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RESEARCH ARTICLE

Comparing the fertility of Ghanaian migrants in Europe with nonmigrants in Ghana

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Abstract

The fertility behaviour of migrants is often studied by examining migrants and native nonmigrants in the country of destination. To understand the mechanisms for migrant fertility, it is important to know what distinguishes them from the population they originate from. The Ghanaian sample of the "Migrations between Africa and Europe" project allows us to contrast the fertility of those who never emigrated from Ghana and Ghanaian migrants who are residing in the UK or the Netherlands. First, we estimate discrete-time hazard models of first birth to evaluate whether first birth timing is influenced by migration. Second, we apply Poisson regression techniques to examine differentials in completed fertility. We find that Ghanaian migrants postpone first childbirth compared with nonmigrants. Differences are largest at ages 20 to 24 for women and 20 to 29 for men. Ghana experiences a typical *brain drain*, which means that especially the highly skilled emigrate. In our sample, this is particularly true for women. Education seems to be an important determinant of the postponement of first childbirth in Ghana, although we cannot clearly attribute migrants' later first births to their higher level of education. However, our findings on completed fertility reveal that migrants have fewer children than nonmigrants and this difference diminishes considerably if we take into account their level of education. Apparently, migrants do not fully catch up after postponing first childbirth and end up with a lower number of children by the age of 40.

KEYWORDS
Ghana, MAFE, migrant fertility, migration, selection

1 | INTRODUCTION

Migration and the demographic transition, and thus fertility, are highly intermingled phenomena at the macro level (Fargues, 2011). In the individual life course, migration has a strong impact on the occurrence and timing of childbirth. Most of the previous research on migrant fertility focuses on the comparison of the fertility behaviour of migrants and native nonmigrants in the country of destination to study assimilation processes towards the majority population (e.g., Andersson, 2004; Carter, 2000; Milewski, 2007). The opposite perspective, namely, comparing migrants and their nonmigrant counterparts in their country of origin, has been chosen less often. That is remarkable because the nonmigrants in the country of origin make up the population from which the migrants originate and are thus the first choice comparison group.

The main reason for this research gap is the way most social surveys are conducted. Survey data on migrant populations are usually collected in destination countries, and therefore, no information is available on their nonmigrant counterparts in the country of origin. The few existing studies on migrant fertility that consider migrants as well as nonmigrants in the country of origin focus exclusively on the United States (US) context (Choi, 2014; Frank & Heuveline, 2005; Lindstrom & Giorguli Saucedo, 2007; Singley & Landale, 1998). Mexican immigrants in the US appear to have lower annual birth probabilities and lower completed fertility compared with nonmigrants remaining in Mexico. However, fertility rates were found to be high in the period immediately after arrival (Frank & Heuveline, 2005; Lindstrom & Giorguli Saucedo, 2007; Perez-Patron, 2012).

This paper focuses on international emigration from Ghana to Europe. It is particularly suitable to investigate selectivity of migrants in terms of education because international emigration rates from Ghana are exceptionally high among the elites. To disentangle the impact of educational selectivity on migrant fertility, we use data provided by the "Migrations between Africa and Europe" (MAFE) project. The transnational setting of the data allows us to compare the fertility of Ghanaian migrants who currently reside in the Netherlands and the United Kingdom (UK) with that of nonmigrants in Ghana.

In a first step, discrete-time regression models allow us to examine first childbirth from a life course perspective. Second, we apply Poisson regression techniques to evaluate whether differences in first birth between migrants and nonmigrants result in differences in the number of children ever born by age 40 in both groups. Both analyses include level of education as our main covariate.

2 | THE GHANAIAN FERTILITY AND MIGRATION CONTEXT

Within Africa, Ghana holds a forerunner position regarding demographic change (Reed, Andrzejewski, & White, 2010). It has experienced a sharp fertility decline: The Total Fertility Rate (TFR) has been rapidly decreasing during the last decades from about 6.4 in 1988 to 4.0 in 2008 (Ghana Statistical Service, Ghana Health Service, & ICF Macro, 2009). There is a clear educational gradient in fertility. Women with no formal education have on average six children, whereas those with postsecondary education have on average 2.1 children (Ghana Statistical Service et al., 2009).

Almost all women are married by age 40, which implies that marriage is universal in (Ghana Chuks, 2002). However, the female median age at first marriage lies with 19.8 more than 6 years below the value for men with 25.9 (Ghana Statistical Service et al., 2009). The prevalence of extramarital childbirth is low (3.9% in 2003) (Garenne, 2008, p. 67). Also, fertility timing seems to be closely linked to marriage. The median age at first birth for Ghanaian women (20.7) is only slightly above the median age at first marriage (Ghana Statistical Service et al. 2009). Historically, women in Ghana are much more independent of their husbands in comparison with women in other Sub-Saharan African countries, such as Senegal (e.g., Reed et al., 2010). This is particularly true of the Akan people, Ghana's most numerous ethnic group, whose heritage system is matrilineal. Accordingly, female employment rates are high in Ghana, 9 out of 10 married women are employed (Ghana Statistical Service et al., 2009).

Out-migration from Ghana, especially to neighbouring countries, has been common since the country gained independence in 1957. In the early 1980s, a period of economic crisis and political instability, a severe drought and mass expulsions of Ghanaians in Nigeria, led to an increase of emigration from Ghana to Europe, North America, and North Africa (Anarfi, Kwankye, Ababio, & Tiemoko, 2003). Ghana suffers from a severe *brain drain*: The lack of opportunities for further education, long working hours, and low wages enhances emigration among the highly skilled. About 47% of those with at least tertiary educational attainment emigrate, causing severe problems in the Ghanaian society and the health sector in particular (Docquier & Marfouk, 2005). Clemens and Pettersson (2008) estimated that about 56% of doctors and 24% of nurses who were trained in Ghana are working abroad.

