and DHS samples included in this study.

Leveraging TeO data provides a subsample of first-generation migrant women who came to France over the age of 15 from four countries in West Africa (Cameroon; Ivory Coast; Mali; and Senegal) and two countries in Central Africa (Congo Brazzaville; Congo DRC). The countries are all former French colonies, with the exception of the DRC (which was a Belgian colony) and Cameroon (which was a German Colony that was later jointly governed by the British and French following World War I). Though all six countries fall into the UN's definition of "least developed countries" there is heterogeneity in their levels of socioeconomic development. As Appendix Table 1 shows, Congo (Brazzaville) has the highest GDP per capita (largely due to petroleum export), whereas Congo DRC and Mali have the lowest. The DRC in particular has been plagued by a decades long civil war, which helps account for the very low GDP. As Appendix Table 1 shows, the Total Fertility Rates (TFRs) of the women from these countries at survey ranged from a high of 6.67 in Mali to a low of 4.75 in Congo Brazzaville at the time of survey. It is worth nothing that these are much higher than the TFR in France, which was approximately 2, in the period of data collection.

Table 1 Panel A provides information about the sample sizes of women in origin countries, migrant women, and non-migrant women in France. We focus on migrants who came over the age of 15. We exclude migrants who came under the age of 15 (the so-called "1.5 generation") because these migrants are typically exposed to destination-country norms at

younger ages (during childhood) (Milewski 2007, 2010; Wolf 2016). Our small first-generation migrant samples noted in Table 1 are fairly consistent with those in the existing literature (Wolf and Mulder 2019). Nonetheless, to avoid bias due to the disproportionately larger samples of non-migrants in origin countries relative to the sample of migrants in France, we take a seeded random draw of 350 women from each of the non-migrant origin samples and non-migrant French sample. Table 1 Panels B and C present the final analytical samples used in our analyses.[2] For most analyses, we produce both country-specific and pooled results (with country fixed effects). For some supplementary analyses on sub-samples we exclusively use the pooled sample because the country-specific samples become very small.

Measures

In all surveys, respondents are asked about their family and demographic background, fertility history, current reproductive health, and relationship dynamics. We create harmonized measures of fertility outcomes and socioeconomic/ sociocultural background across the TeO and DHS.

Fertility outcomes: We create continuous measures of children ever born (CEB) as our main measure of fertility. We also create a series of timing variables for event history analyses where we look at the age of women's transitions to first birth (measured in person-months, starting risk at age 15) and the age of women's transitions into unions—which includes either

[2] The sample in Table 1 Panel B is used in the first part of our analyses where we present age-adjusted OLS regression estimates for children ever born for different populations (Figures 1-2), whereas the sample in Table 1 Panel C is used in multivariate analyses (Tables 3-4) and is slightly smaller due to missing data. We use listwise deletion to identify the final multivariate sample presented in Panel C. We show that the age-adjusted estimates of children ever born are substantively the same using both the samples in Panels B and C (see Figure 1 and Table 3). In supplementary analyses we use multiple imputation (MI) to attempt to address missing data, however MI is problematic for our purposes due to concerns about violation of the missing at random assumption. Furthermore, MI cannot be used with entropy balancing.

marriage or cohabitation (measured in person-months, starting risk at age 15).[3] To provide further insight into women's fertility preferences we include a measure of stated ideal number of children. Women who provide non-numeric responses are excluded from this measure; about 8% of women in the full DHS sample provide a non-numeric response (i.e. "Up to God"), 6.5% of women in the full TeO sample report that they do not know, and an additional 0.24% of women in the full TeO sample refuse to respond to this question.

Migration status: Our analysis considers three different categories of people: (1) migrants from sub-Saharan Africa who arrived in France over the age of 15; (2) women in corresponding sub-Saharan African countries of origin; and (3) French women of non-migrant origin.[4]

Our multivariate models include the following background socioeconomic and sociocultural characteristics that predict selection into migration. We focus on migrant characteristics that were from the period prior to arrival in France, and not those that would have been likely impacted by migration to France (i.e. current marital status, current preferences, current employment).

Education: Education is an important predictor of migration and an important determinant of socioeconomic status (Feliciano 2005; Ichou 2014; Rendall and Parker 2014; Spörlein and Kristen 2019). We measure education with a series of indicator variables including no diploma; primary diploma; some secondary; secondary diploma; and tertiary. Because education may be impacted by migration, for migrant women we use education prior to arrival in France, which is created using TeO questions about whether education was completed prior to migration and if not what level of education had been completed upon arrival in France.

[3] Results are robust to starting age at risk at age 10.
[4] By non-migrant origin we mean no family history of migration in the last two generations.

Sibling size: Since research suggests that norms about childbearing and desired family size are shaped by experiences and socialization in childhood, and because sibship may proxy for norms valuing large family sizes learned in childhood, we control for number of siblings. Furthermore, sibling size may also capture socioeconomic status given the well-documented negative association between mothers' education and total fertility outcomes (Behrman 2002). We construct measures of sibling size using information in the DHS and TeO about the number of siblings from the same biological mother (including siblings who are no longer living: 0-2 siblings; 3-4 siblings; and 5+ siblings).[5]

Birth order: We include an indicator for whether the respondent is the first born child given that birth order might be an important determinant of young women's educational and marriage opportunities (Pesando and Abufhele 2019), which may in turn, influence migration.

Religion: Considering that Muslim women have higher birthrates than women of other religious backgrounds in France (Toulemon 2004), in part because they are more religious and have larger ideal family sizes (Behrman and Erman 2019), we also control for religion (Muslim, Christian, and other religion).

Age: All models also include age fixed effects (i.e. indicator controls for age in years) to account for age-related fertility differentials. Results are robust to re-specification using a continuous measure of age, though the age fixed effects approach generally yields more conservative estimates.

Additional pre-migration work and family characteristics: In supplementary analyses, we also include several additional variables under the assumption that women in origin countries are still "at risk" of migration to France and thus their characteristics at survey provide a valid

[5] We prefer this to a continuous measure due to differences in top coding between the DHS and TEO for sibling size.

counterfactual for the experiences of migrants prior to arrival in France. These include a dichotomous indicator of having a child prior to arrival in France (or having a child at survey for non-migrants); being in a union prior to arrival in France (or being in a union at survey for non-migrants); working prior to arrival in France (or working at survey for non-migrants); and a continuous measure of year at arrival in France (or year at survey for non-migrants).[6]

Methods

The first part of our analysis explores a central question: does reference group matter for understandings of migrant fertility? To this end, we produce descriptive estimates, by country of origin, that show how the age-adjusted OLS association between migration and fertility outcomes differ depending on whether first generation migrants are compared to women in origin countries or women in destination countries. In these estimates we control only for age fixed effects and use sampling weights from both the DHS and TeO to ensure representativeness. Due to concern of right censoring with our measure of children ever born, we also produce a series of Kaplan-Meir survival curves that make the same comparison looking at the timing of first birth and first union formation.

Because selection into migration is not random and migrants may be pre-disposed to different fertility norms and behaviors, we then provide a descriptive overview of selection processes and how migrants differ from women in origin countries. Next, we use OLS regressions with entropy balancing techniques where non-migrants in origin contexts are

[6] We do not include these variables in our main models because (i) they require a strong counterfactual assumption; (ii) we do not have granular information about pregnancy/marriage status at arrival in France due to lack of information on the month of arrival to France; (iii) addition of these extra variables further reduces our small samples in cases of missing variables and leads to problems in the convergence in some of the country-specific models.

weighted to resemble migrants on observed characteristics and explore whether the association between migration and fertility changes upon accounting for selection into migration on these observed characteristics.