Female emigration from Ghana increased steadily in the last decades of the 20th century. In 2007, 45% of the Ghanaian immigrants in OECD countries were female (Quartey, 2009). More women than before emigrate independently, often leaving their partner and children behind (Adepoju, 2005; Awumbila, Manuh, Quartey, Tagoe, & Bosiakoh, 2008). Many Ghanaians leave the country to complete higher education, to join their family, or to get married (Twum-Baah, 2005). For both men and women, being unemployed and having tertiary education are the best predictors of emigration, next to having a migrant network (Black, González-Ferrer, Kraus, Obucina, & Quartey, 2013; Van Dalen, Groenewold, & Schoorl, 2005).

Although Ghanaian migration to the UK has a long history due to colonial ties, immigration policy has been tightened in the beginning of the 1990s, and Ghanaians require a visa to immigrate to the UK. The direct recruitment of health workers based on the National Health Service Plan induced immigration of high-skilled work-related migrants to the health sector (Schans, Mazzucato, Schoumaker, & Flahaux, 2013). Another legal channel, which is used by male and female Ghanaian migrants to about the same extent, is spousal settlement (Charsley, Storer-Church, Benson, & Van Hear, 2012). In 2015, about 103,000 Ghanaian migrants in the UK made up the largest Ghanaian immigrant population in Europe (Migration Policy Institute, 2013)[1].

Ghanaian migration to the Netherlands is a more recent phenomenon, which was less dominated by highly educated immigrants and is mainly considered to be migration for economic reasons (Mazzucato, 2008). The average level of education is lower compared with the Dutch, and most Ghanaian immigrants work in jobs that require low skills, such as manual labour (Jones-Bos, 2005). Many Ghanaians tried to circumvent the Dutch stringent immigration policy, entered the country on a tourist visa, and then overstayed the granted visa duration. In this category, some immigrants overcome this illegal status by arranging so-called contract marriages with Dutch natives (Van Dijk, 2014). Scholars estimate that the undocumented Ghanaian population might amount about the same size as the registered population, summing up to a total of about 40,000 Ghanaians living in the Netherlands in the year 2000 (Bump, 2006; Mazzucato, 2008).

A number of comparative studies on the basis of MAFE data investigated the family arrangements of Ghanaian immigrants in the Netherlands and the UK. It appears that couple reunification in Europe is not very common for Ghanaian immigrants in these countries. After 10 years of couples' separation, three quarters of Ghanaian immigrants' partners still live in Ghana (Beauchemin et al., 2015; Mazzucato et al., 2015). A large share of Ghanaians migrated before having children (63% in the UK and 48% in the Netherlands). More than two thirds of those migrants who already had children before migration left their children behind when migrating to Europe (Caarls, Mazzucato, Schans, Quartey, & Addoquaye Tagoe, 2013).

[1] There are no estimates illustrating the amount of undocumented Ghanaians in the UK, but some studies based on the MAFE survey show that indeed there are very few undocumented Ghanaians in the UK sample and that migrants in the Netherlands are more likely to be undocumented (Mazzucato, Schans, Caarls, & Beauchemin, 2015; Schoumaker, Flahaux, Beauchemin, Mazzucato, & Sakho, 2013).

3 | THEORETICAL AND EMPIRICAL CONSIDERATIONS

Differences in the fertility of migrants and nonmigrants in the country of origin may be explained with the help of selection, disruption, or adaptation arguments.

Scholars largely agree on the fact that migrants are not a random sample of the population at origin but that they instead are *selected* regarding specific characteristics (Borjas, 1987; Lee, 1966; Ribe & Schultz, 1980; Thomas, 1938). In Ghana, the selectivity of migrants seems to be strongly correlated with their level of education. From a microeconomic point of view, high levels of education lead to higher opportunity costs that result in a higher age at first birth for highly educated and career-oriented women (Gustafsson, 2001; Schultz, 1969). Postponed first childbirth is furthermore an important determinant of subsequent fertility, as has been stressed by many authors (e.g., Bumpass, Rindfuss, & Janosik, 1978; Rosenzweig & Schultz, 1985). Because Ghanaian migrants are probably selected on low fertility characteristics such as high levels of education, we expect Ghanaian migrants to postpone first childbirth and have a lower number of children compared with nonmigrants in Ghana even after controlling for important demographic characteristics such as birth cohort, ethnicity, and religion (Hypothesis 1). If migrants are selected on low fertility characteristics, differences between migrants and nonmigrants should be due to their comparatively high education and should thus be insignificant after controlling for level of education (Hypothesis 2).

Migrants may not only differ from nonmigrants because of their characteristics, they have also been shown to *adapt* fertility patterns in the host country as a reaction to a new economic and institutional framework (Hervitz, 1985; Kahn, 1988; Lindstrom & Giorguli Saucedo, 2002; Singley & Landale, 1998; Stephen & Bean, 1992). In the Netherlands (TFR of 1.7) and in the UK (TFR of 1.8), the TFR is substantially lower than in Ghana, where it was 4.2 in 2014 (The World Bank, 2016). Thus, according to adaptation theory, Ghanaian migrants would have a lower completed fertility. If substantial differences in completed fertility between migrants and nonmigrants remain even after taking into account the level of education, this would hint towards an adaptation of fertility after migration to Europe (Hypothesis 3).

To understand the fertility patterns of return migrants selection and adaptation arguments are most relevant as well. Similar to migrants, return migrants are a selected group. The decision to go back could be related to different reasons, such as an expired residence permit, the wish to reunite with their families back home, or never having intended to stay for a long time. These reasons for return could be correlated with higher fertility norms and thus lead to a higher number of children of return migrants as compared with migrants. Return migrants spent some time in Europe, but as they returned, they were likely exposed to the lower fertility setting to a lesser extent than the migrants who stayed in Europe. Therefore, we expect Ghanaian nonmigrants to have the highest number of children by age 40, migrants residing in Europe to show the lowest number of children and return migrants to lie in-between (Hypothesis 4).

According to the *disruption* hypothesis, migration is a stressful event that causes an interruption of fertility in the years shortly after migration (Ford, 1990; Hervitz, 1985; Kulu, 2005; Stephen & Bean, 1992). Several studies have shown that migrants have low fertility rates immediately after immigration and make up for their low fertility later (e.g., Carter, 2000; Roig Vila & Castro Martín, 2007). For Ghanaian migrants, we expect first birth risks to be low in the period immediately after immigration and higher during the following years (Hypothesis 5). Depending on whether they catch up their low fertility immediately after arrival in the years thereafter, this could lead to a lower number of children in later life.

4 | DATA AND METHODS

The data collected for the MAFE project are particularly valuable for migration research because of their transnational set-up.[2] They provide a unique opportunity for migrant fertility research as they include retrospective birth, migration, and employment histories for international Ghanaian migrants and their nonmigrant counterparts in Ghana. A migrant is defined as a person who was born in Ghana but has been living outside the country for at least 1 year after his or her 18th birthday, as a documented or undocumented migrant. Circular migration and transit stays in other African countries before migrating to Europe are quite common among Ghanaian emigrants. The sample of Ghanaian households was drawn in 2009 and 2010 as a stratified multistage random sample of Ghanaian-borns residing in the cities of Kumasi and Accra. It includes nonmigrants, return migrants, and partners of migrants. However, the last category is quite small and was therefore excluded from our analyses. In addition, the MAFE data comprise a quota-based sample of Ghanaian-born migrants who resided in the Netherlands or in the UK, including undocumented migrants and migrants holding a residence permit. To account for the sampling strategy, the MAFE project provides post-stratification weights (for more information on sampling and weighting, see Schoumaker & Mezger, 2013). We weighted our sample with the help of the R package *survey* (Lumley, 2004).

The first part of our analyses focuses on first birth patterns of Ghanaian migrants and nonmigrants. We plot the hazard rates of first childbirth by migrant status and by level of education.

In a next step, we employ discrete-time hazard regression models of first childbirth, specifying the hazard rate as a complementary log–log function. This analysis is based on the full sample of respondents aged 25 to 75 considering retrospective information on first births that

[2]The MAFE project is coordinated by INED (C. Beauchemin) in partnership with the Université catholique de Louvain (B. Schoumaker), Maastricht University (V. Mazzucato), the Université Cheikh Anta Diop (P. Sakho), the Université de Kinshasa (J. Mangalu), the University of Ghana (P. Quartey), the Universitat Pompeu Fabra (P. Baizan), the Consejo Superior de Investigaciones Científicas (A. González-Ferrer), the Forum Internazionale ed Europeo di Ricerche sull'Immigrazione (E. Castagnone), and the University of Sussex (R. Black). The MAFE project has received funding from the European Community's Seventh Framework Programme under Grant agreement 217206. For more details, see: http://mafeproject.site.ined.fr/.

TABLE 1 Occurrences and exposures of first birth for female and male Ghanaian nonmigrants and migrants. Percentage of person-years at risk and number of first birth events

	Women				Men			
	Nonmigrant		Migrant		Nonmigrant		Migrant	
	Person-years (%)	No. of first births	Person-years (%)	No. of first births	Person-years (%)	No. of first births	Person-years (%)	No. of first births
Age^t								
15–19	10	127	1	3	6	15	0	1
20–24	25	225	11	12	23	82	7	9
25–29	27	142	28	35	28	119	25	32
30–34	21	35	32	14	24	61	35	43
35–39	16	10	27	5	18	11	32	14
Birth cohort								
1933–1949	12	65	10	6	16	48	7	10
1950–1959	22	122	26	14	25	85	28	25
1960–1969	30	143	28	18	27	83	36	36
1970–1979	29	161	28	25	25	60	25	26
1980–1988	7	48	7	6	7	12	4	2
Level of education								
Less than secondary	40	215	21	11	16	39	9	10
Secondary	37	194	28	14	33	104	15	18
Postsecondary	23	130	51	44	52	145	76	71
Employment status^t								
Studying	7	31	7	8	16	38	11	8
Economically active	83	413	82	50	80	237	84	88
Inactive, homemaker, or unemployed	11	95	11	11	4	13	5	3
Religion								
Muslim	9	53	2	1	8	23	5	3
Protestant	25	134	20	12	25	68	29	30
Charismatic/Pentecostal	45	247	48	36	38	111	37	36
Other	20	105	30	20	29	86	30	30
Ethnicity								
Akan	59	308	65	46	61	179	68	67
Ga-Adangbe	20	121	12	5	16	52	12	12
Other	21	110	23	18	23	57	20	20
Total	8,692	539	1,684	69	4,295	288	2,036	99

Note. Covariates marked with a^t are time-varying. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted.