To conduct the entropy balancing, we generate a set of weights that make the women in origin countries background characteristics (i.e. education) match the migrant respondent's background characteristics on mean, variance, and skew. We then run the multivariate OLS regressions using these weights (along with age fixed effects). Entropy balancing is similar in spirit to propensity score matching (PSM) (Hainmueller and Xu 2013; King and Nielsen 2019; Zhao and Percival 2017); however, entropy balancing is preferable for our small sample sizes given that PSM assumes a functional form, which may cause more unbalance than balance. We use OLS regression models for all analyses for ease of interpretation and to conduct the entropy balancing adjustment.[7] In addition, we conduct a number of supplementary multivariate analyses where we stratify the models by respondent age, reason for migration, and childbearing status prior to migration to explore whether there is evidence of processes of adaptation, selection, or disruption.

Results

Age-Adjusted OLS Regression Associations of the Relationship Between Migration and Fertility Comparing Migrants to Women in Both Origin and Destination Countries

The first aim of our study is to explore how understandings of migration and fertility adaptation differ depending on whether migrants are compared to women in destination countries—the standard comparison in the literature—versus origin countries. As can be seen in

[7] We also re-run analyses using ordered logistic regression rather than OLS models and find similar results (available upon request).

the right side of Figure 1 Panel A, on average migrant women in the sample have about one more child at survey compared to non-migrant French natives, ranging from Cameroonian migrants having, on average, about .3 more children than French women to Malian migrants having an average of 2 more children than French women. These findings are roughly in line with a large body of research, which shows that first generation migrants from high-fertility contexts have higher fertility than native-born women, thus supporting the socialization hypothesis and casting doubt on whether adaptation occurs in the first generation due to strong adherence to home-country norms.

In contrast, as can also be seen in the left side of Figure 1 Panel A, findings look considerably different when migrants are instead compared to women from their origin countries. In this case, the number of children ever born at survey is consistently lower among migrant women than among non-migrant women who remain in the country of origin, a pattern that holds in all six countries. For example, Malian migrants—who have on average two more children than French women—have an average of two fewer children than women in Mali. Likewise, Cameroonian migrants—who have an average of .3 more children than French women—have almost 3 children less than women in Cameroon. To account for the fact that child mortality is higher in origin countries, we re-construct this figure with a measure of living children instead of children ever born and find the results to be substantively the same (Appendix Figure 1).

Because estimates of children ever born may be biased by right censoring among women who have not finished their reproductive careers, we model transitions into first births using event history methods that better address censoring. Figure 2 Panel A presents Kaplan-Meir Survival Curve estimates of the age of first birth and shows a complementary pattern to what is

seen in Figure 1. In general, migrant women transition into first births more slowly than women in origin countries but more quickly than non-migrant French women. Because the transition into childbearing is closely linked to union formation in many places, we also present Kaplan-Meir Survival Curves of the timing of union formation (Figure 2 Panel B). In most cases, the timing of union formation for migrants in France more closely resembles women in France than women in origin contexts.

As a next step, we explore age-adjusted OLS regression predictions of women's ideal family sizes in Figure 1 Panel B. Consistent with what we saw in the other figures, migrants have higher ideal family sizes than women in France, but lower ideal family sizes than women in sending countries. So, for example, Senegalese migrants' ideal family size is almost two children higher than French women's, but almost two children lower than women in Senegal. This is important because it suggests that the lower childbearing among migrants compared to women in origin countries is not merely a mechanical lowering of children due to the increased financial costs of childbearing in France and/or disruption process where marriage and childbearing are delayed due to logistics of migration. Instead, it suggests that migrant's lower childbearing reflects (at least partially) preferences for fewer children that are distinct from women in origin countries.

These descriptive findings illuminate how point of reference, or comparison group, is critical to how scholars conceptualize migrant fertility. Although migrant women have higher children ever born than French women, they have lower children ever born, lower ideal family sizes and delayed transitions into unions and childbearing compared to women in origin countries. This suggests that there may be more evidence of migrant fertility adaptation in the first generation when migrants from high fertility contexts in Africa are compared to women in

origin countries as opposed to French women. At the same time, these findings could also be explained by other factors—particularly differential selection into migration—a topic that we take up in more detail in the subsequent sections.

Descriptive Overview of Selection into Migration

To better understand the different reasons why women select into migration, Figure 3 Panel A presents descriptive information on the reason given by migrants (in the TeO sample) on their application for a French residence permit (see Appendix Table 2 for corresponding tables). Figure 3, Panel A shows country-level heterogeneity in reasons for migration. For example, 54% of migrants from the DRC seek political asylum (refugee status). In contrast, about 1% of women from Senegal seek political asylum. Instead, the majority of Senegalese women—about 55%—report migrating for family reunification. In fact, for every country other than the DRC, family reunification is the most common category chosen, although the relative size of family reunification and other categories varies across countries. Reports of migration for work are low (ranging from 4 to 16%), but this likely reflects that these are only people who are applying for legal residence. It is possible that high percentages of respondents who are missing on this question or reported "other" as an answer are economic migrants as well.

Figure 3 Panels B-D present information on how migrants differ from women in origin countries on key pre-migration characteristics (see Appendix Table 2 for corresponding tables). Figure 3 Panel B shows that across the board there is evidence of positive selection on education whereby migrants have greater representation in categories with higher educational attainment and lower representation in categories with low educational attainment compared to women who remain in the country of origin. On the other hand, Figure 3 Panel C shows limited differences

between migrants and women in origin countries on sibling sizes and in some countries—such as the DRC and Congo Brazzaville—Figure 3 Panel D shows migrants and women in origin countries also resemble each other on religion. In other countries—such as Senegal, Cameroon, and the Ivory Coast—Christians are overrepresented among migrant populations. Such distinctions could be important for adaptation processes given documented discrimination against Muslims in France (Alba and Foner 2015).

Taken together these descriptive findings support the idea that women who select into migration are different than women in origin countries on observed background characteristics prior to migration. Nonetheless, migration is an important social process that leads to profound changes in women's lives. Appendix Figure 2, Panel A provides additional contextual information about the experiences of the migrants in our sample in France. Although only about a third of respondents in our sample are French citizens and only about a third have partners who are French citizens, the majority of respondents (63%) report that they feel French and about 77% of respondents report they feel at home in France, which could be aided by the fact that almost all spoke at least some French upon arrival. Most women also report that they still identify with their origin countries, which could reflect women's abilities to inhabit multiple identities (i.e. both French and native country) simultaneously. At the same time, about 42% of respondents reported that they have experienced discrimination in the last five years, which may impact women's abilities to incorporate into French society.

Multivariate Entropy-Weight Analysis of the Association Between Migration and Fertility, Comparing Migrants to Women in Origin Countries

In the proceeding section we showed how migrants differ from women in origin countries on observed background characteristics. In the next analytic component, we explore whether the negative association between migration and children ever born when comparing migrants to women in origin countries changes upon controlling for selection into migration on these observed characteristics. In Table 2, the "a" column presents age-adjusted estimates of associations between migration and children ever born at survey among women who migrated compared to women who did not migrate[8]; the "b" column presents age-adjusted estimates of associations between migration and children ever born at survey using entropy balancing to weight non-migrant women's education, religion, birth order, and sibling size to resemble those of migrant women, thus helping to account for selection on migration on observed characteristics.

In all of the countries, adjusting for these background characteristics reduces the magnitude of the estimated effect of migration. However, in every country migrants have statistically fewer children ever born than women in origin countries—ranging from about one fewer child in the DRC to 2.43 fewer children in Cameroon—net of observed background characteristics. These effects, even after adjustment with additional controls, are quite substantial in terms of the percentage difference in total fertility. Although we cannot rule out the possibility that unobserved selectivity into migration might change these estimates, the overall high r-squared in the analysis presented in Table 2 (ranging from 0.42 to 0.87), does suggest that a fairly high proportion of the variance in children ever born is explained by variables in the model.

[8] These differ marginally from estimates in Figure 1 due to differences in the sample size due to missing variables (this is shown in Table 1 Panels B and C).

Findings from Table 2 are further supported in Appendix Table 3, Panel A where we show that migrants have significantly fewer children ever born compared to women in origin countries upon introducing additional controls for childbearing, union formation and work prior to arrival in France, and year of arrival in France (assuming that women in origin countries current characteristics provide a valid counterfactual). Appendix Table 3, Panel B shows that results are similarly robust to limiting the sample of women in origin countries to those living in urban areas, which we do in case migrants are more likely to be from urban areas where TFRs are lower than national averages. To assess the possibility that some women in origin countries could be return migrants or internal migrants we conduct a sensitivity analysis, in Appendix Table 3, Panel C where we limit the DHS sample to women who have always lived in the same residence, which means we are confident they have never migrated; results are robust to this specification.[9]

In Table 3 we replicate the multivariate entropy weight analysis with ideal family size as the outcome. We find differences in ideal family size between migrants and women in origin countries are reduced somewhat by controlling for background factors, but there is still a sizeable negative association between migration and ideal family net of observed characteristics (the coefficient ranges from 1.34 in the Ivory Coast to 1.99 in Congo Brazaville). This supports the idea that lower levels of children ever born among migrants reflect preferences for fewer children as opposed to just migration-related disruption in family formation processes.

Taken together, the findings from this section provide some support for the selection hypothesis given that selection into migration on observed background characteristics explains

[9] Although return migration from Europe to Africa is common(González-Ferrer et al. 2014; OECD 2008; Schoumaker, Bruno and Alioune Diagne 2010), return migrants likely make up relatively small proportions of the total populations in origin countries.

some, but not all, of the association between migration and fertility. Nonetheless, the sizeable negative associations between migration and both children ever born and ideal family sizes net of observed characteristics also support the adaptation perspective.

Supplementary Multivariate Analyses Stratified by Childbearing Status Prior to Arrival in France

Appendix Figure 2 Panel B provides supplementary information about the ages of migrant women's arrival to France and initiation into childbearing and union formation to provide insight into sequencing of these events. Among the 40% of migrants in the sample who did initiate childbearing prior to arrival in France, there is a lag between the average age of first birth (age 22) and age of arrival in France (30). Among the 60% of migrants in our sample who did not initiate childbearing prior to arrival in France, the average age at arrival in France (age 23) is closely followed by union formation (age 24) and childbearing (age 25). On one hand, the fact that women who were childless upon arrival initiated childbearing at older ages than women who had children prior to arrival suggests some degree of disruption. On the other hand, the fact that women who are childless upon arrival fairly quickly transition into unions and childbearing upon arriving in France indicates that any disruption may be temporary.

Next, we conduct a cox proportional hazards analysis of timing to first birth separately for women who had children prior to arrival in France and women who did not (the comparison group for both cases are women in origin countries). If selection were driving results, we might expect that women who had children prior to arrival in France would have had different fertility behavior from their counterparts in origin countries (i.e. later transitions into first births even before migration). Instead, we find that migrants who had children before arrival in France do

not have significantly different transitions into first birth than women in origin countries (Appendix Table 4, Panel A). On the other hand, migrants who were childless upon arrival to France do have significantly later transitions into first births than women in origin countries (Appendix Table 4, Panel A), which could reflect disruption or adaptation. The same pattern holds for union formation (Appendix Table 4, Panel B).

Although Appendix Table 4, Panel A shows that women who initiated childbearing prior to arrival in France did not have significantly different transitions into childbearing than women in origin countries, multivariate analyses with entropy weights indicate that these women do have, on average, one fewer child ever born than women in origin countries net of observed characteristics ($p<0.001$) (Appendix Table 4, Panel C). The same pattern holds for women who initiate childbearing after migrating to France (Appendix Table 4, Panel D) and for women at the end of their reproductive careers (i.e. over the ages of 40 and 45). Taken together these results suggest that women who initiate childbearing prior to arrival in France have similar first birth transitions to women in origin countries, but do not continue to have children at the same rate, thus resulting in lower number of children ever born. While some of this might be due to disruption in the post-migration period, the literature suggests that disruption is often temporary (Choi 2014; Lübke 2014), in which case the lower children ever born among women at the end of their reproductive careers might reflect adaptation processes.

Supplementary Multivariate Analyses Stratified by Reason for Migration

As an additional supplement, we disaggregate the sample by refugee status because migration among women who claim political asylum may have been forced or involved limited volition (Fussell 2012), which means that issues around selection into migration may be different

for this population as compared to women who migrate for family or economic reasons. In Appendix Table 5 Panel A we find political asylum seekers have 1.25 lower children ever born than women in origin countries net of observed characteristics ($p<0.001$) (results are similar for the sample of non-political asylum speakers which are also presented). When interpreting these results it is important to recognize that asylum seekers who make it to France might represent more privileged populations among those displaced from origin contexts, which would be consistent with Appendix Table 2 (which highlights selection in migration).

Discussion

Considerable literature suggests there is limited evidence of fertility adaptation in the first generation among migrants from high fertility contexts who settle in destinations characterized by lower fertility. Instead, this scholarship suggests that socialization in fertility and family norms prior to migration plays a strong role in explaining migrant fertility patterns. Yet, most studies that have explored this issue have compared the reproductive outcomes of migrant women to those of non-migrant women in destination contexts. Building on scholarship that emphasizes the importance of taking a multi-sited perspective when exploring migrant fertility (Choi 2014; Frank and Heuveline 2005; Toulemon 2004), we combined nationally representative micro-data to compare migrant fertility women from six high fertility African countries to women in *both* origin countries and France (the destination country).

Our descriptive exercise where we compared migrants to women in both origin and destination contexts revealed two important takeaways. First, migrant women from all six African countries in our study exhibited dramatically lower children ever born, lower ideal family sizes, and slower transitions into first births and first unions than did non-migrant women

who remained in the countries of origin. Second, these patterns contrasted sharply with estimated differences between migrant women and French country-natives, showing how estimates based on this comparison alone might present an incomplete or misleading picture of migrant fertility adaptation. Indeed, there was much more evidence of migrant fertility adaptation in the first generation when the reference group was women in origin—rather than destination—countries. This comparative exercise illuminated how point of reference, or comparison group, is critical to how scholars conceptualize the relationship between migration and fertility.

Our descriptive findings could have reflected adaptation processes, although they also could have reflected differential selection into migration or disruption of family formation processes related to migration. To explore these processes, we showed that migrants in our sample were positively selected on education and on some—though not all—other background characteristics. Next we conducted multivariate analyses where women in origin countries were weighted to resemble migrants on observed characteristics, showing that selection into migration on observed characteristics explained some, but not all, of the association between migration and fertility outcomes. The fact that migrants in our sample had on average one fewer child *and* reported desiring 1.5 fewer children than women in origin countries (net of observed characteristics), indicated that lower childbearing among migrants compared to women in origin countries reflected (at least partially) preferences for fewer children that were distinct from women in origin countries.