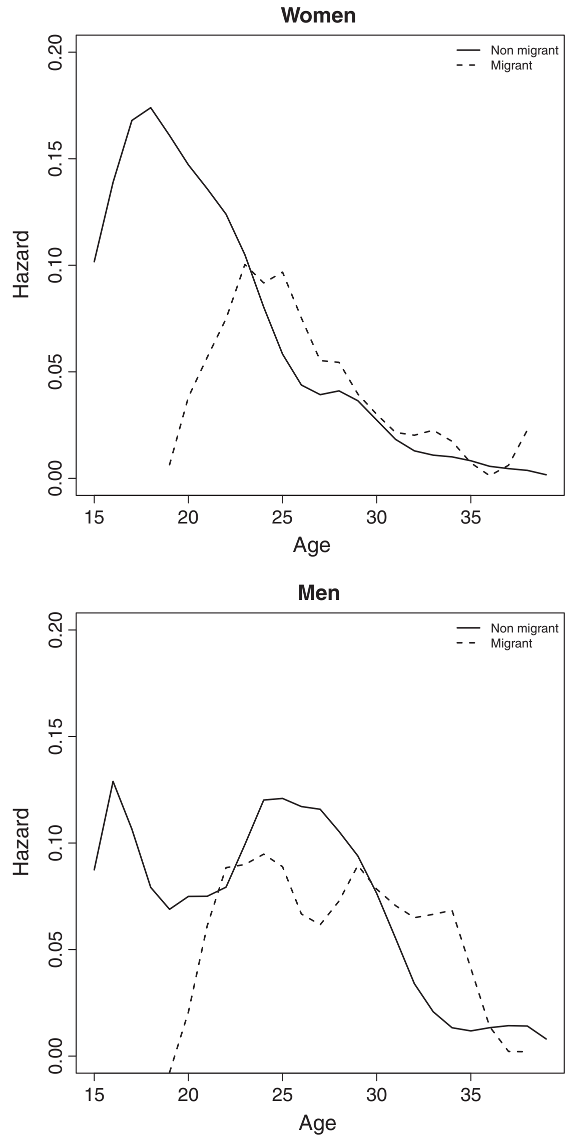
TABLE 2 Occurrences and exposures of first birth for female and male Ghanaian migrants. Percentage of person-years at risk and number of first birth events

	Women		Men	
	Person-years (%)	First birth events	Person-years (%)	First birth events
Duration of stay^t				
0–1	25	25	26	26
2–3	21	14	20	28
4+	54	30	54	45
Country of stay^t				
NL	36	20	38	31
UK	38	34	31	32
Other	26	15	31	36
Reason for migration^t				
Family	43	29	10	11
Better life/work	35	20	57	59
Studies	8	8	18	17
Other/missing	14	12	15	12
Total	1,684	69	2,036	99

Note. Covariates marked with a^t are time-varying. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted.

occurred between ages 15 and 39.[3] In a second set of models of first birth, we restrict our sample to migrants only and include the duration of stay in the country of destination and the reasons for migration. Due to the small sample size, it is not possible to consider migrants in the Netherlands and in the UK separately or to evaluate interactions between our covariates and the country of destination. However, we control for the country of stay and have to leave further investigations, which may take into account the different receiving contexts, to future research.

The final sample for the analysis on first births is shown in Table 1. In our time-varying setting, a person counts as nonmigrant as long as he or she lives in Ghana and has never emigrated. The respondent is considered a migrant once he or she leaves Ghana, irrespective of the country of stay. The number of person-years in which migrants are at risk of a first birth after they return to Ghana is too small to conduct meaningful analysis on their first birth patterns. Therefore, we treat return migrants as nonmigrants as long as they live in Ghana, count them as migrants once they leave Ghana and censor their life courses upon return to Ghana.[4] The control variables are age ("15–19," "20–24," "25–29," "30–34," and "35–39"), birth cohort ("1933–1949," "1950–1959," "1960–1969," "1970–1979," and "1980–1988"), religious denomination ("Muslim," "Protestant," "Pentecostal/Charismatic," and "other"), ethnicity ("Akan," "Ga-Adangbe," and "other"), and the highest educational degree obtained ("less than secondary," "secondary," and "postsecondary"). Employment status is constructed as a time-varying covariate as well ("studying," "economically active," and "inactive, homemaker, or unemployed"). Because of the small number of first childbirths out of union (n = 15 for women and n = 14 for men), we take into account the union status by analysing only person-years that have been spent in a union, irrespective of the legal status of that union. Pretests show that an alternative strategy, namely, controlling for union status, produced very similar relative risks and *p* values. To evaluate whether migrants postpone first childbirth due to educational selectivity, we include two interaction effects, combining age and migrant status as well as age and education.



Note: Hazard rates for migrants are displayed only for ages at which more than 10 persons have been at risk of having a first child. The curves were smoothed using a cubic smoothing spline.
Data: MAFE Ghana 2009-2010, weighted

FIGURE 1 Hazard rates of first childbirth by time-varying migrant status

In a following step, we examine the effects of migration-specific covariates such as the duration of stay ("0–1 year," "2–3 years," and "4+ years"), the primary reason for migration ("family," "seeking a better life/work-related reasons," "studies," and "other/missing"), and the country of stay ("UK," "NL," or "other") (see Table 2). These three covariates are time-varying, because we consider not only the person-years that were spent in the country of final destination but also the transit periods if a migrant stayed in another country before arriving to the UK or the Netherlands.

The second part of our analyses focuses on migrant–nonmigrant differentials in completed fertility. The Poisson regression models predict the number of children ever born, which can be read from the value of the constant, assuming that the effect of the independent variables is zero. The contribution of the explanatory variables is illustrated by Incidence Rate Ratios, which describe the multiplicative effect of a covariate on the predicted fertility rate in comparison with a reference category. For this part of the analysis, the sample was restricted to respondents aged 40 or older at the time of the interview. Because it is not possible to include time-varying covariates in a count data model, we use the information whether a respondent has ever been a migrant. Also, here we are able to study those who have ever been a return migrant separately. However, we run the risk of applying anticipatory analysis, which means that we would use the migrant status to explain future fertility even before a person became a migrant. By doing so, we would condition on future behaviour, which is problematic and should be avoided (Hoem & Kreyenfeld, 2006). To minimize the bias, we include only those migrants who migrated before age 30, which, as can be seen from Figure 1 on page 1, lies beyond the main age of entry into parenthood. As control variables, we include birth cohort, ethnicity, religious

[3] In Ghana, the mean age difference between partners was 7.6 in 1998. For almost 50% of the couples, the man was 5 to 14 years older than the woman (Barbieri & Hertrich, 2005). However, the number of first childbirths after age 40 is rare for both, men and women. As a result, we decided that there is no need to extent the age range for men.

[4] Out of 69 first children by female migrants, 13 were born to migrants who had already returned to Ghana, 33 out of 99 men's children were born after return to Ghana.

TABLE 3 Number of female and male respondents aged 40+ at interview and their number of births by covariates

	Never migrated		Migrant		Return migrant	
	No. of persons in %	No. of births	No. of persons in %	No. of births	No. of persons in %	No. of births
Women						
Birth cohort						
1933–1949	19	204	13	20	15	32
1950–1959	31	309	44	47	32	44
1960–1969	50	413	42	46	53	91
Level of education						
Less than secondary	36	389	18	20	34	71
Secondary	50	431	20	17	51	74
Postsecondary	14	106	62	76	15	22
Religion						
Muslim	7	98	2	1	19	34
Protestant	27	233	24	19	13	23
Charismatic/Pentecostal	44	407	38	41	55	87
Other	22	188	36	52	13	23
Ethnicity						
Akan	52	496	78	87	40	61
Ga-Adangbe	29	247	2	2	28	61
Other	18	183	20	24	32	45
Total	100	926	100	113	100	167
Men						
Birth cohort						
1933–1949	28	155	7	13	6	24
1950–1959	27	127	39	71	41	115
1960–1969	45	151	54	74	53	118
Level of education						
Less than secondary	13	70	10	16	14	41
Secondary	50	222	7	11	45	108
Postsecondary	37	141	84	131	41	108
Religion						
Muslim	10	43	2	4	11	34
Protestant	22	93	25	30	39	108
Charismatic/Pentecostal	37	158	41	62	24	58
Other	31	139	33	62	26	57
Ethnicity						
Akan	57	263	69	116	59	153
Ga-Adangbe	18	73	11	12	23	58
Other	24	97	20	30	18	46
Total	100	433	100	158	100	257

Note. Based on migrants who migrated up to age 29. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted.

denomination, and level of education in our models. A dispersion test showed that the data were neither underdispersed nor overdispersed and that there was no need to adjust the standard errors (Cameron & Trivedi, 1990). The final sample for our Poisson model is described in Table 3.

5 | RESULTS

5.1 | First childbirth

Figure 1 illustrates the hazard rates of first childbirth for Ghanaian migrants and nonmigrants. The hazard rates for migrants are displayed only for ages 18 and older, because our migrant covariate is time-varying and too few person-years were spent as a migrant before age 18. We find that, in line with our first hypothesis, first childbirth is postponed for female migrants compared with nonmigrants. First childbirth for nonmigrants is most likely around age 19, whereas migrants are most likely to have their first child about 5 years later. Apparently, first childbirth is also postponed for male migrants, but differences between migrants and nonmigrants in Ghana are smaller compared with women.

As can be seen from Table 1, particularly, our female migrant sample differs from the nonmigrants in Ghana regarding their average level of education. Although the vast majority of Ghanaian nonmigrants holds a secondary or lower degree, most female migrants completed postsecondary education. The majority of male nonmigrants and migrants hold a postsecondary degree.

Figure 2 shows the hazard rates of first birth by level of education. Differences by level of education are largest at the younger age groups. At ages 15 to 19, first childbirth is particularly likely for women with secondary education and least likely for those with a postsecondary degree, who postpone first childbirth. Differences by level of education are less pronounced for men, but similar to women, first birth rates of men with secondary education are highest in the main childbearing years between ages 19 and 27. However, men with low educational status have higher first birth rates before age 20 but show particularly low rates later on.

Tables 4 and 5 display the results of our discrete-time hazard models on first childbirth for female and male respondents. We find that there is no significant difference between migrants and nonmigrants in their first birth risks (Models 1a and 1b). For women, we find a strong age effect revealing that first childbirth is most likely at ages 15 to 24. The main ages for first childbirth of men are 20 to 29. In both samples, the youngest cohorts born between 1980 and 1988 seem to be least likely to have a first child. As the life courses of the younger respondents are truncated, the negative coefficient for birth cohorts 1980 to 1988 might be due to collinearity between age and cohort. We applied some additional tests and estimated our regression models for a limited sample of person-years between ages 15 and 29. However, restricting our sample to childbirths that occurred up to age 29, the age until which all cohorts should be equally represented, led to the same finding.[5]