While we saw similar overall patterns in descriptive analyses and multivariate models for migrants from all six countries, there were some interesting country-level differences in the magnitude of associations. In descriptive analyses, migrants from Cameroon had children ever

born that more closely resembled French women compared to other groups whereas migrants from Mali had considerably higher children ever born that French women compared to other groups. Likewise, in multivariate models migrants that compared migrants to women at origin migrants from Cameroon also had about 2.4 fewer children ever born than women in Cameroon (net of controls), which was higher than the average for the pooled sample (which was about one). These between country differences could be related to origin country factors such as GDP and TFR (i.e. Cameroon has one of the highest GDPs in our sample and Mali has one of the lowest), but they could also be related to differences in migrant experiences, citizenship status, and migrant communities in France. Better understanding differences in fertility trajectories of migrants from sending regions with similar fertility levels would be a fruitful area for further analysis.

Although our study provided an innovative way to assess migration and fertility at the micro-level, it had a number of limitations. First, although migration is often circular, our sample was limited to cross-sectional data that did not permit us to observe whether respondents in origin countries would eventually migrate, or if migrants in France would eventually return home. While in a sensitivity analysis we were able to ensure women in origin countries were not return/internal migrants, the future migration patterns of women in our sample remained unknown, and it would be substantively of interest to explore fertility behaviors and preferences of return migrants. Related to this, many of the women in our sample were still in their reproductive years and could have continued with childbearing following the survey. Nonetheless, findings were robust to limiting to women over the age of 45 and looking at transitions into first births and first unions.

Another limitation of our study is that we controlled for selection on observed characteristics only, and relatedly, those characteristics were limited to variables that appeared in both the TeO and the DHS. As a result, we couldn't wholly account for unobserved characteristics that might affect both migration and fertility. A further limitation is that the TeO did not provide detailed information on child mortality. Although we showed results were robust to using living children rather than children ever born, the lack of information about the timing and location of child mortality meant we were unable to explore the extent to which experiences with child mortality—which are much less common in France than sub-Saharan Africa—contributed to fertility processes described in the paper. Nonetheless, given the selection patterns observe, with more highly educated women more likely to migrate, child mortality might play less of a role in explaining fertility than if less educated women migrated equally. A final limitation was that our analyses could not fully demarcate the different processes of selection, adaptation, and disruption, although, as indicated by our results, it was likely that multiple processes occurred simultaneously.

Our perspective is important for scholars and policymakers alike. Although other scholars have recognized the importance of taking a multi-sited perspective, the emphasis in research and policy has overwhelmingly focused on the migrant-destination comparison. This one-sided perspective can have real world policy consequences, particularly in contexts where migration is a sensitive political issue. For example, in the past, the rate of pregnancy of migrants compared to native-born French has been proposed as a measure that could be used to assess the extent of migrant integration into French society (Favell 1998). Our study indicated the problems inherent in using a one-sided comparison of migrants to women in destination contexts in assessing the extent of integration or adaptation that has occurred. Further, our

findings highlighted the need to continue expanding current paradigms used to describe the relationship between migration and fertility and to develop new data sources that enable scholars to more comprehensively understand how migration shapes women's reproductive trajectories relative to both origin country non-migrants and destination country natives.

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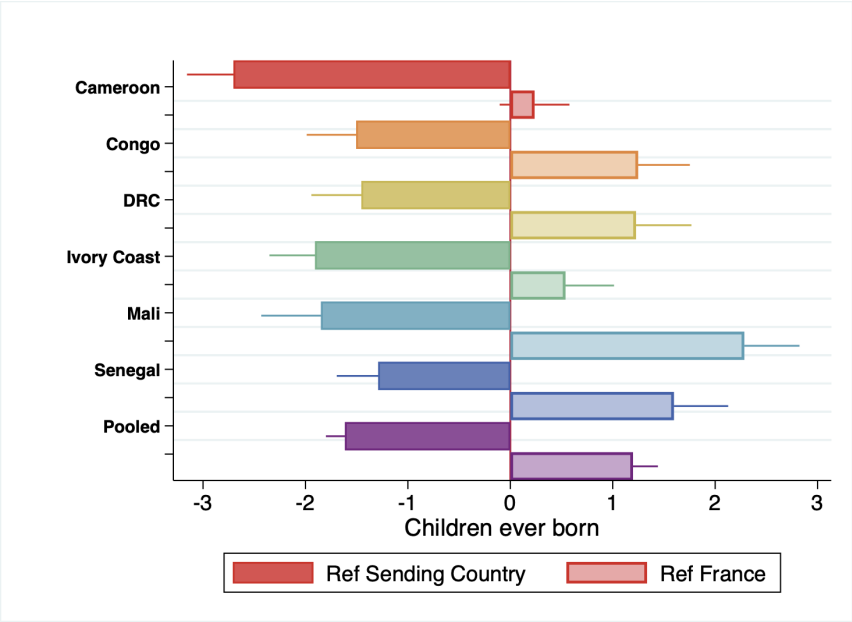
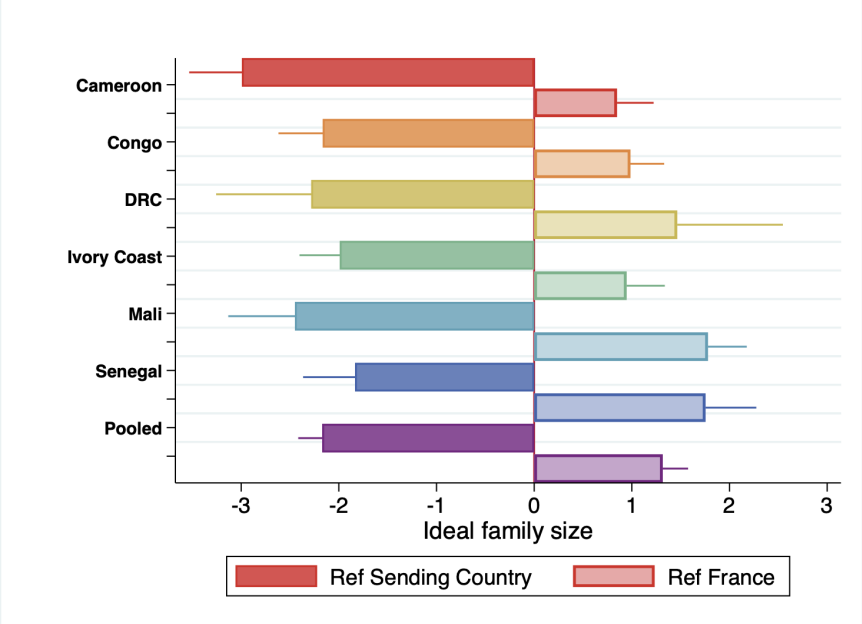
Figure 1. Age-adjusted OLS regression estimates of the association between migration and children ever born (Panel A) and ideal family size (Panel B). Comparison of first-generation migrants to non-migrant French women (right) and first-generation migrants to non-migrant women in origin countries (left). All estimates are weighted using survey weights provided by DHS and TEO and include age fixed effects.

Panel A.



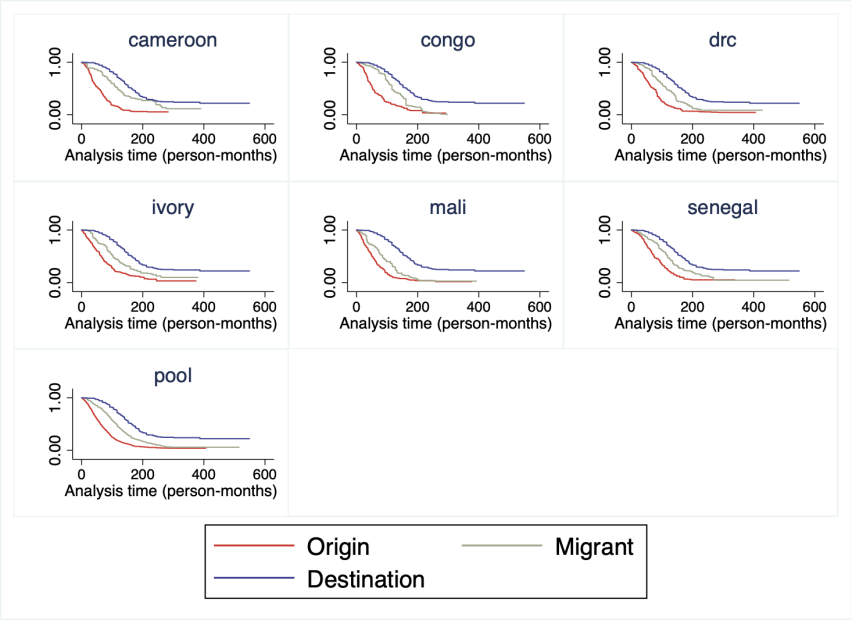
Panel B.