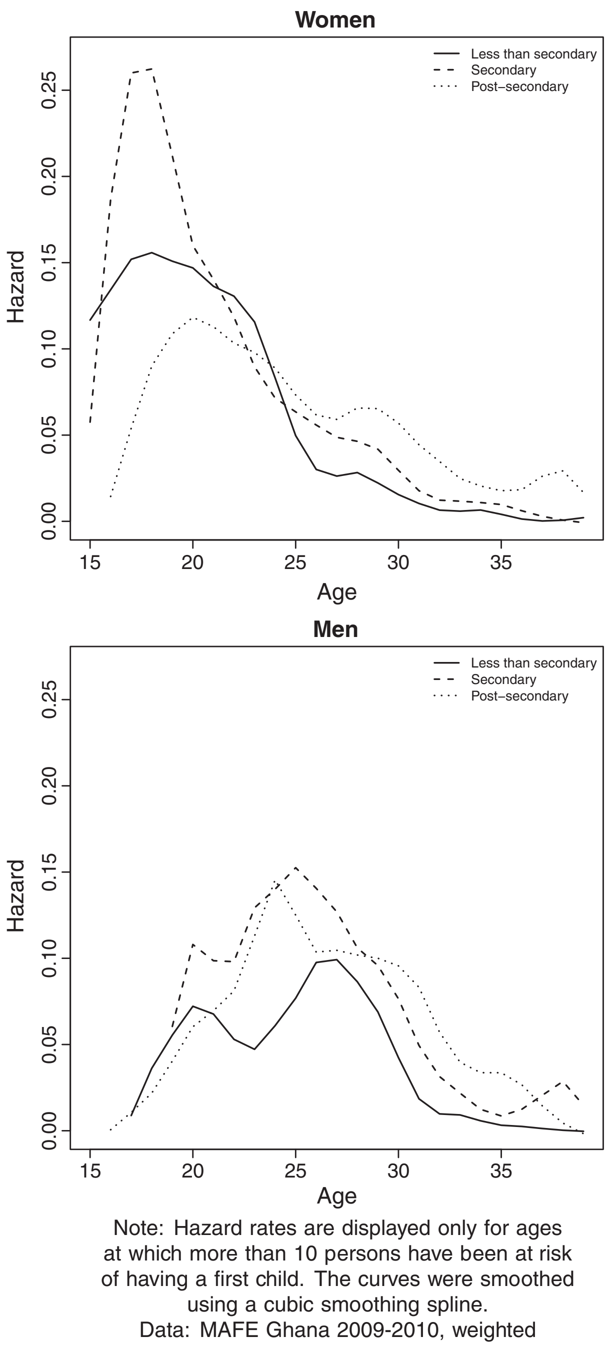


FIGURE 2 Hazard rates of first childbirth by level of education.

To account for the different age profile of first birth for migrants and nonmigrants as shown in Figure 1, we included an interaction of age and migrant status (Models 2a and 2b in Tables 4 and 5). Interestingly, in our models for women the odds ratio of our migrant status covariate becomes significant once we include the interaction. The positive effect can be explained from the fact that the reference group is ages 25 to 29, the age at which female migrants' hazard rates are higher compared with non-migrants. Figure 3 demonstrates the predicted probabilities of first childbirth at ages 20 and above, because the number of respondents at risk is too small to reveal reliable results for the younger ages. It appears that first birth probabilities between female migrants and nonmigrants differ only for age groups 20 to 29. Although female migrants have lower first birth probabilities at ages 20 to 24, these probabilities exceed those of nonmigrants at ages 25 to 29. As compared with women, the catching up of male migrants occurs slightly later, at ages 30 to 34.

We find no significant influence of religious denomination or employment status on first birth risks, but, unexpectedly, there seems to be a positive relationship between level of education and the propensity to have a first child. As was shown in Figure 2, women with postsecondary education seem to catch up their first childbirths at ages 25 and above. Models 3a and 3b therefore include an interaction between age and level of education. The results are displayed graphically in Figure 4. The confidence intervals overlap, indicating that the statistical power is too low to find significant differences. However, the results indicate that first childbirth risks are highest at ages 15 to 19 for respondents with secondary education and lower degrees, whereas those of the highly skilled are highest at ages 20 to 24. Thus, women and men with postsecondary education seem to postpone first childbirth compared with those with a lower level of education.

Our small sample size makes it difficult to draw clear conclusions on the impact of educational selectivity on migrants' first birth patterns. However, we learnt from our regression models that migrants, particularly female migrants, seem to postpone first childbirth. The descriptive tables show that female migrants have much higher levels of education compared with nonmigrants in Ghana. Furthermore, the highly skilled seem to postpone first childbirth, whereas women with secondary or lower degrees have their first child earlier. We conclude that the selectivity of female migrants regarding high education could be one of the main drivers of their first birth postponement, although owing to limited sample size, the models do not provide firm evidence as to whether

[5] Results are available upon request from the authors.

TABLE 4 Determinants of first birth for women. Discrete-time hazard model. Relative risks and statistical significance

	Model 1a	Model 2a	Model 3a
Constant	0.05***	0.05***	0.06***
Migrant status^t (Ref.: nonmigrant)			
Migrant	1.03	1.56*	0.91
Age^t (Ref.: 25–29)			
15–19	4.06***	4.15***	4.98***
20–24	2.73***	2.83***	1.86**
30–34	0.34***	0.34***	0.23***
35–39	0.11***	0.11***	0.09***
Level of education (Ref.: secondary)			
Less than secondary	0.86*	0.85*	0.53*
Postsecondary	1.19	1.17	1.26
Birth cohort (Ref.: 1950–1959)			
1933–1949	1.00	1.01	1.01
1960–1969	0.91	0.91	0.93
1970–1979	0.84	0.84	0.85
1980–1988	0.67**	0.69**	0.72**
Religion (Ref.: Charismatic/Pentecostal)			
Muslim	1.05	1.06	1.09
Protestant	1.09	1.09	1.10
Other	1.01	1.01	1.02
Ethnicity (Ref.: Akan)			
Ga-Adangbe	1.18*	1.18*	1.17
Other	1.08	1.07	1.05
Employment status^t (Ref.: economically active)			
Studying	0.72	0.72	0.82
Inactive, homemaker, or unemployed	1.24	1.25	1.19
Interaction (Ref.: nonmigrant, ages 25–29)			
Migrant, ages 15–19		0.65	
Migrant, ages 20–24		0.38**	
Migrant, ages 30–34		0.87	
Migrant, ages 35–39		1.23	
Interaction (Ref.: secondary, ages 25–29)			
Less than secondary, ages 15–19			1.03
Less than secondary, ages 20–24			2.55**
Less than secondary, ages 30–34			1.50
Less than secondary, ages 35–39			0.20
Postsecondary, ages 15–19			0.28**
Postsecondary, ages 20–24			0.99
Postsecondary, ages 30–34			2.47
Postsecondary, ages 35–39			3.07
Observations	10,097	10,097	10,097
R^2	.115	.116	.115