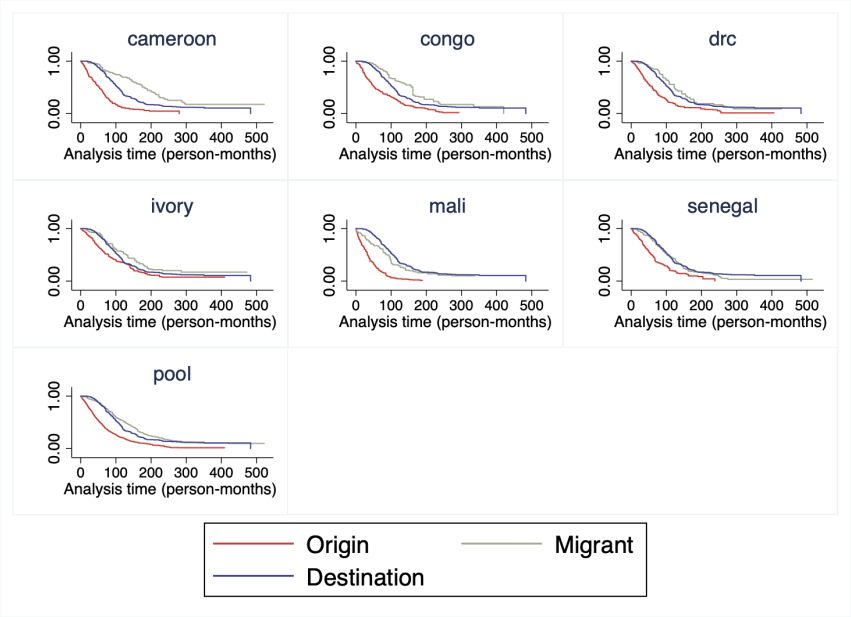
Source: DHS and TEO

Figure 2. Kaplan Meier Survival Curves predicting transitions into first births (Panel A) and first unions (Panel B). Comparison of first-generation migrants to French women and first-generation migrants to women in origin countries. All estimates are weighted using survey weights provided by DHS and TEO.

Panel A. Transitions into first births



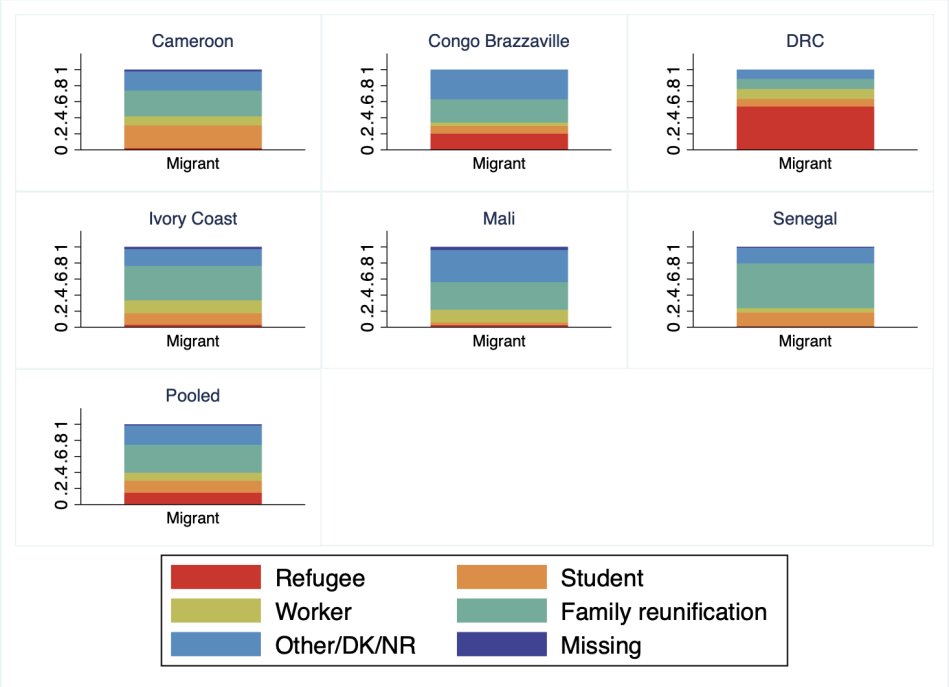
Panel B. Transitions into unions



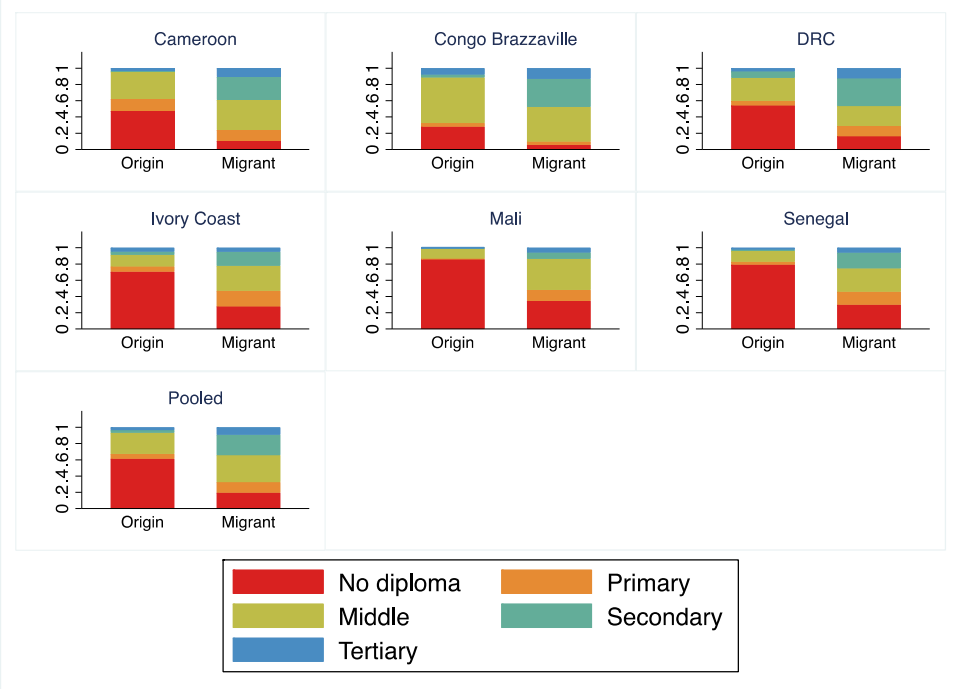
Source: DHS and TEO

Figure 3. Descriptive information on why migrants select into migration and descriptive (Panel A) and comparison of how migrants differ from women countries of origin on education, sibling size, and religion (Panel B). All estimates are weighted using survey weights provided by DHS and TEO.

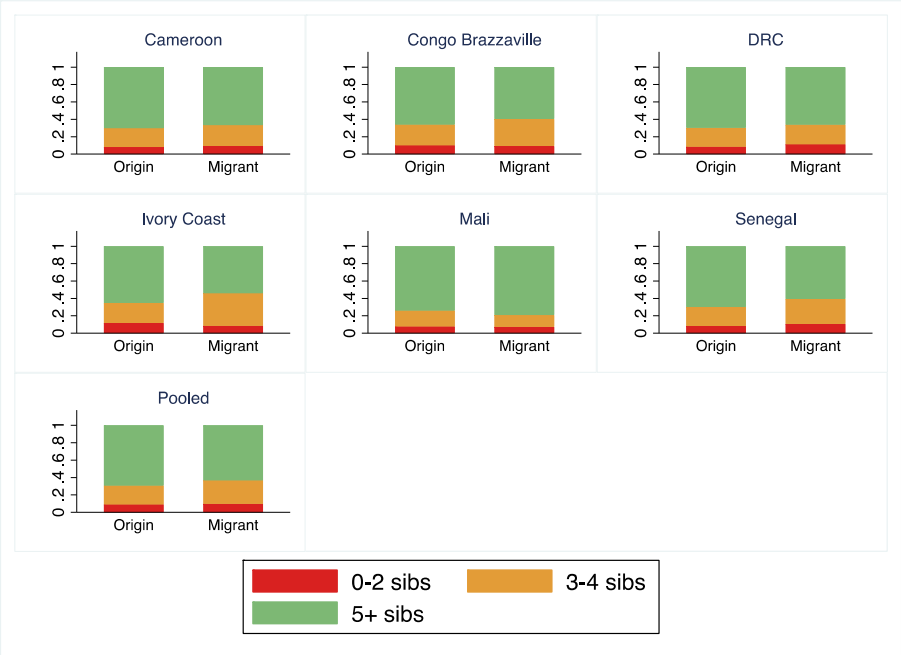
Panel A. Reasons for migration



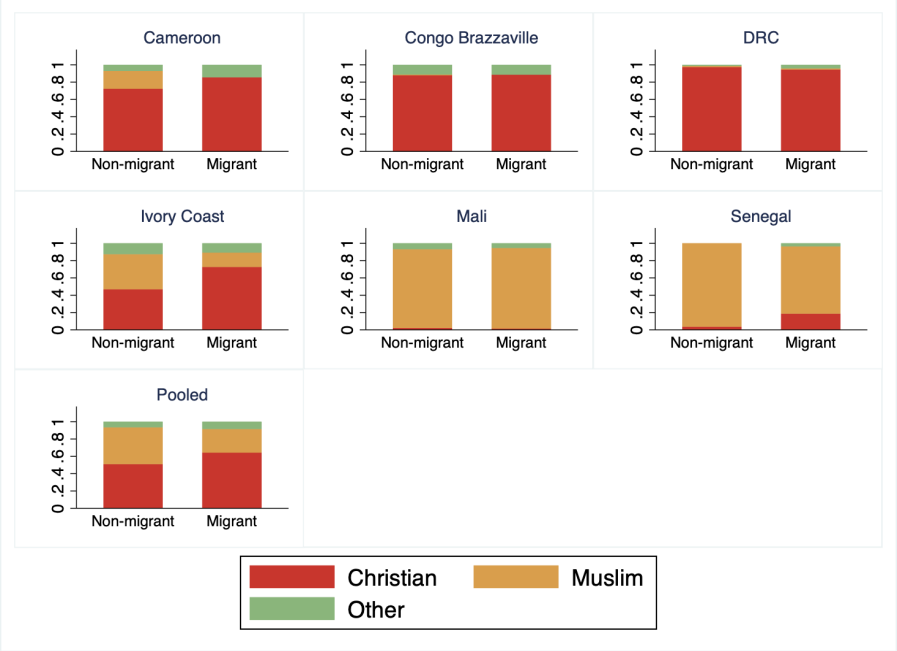
Panel B. Selection on education



Panel C. Selection on sibling size



Panel D. Selection on Religion



Source: TEO and DHS

Table 1. Overview of analytical sample. Panel A presents raw samples sizes. Panel B presents the seeded random sample used in descriptive analyses. Panel C presents the seeded random sample used in multivariate analyses with listwise deletion to ensure standard sample sizes across multivariate models.

Panel A. Raw Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Cameroon	Congo	DRC	Ivory Coast	Mali	Senegal	Pooled
1st gen migrants in France	95	70	88	87	90	157	502
Non migrants in sending countries	26,082	17,870	9,995	10,060	14,583	30,290	108,880
Non-Migrant French	3,781	3,781	3,781	3,781	3,781	3,781	3,781

Panel B. Seeded Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Cameroon	Congo	DRC	Ivory Coast	Mali	Senegal	Pooled
1st gen migrants in France	95	70	88	87	90	157	502
Non migrants in sending countries	350	350	350	350	350	350	2100
Non-Migrant French	350	350	350	350	350	350	350

Panel C. Multivariate Sample*	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Cameroon	Congo	DRC	Ivory Coast	Mali	Senegal	Pooled
1st gen migrants in France	73	49	65	54	39	104	386
Non migrants in sending countries	342	340	336	341	338	339	2,036
Non-Migrant French	217	217	217	217	217	217	217

*Samples in models with ideal family size differ due to missing values on ideal family size variable.

Table 2. Multivariate OLS regression estimates of the association between migration and children ever born (CEB) comparing migrants to women in origin countries. Baseline models (model "a") includes only age fixed effects and uses sampling weights provided by DHS and TEO. Entropy weight (EW) models (model "b") includes age fixed effects and uses entropy weights to make women in origin countries resemble migrants on education, sibling size, birth order, and religion.

Panel A. CEB	**Cameroon**		**Congo**		**DRC**		**Ivory Coast**	
	(n=415)		*(n=389)*		*(n=401)*		*(n=395)*	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Migrant (ref= origin)	-2.71***	-2.43***	-1.46***	-1.06***	-1.48***	-0.95**	-1.88***	-1.27***
	(0.24)	(0.37)	(0.25)	(0.20)	(0.29)	(0.32)	(0.24)	(0.25)
Age FE	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Entropy weights	NO	YES	NO	YES	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	NO	NO	NO	NO
R-Squared	0.48	0.63	0.87	0.71	0.63	0.60	0.56	0.56

Panel B. CEB	**Mali**		**Senegal**		**Pooled**	
	(n=377)		*(n=443)*		*(n=2,420)*	
	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)
Migrant (ref= origin)	-2.36***	-1.16*	-1.65***	-1.18***	-1.69***	-1.17***
	(0.31)	(0.46)	(0.23)	(0.26)	(0.10)	(0.12)
Age FE	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES
Entropy weights	NO	YES	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
R-Squared	0.65	0.63	0.51	0.68	0.42	0.49

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 3. Multivariate OLS regression estimates of the association between migration and ideal family size (IFS) comparing migrants to women in origin countries. Baseline models (model "a") includes only age fixed effects and uses sampling weights provided by DHS and TEO. Entropy weight (EW) models (model "b") includes age fixed effects and uses entropy weights to make women in origin countries resemble migrants on education, sibling size, birth order, and religion.