Note. Covariates marked with a^t are time-varying. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted. *p<.1. **p<.05. ***p<.01.

this is the case. It appears that our findings speak in favour of our second hypothesis, which stated education to play a major role in the postponement of first birth and thus explaining the differences in first birth behaviour between migrants and nonmigrants.

When drawing conclusions on migrant fertility, we have to keep in mind that migrants are not a homogeneous group. This is why, in a next step, we estimated regression models of first birth for a migrant sample only which allows us to include migration-specific covariates. The results are displayed in Table 6. We find no significant impact of the duration of stay in the country of destination for female migrants. As suggested by our disruption hypothesis, we find that male migrants' first birth intensities are about three times as high in the second and third year after arrival compared with the period immediately after arrival. First birth risks do not differ significantly between migrants who reside in the UK and the Netherlands. Women who lived in any other country before arriving to the UK or the Netherlands experienced low first birth risks during that time, but men's first birth risks were higher compared with the person-years spent in the Netherlands or the UK. Furthermore, there were no significant effects of the reason for migration. One could think that the reasons for migration might be correlated with employment status or level of education, but excluding those covariates from our models did not lead to any different findings (results not shown).

TABLE 5 Determinants of first birth for men. Discrete-time hazard model. Relative risks and statistical significance

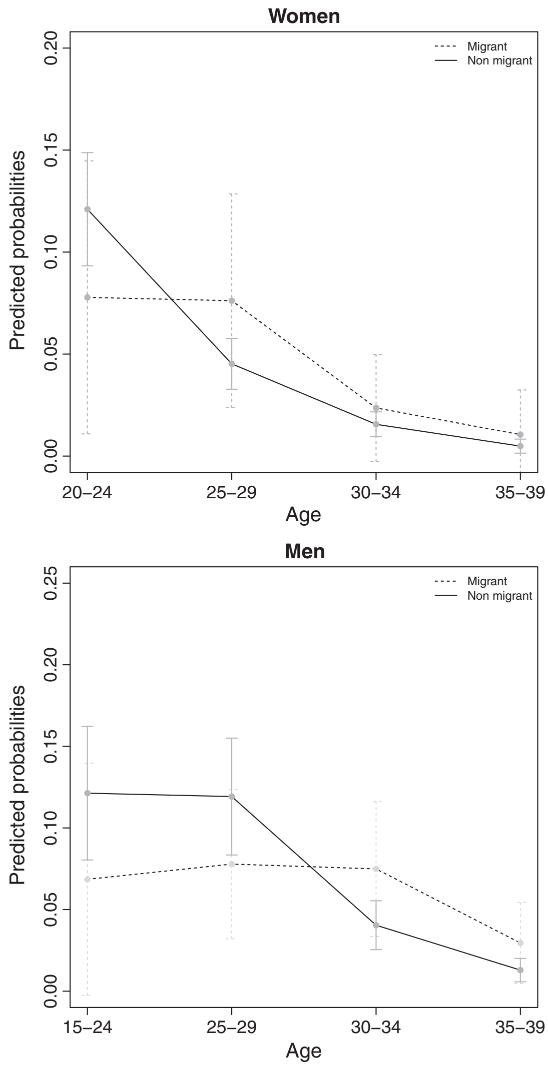
	Model 1b	Model 2b	Model 3b
Constant	0.13***	0.13***	0.14***
Migrant status^t (Ref.: nonmigrant)			
Migrant	0.97	0.63	0.93
Age^t (Ref.: 25–29)			
15–19	0.91	0.87	1.12
20–24	1.11	1.10	0.91
30–34	0.37***	0.32***	0.29***
35–39	0.12***	0.10***	0.12***
Level of education (Ref.: secondary)			
Less than secondary	0.87	0.87	0.90
Postsecondary	1.08	1.10	1.09
Birth cohort (Ref.: 1950–1959)			
1933–1949	0.79*	0.79*	0.77**
1960–1969	0.49**	0.48***	0.50**
1970–1979	1.03	1.07	1.04
1980–1988	0.89	0.89	0.92
Religion (Ref.: Charismatic/Pentecostal)			
Muslim	1.01	1.01	1.05
Protestant	1.19	1.21	1.18
Other	1.00	1.00	0.98
Ethnicity (Ref.: Akan)			
Ga-Adangbe	0.70**	0.71**	0.78
Other	1.10	1.09	0.84
Employment status^t (Ref.: economically active)			
Studying	0.78	0.80	0.83
Inactive, homemaker, or unemployed	1.29	1.27	1.22
Interaction (Ref.: nonmigrant, ages 25–29)			
Migrant, ages 15–19		1.37	
Migrant, ages 20–24		0.81	
Migrant, ages 30–34		2.84**	
Migrant, ages 35–39		3.42	
Interaction (Ref.: secondary, ages 25–29)			
Less than secondary, ages 15–19			1.61
Less than secondary, ages 20–24			0.82
Less than secondary, ages 30–34			0.57
Less than secondary, ages 35–39			0.11*
Postsecondary, ages 15–19			0.21
Postsecondary, ages 20–24			1.72
Postsecondary, ages 30–34			1.97
Postsecondary, ages 35–39			1.44
Observations	5,998	5,998	5,998
R^2	.065	.068	.074

Note. Covariates marked with a^t are time-varying. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted. *p<.1. **p<.05. ***p<.01.