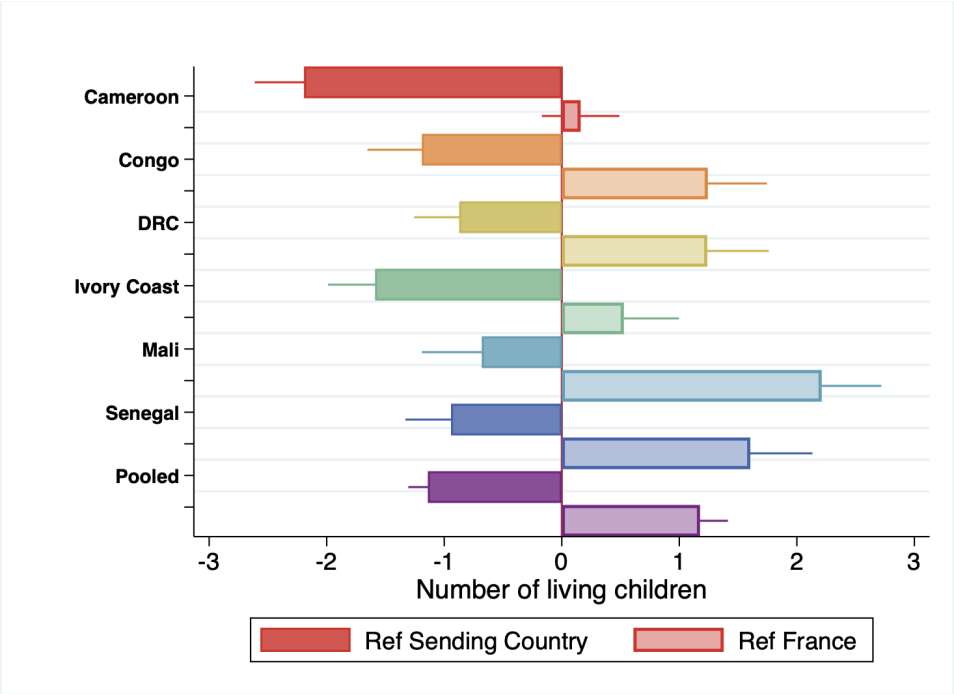
Panel A. IFS	**Cameroon**		**Congo**		**DRC**		**Ivory Coast**	
	(n=373)		*(n=355)*		*(n=373)*		*(n=356)*	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Migrant (ref= origin)	-2.99***	-1.65***	-2.11***	-1.99***	-1.73**	-1.92***	-2.00***	-1.34***
	(0.28)	(0.26)	(0.24)	(0.28)	(0.65)	(0.47)	(0.21)	(0.33)
Age FE	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Entropy weights	NO	YES	NO	YES	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	NO	NO	NO	NO
R-Squared	0.40	0.49	0.75	0.47	0.47	0.41	0.30	0.40

Panel B. IFS	**Mali**		**Senegal**		**Pooled**	
	(n=304)		*(n=354)*		*(n=2,115)*	
	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)
Migrant (ref= origin)	-2.90***	-1.68***	-2.16***	-1.79***	-2.11***	-1.51***
	(0.32)	(0.45)	(0.28)	(0.30)	(0.15)	(0.20)
Age FE	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES
Entropy weights	NO	YES	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
R-Squared	0.58	0.47	0.35	0.49	0.17	0.22

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

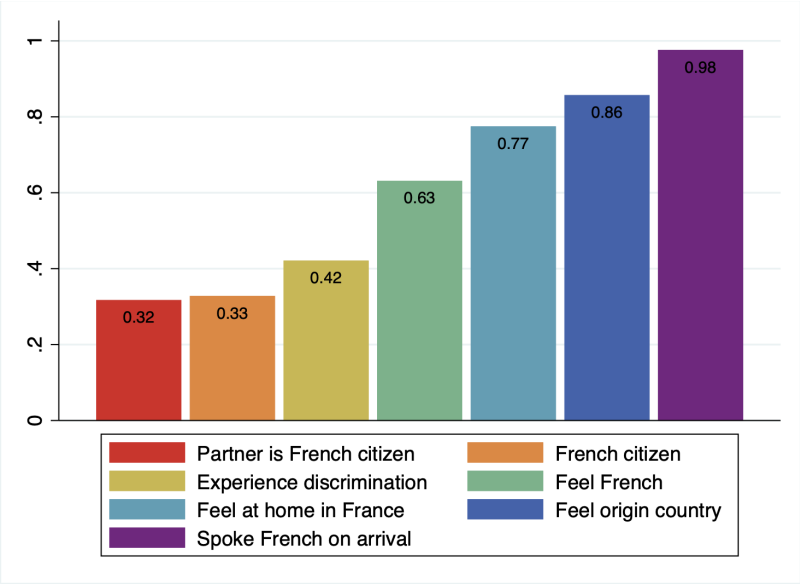
Appendix Figure 1. Age-adjusted OLS regressions of the association between migration and living children. Comparison of first-generation migrants to non-migrant French women (right) and first-generation migrants to non-migrant women in origin countries (left). All estimates are weighted using survey weights provided by DHS and TEO and include age fixed effects.



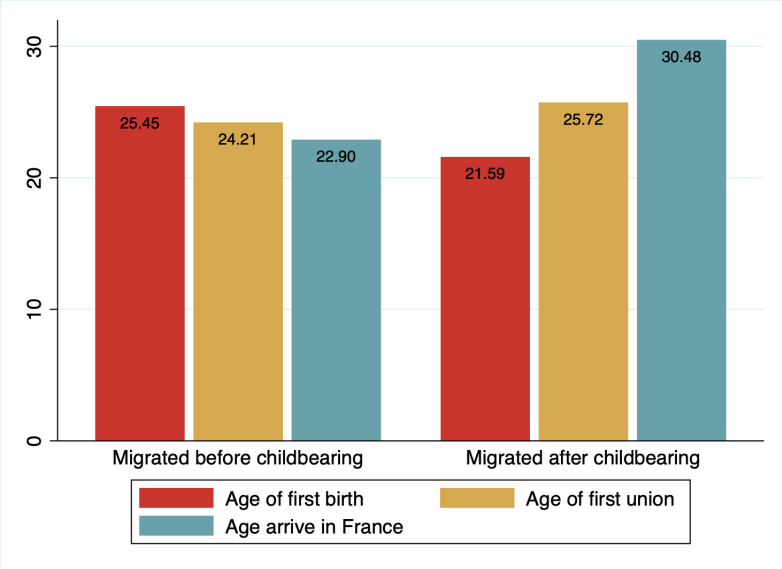
Source: TEO and DHS

Appendix Figure 2. Descriptive information about migrant women's experience in France (Panel A) and descriptive information about migrant women's ages at first birth, union, and arrival in France (B). All estimates are weighted using survey weights provided by TEO.

Panel A. Migrant women's experience in France



Panel B. Migrant women's ages at first birth, union, and arrival in France



Source: TEO

Appendix Table 1. Information about data source, year region, Total Fertility Rate (TFR), GDP per capita

Region	Country	Source	Years	TFR	GDP per capita, PPP
Europe	France	TEO	2008/09	2.01	35,095
Central Af.	Congo (Brazzaville)	DHS	2005, 2011/12	4.75	4,845
Central Af.	Congo (DRC)	DHS	2007	6.65	586
West Af.	Cameroon	DHS	2004, 2011	5.2	2,666
West Af.	Ivory Coast	DHS	2011/12	5.03	2,495
West Af.	Mali	DHS	2006	6.76	1,639
West Af.	Senegal	DHS	2005, 2010/11	5.11	2,459

Data on TFR from the World Bank (for countries with more than one survey year the TFR and GDP was the average of both years). GDP reflects current international dollars.

Appendix Table 2. Information about selection into migration. Panel A presents descriptive overview of why women reported migrating on their application for a residence permit. Panel B presents descriptive overview of background characteristics of migrants to France. Panel C presents information on background characteristics of women in origin countries. Estimates use sampling weights provided by DHS and TEO.

Panel A. Reasons for migration	(1) Cameroon	(2) Congo	(3) DRC	(4) Ivory Coast	(5) Mali	(6) Senegal	(7) Pooled
Refugee	0.02	0.20	0.54	0.03	0.03	0.01	0.15
Student	0.28	0.09	0.09	0.14	0.04	0.17	0.15
Worker	0.11	0.04	0.13	0.16	0.16	0.05	0.10
Family Reunification	0.32	0.29	0.12	0.43	0.34	0.56	0.35
Other/DK/Refuse	0.24	0.37	0.12	0.21	0.40	0.19	0.24
Missing	0.02	0.00	0.00	0.03	0.04	0.01	0.01
N	73	49	65	54	39	104	384

Panel B. Background characteristics of migrants	(1) Cameroon	(2) Congo	(3) DRC	(4) Ivory Coast	(5) Mali	(6) Senegal	(7) Pooled
First born	0.23	0.31	0.23	0.24	0.24	0.21	0.24
0-2 Siblings	0.10	0.09	0.11	0.09	0.04	0.11	0.10
3-4 Siblings	0.23	0.31	0.23	0.38	0.14	0.28	0.27
5+ Siblings	0.67	0.60	0.66	0.54	0.82	0.61	0.63
No diploma	0.11	0.06	0.16	0.28	0.32	0.30	0.19
Primary school diploma	0.14	0.04	0.13	0.19	0.14	0.16	0.13
Some secondary school	0.37	0.43	0.25	0.31	0.40	0.29	0.33
Secondary diploma	0.29	0.35	0.34	0.17	0.08	0.19	0.25
Higher education	0.10	0.13	0.12	0.05	0.06	0.06	0.09
Christian	0.86	0.89	0.95	0.73	0.01	0.19	0.65
Muslim	0.00	0.00	0.01	0.16	0.97	0.78	0.27
Other religion	0.14	0.11	0.04	0.11	0.02	0.04	0.08
Year of birth	1969	1971	1967	1973	1973	1971	1970
N	73	49	65	54	39	104	384

Panel C. Background characteristics of women in origin countries	(1) Cameroon	(2) Congo	(3) DRC	(4) Ivory Coast	(5) Mali	(6) Senegal	(7) Pooled
First born	0.20	0.21	0.18	0.23	0.17	0.21	0.20
0-2 Siblings	0.08	0.10	0.09	0.12	0.08	0.08	0.09
3-4 Siblings	0.22	0.24	0.22	0.23	0.18	0.22	0.22
5+ Siblings	0.70	0.66	0.70	0.65	0.74	0.70	0.69
No diploma	0.48	0.28	0.54	0.71	0.86	0.79	0.61

Primary school diploma	0.15	0.04	0.06	0.06	0.01	0.04	0.06
Some secondary school	0.33	0.56	0.28	0.14	0.13	0.13	0.26
Secondary diploma	0.01	0.04	0.08	0.04	0.00	0.02	0.03
Higher education	0.03	0.08	0.04	0.05	0.00	0.02	0.03
Christian	0.72	0.89	0.98	0.47	0.02	0.04	0.51
Muslim	0.21	0.00	0.01	0.41	0.91	0.96	0.43
Other religion	0.07	0.11	0.01	0.12	0.07	0.00	0.06
Year of birth	1980	1981	1978	1983	1979	1979	1980
N	342	340	336	341	338	339	2036

Limited to women with full information on education, religion, siblings, and children ever born (e.g. same sample as used in entropy weights analysis).

Appendix Table 3. Multivariate OLS regression estimates of the association between migration and children ever born /ideal family size comparing migrants to non-migrants in origin countries, including age fixed effects and entropy weights to make non-migrants resemble migrants on education, sibling size, birth order, and religion. Panel A adds additional covariate controls. Panel B limits the sample of women in origin countries to only those living in urban areas. Panel C limits the sample of women in origin countries to those who have always lived in the same residence.

Panel A. Additional controls	(1)	(2)
	Children ever born	Ideal family size
Migrant (Ref= origin)	-0.55***	-1.33***
	(0.16)	(0.24)
Age FE	YES	YES
Controls	YES	YES
Entropy weights	YES	YES
Country FE	YES	YES
Observations	2,375	2,078
R-squared	0.60	0.23

Panel B. Women in origin limited to urban areas	(1)	(2)
	Children ever born	Ideal family size
Migrant (Ref= origin)	-0.80***	-1.19***
	(0.17)	(0.21)
Age FE	YES	YES
Controls	YES	YES
Entropy weights	YES	YES
Country FE	YES	YES
Observations	1,300	1,173
R-squared	0.50	0.23

Panel C. Women in origin limited to those always in same residence	(1)	(2)
	Children ever born	Ideal family size
Migrant (Ref= origin)	-1.09***	-1.60***
	(0.19)	(0.26)
Age FE	YES	YES
Controls	YES	YES
Entropy weights	YES	YES
Country FE	YES	YES

Observations	981	859
R-squared	0.53	0.26

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05
Additional controls in Panel A include childbearing, work, and union prior to arrival in France and year of arrival in France.

Appendix Table 4. Analysis of fertility outcomes stratified by childbearing and union status before and after arrival in France. All models include controls for education, sibling size, birth order, and religion.

Panel A. Cox proportional hazards model (results presented as hazard ratios, age in person-months)	(1) *First birth before arrival in France* Age at first birth	(2) *First birth after arrival in France* Age at first birth
Migrants (Ref= origin)	1.34	0.34***
	(0.29)	(0.06)
Birth year	YES	YES
Controls	YES	YES
Entropy weights	NO	NO
Country FE	YES	YES
Observations	2,037	2,123

Panel B. Cox proportional hazards model (results presented as hazard ratios, age in person-months)	(1) *First union before arrival in France* Age at first union	(2) *First union after arrival in France* Age at first union
Migrants (Ref= origin)	0.78	0.20***
	(0.13)	(0.03)
Birth year	YES	YES
Controls	YES	YES
Entropy weights	NO	NO
Country FE	YES	YES
Observations	1,831	1,944

Panel C. OLS regression with entropy weights, sample of women who had a first birth before arriving in France.	(1) CEB All ages	(2) CEB <40 years	(3) CEB <45 years
Migrants (Ref= origin)	-1.01***	-1.27***	-1.13*
	(0.17)	(0.33)	(0.55)

Age FE	YES	YES	YES
Controls	YES	YES	YES
Entropy weights	YES	YES	YES
Country FE	YES	YES	YES
Observations	2,188	391	191
R-squared	0.54	0.32	0.43

Panel D. OLS regression with entropy weights, sample of women who had a first birth after arriving in France.	(1)	(2)	(3)
	CEB	CEB	CEB
	All ages	<40 years	<45 years
Migrants (Ref= origin)	-1.28***	-2.17***	-1.64**
	(0.14)	(0.33)	(0.61)
Age FE	YES	YES	YES
Controls	YES	YES	YES
Entropy weights	YES	YES	YES
Country FE	YES	YES	YES
Observations	2,270	383	178
R-squared	0.50	0.36	0.54

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Appendix Table 5. Multivariate OLS regression of the association between migration and children ever born (CEB) comparing migrants to non-migrants in origin countries disaggregating the sample by reason for migration; models include age fixed effects and uses entropy weights to make non-migrants resemble migrants on education, sibling size, birth order, and religion.

	Political asylum seekers		*Non-political asylum seekers*	
	(1a)	(1b)	(2a)	(2b)
	Children ever born	Ideal family size	Children ever born	Ideal family size
Migrant (Ref= origin)	-1.25***	-1.50*	-1.14***	-1.59***
	(0.20)	(0.66)	(0.13)	(0.13)
Age FE	YES	YES	YES	YES
Controls	YES	YES	YES	YES
Entropy weights	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Observations	2,087	1,810	2,371	2,068
R-squared	0.55	0.35	0.51	0.31

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05