5.2 | Completed fertility

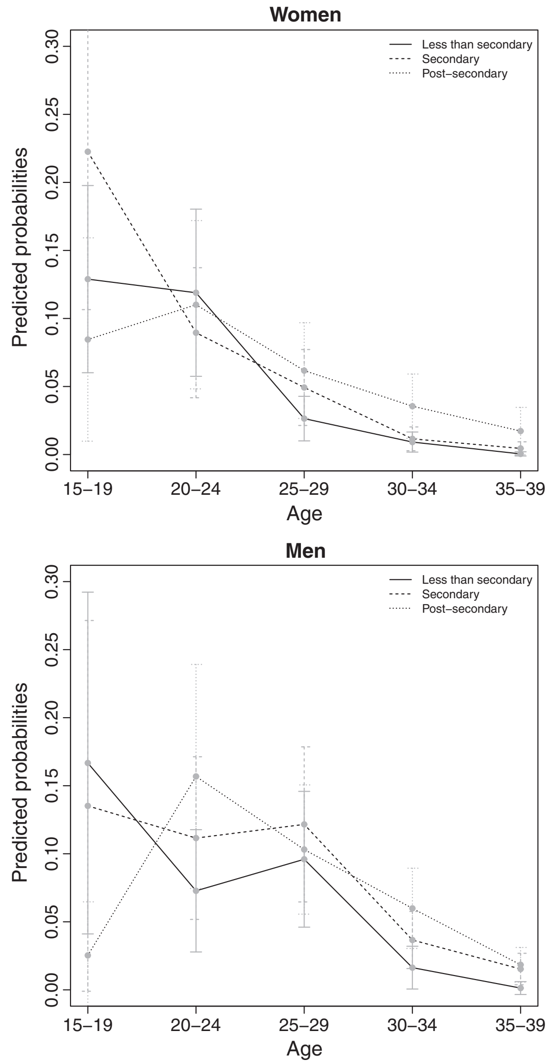
In a second step, we focus on the question whether Ghanaian migrants have fewer children compared with nonmigrants in Ghana. The results of the Poisson regression models are shown in Table 7, and Figure 5 displays the Incidence Rate Ratios of the migrant status covariate before and after controlling for level of education. Supporting our first hypothesis, the results reveal that both female and male migrants have significantly fewer children compared with nonmigrants in Ghana after controlling for birth cohort, ethnicity, and religious denomination of the respondents (Models 5a and 5b). Female nonmigrants have about 4.34 children (4.75 for men), whereas the number of children is 33% lower among migrants (26% for men).

If migrants are selected on low fertility, the difference between migrants and nonmigrants should be lowered after controlling for level of education. After considering the level of education in our models (6a and 6b), the difference between migrants' and nonmigrants' completed fertility diminishes slightly for men and more strongly for women. This means that, in line with our second hypothesis, the fertility differentials of migrants and nonmigrants are partly explained by the higher level of education of migrants in comparison with nonmigrants, especially for women. As migrant men have fewer children than nonmigrant men, even if we consider their higher levels of education, we cannot rule out that the lower number of children might be due to adaptation effects after immigrating to Europe.



Note: Results are based on regression models 2a and 2b. Predicted probabilities are shown for ages above 19 for a hypothetical respondent who is in the reference category of all other covariates.
Data: MAFE Ghana 2009-2010, weighted

FIGURE 3 Interaction of migrant status and age. Predicted probabilities and 95% confidence intervals



Note: Results are based on regression models 3a and 3b. Predicted probabilities are shown for a hypothetical respondent who is in the reference category of all other covariates
Data: MAFE Ghana 2009-2010, weighted

FIGURE 4 Interaction of level of education and age. Predicted probabilities and 95% confidence intervals

Partly in line with Hypothesis 4, our findings on return migrants suggest that they indeed have more children than those who stayed in Europe. However, their fertility level does not differ significantly from, and is estimated to be very similar to, nonmigrants in Ghana. This finding hints towards a selectivity of return migration. In Table 3, it appears indeed that the large majority of return migrants have a secondary or lower school degree, which is very similar to nonmigrants, whereas migrants who stayed in Europe have higher educational levels on average (38% have a secondary degree or lower).

Unfortunately, owing to our small sample size, we cannot go into more detail using Poisson regression analysis. The results should rather be understood as a first hint that differences in first births between migrants and nonmigrants are accompanied by differences in completed fertility and that education seems to play a role in explaining these differences.

6 | DISCUSSION

Many previous studies have applied selection theory to explain why migrants behave in a different way than the majority population at destination (e.g., Milewski, 2007; Mussino & Van Raalte, 2013). But to understand the mechanisms for migrant fertility, it is important to know what distinguishes them from the population from which they originate. Using data from the MAFE project, we therefore address the question whether educational selectivity might be a determinant of birth postponement and lower completed fertility for migrants.

Even though our sample is quite small and the statistical power is too low to find any significant results on the combined effect of age, education, and migrant status, our results seem to speak in favour of our selection hypothesis. First of all, we found that the level of education of Ghanaian migrants was higher compared with nonmigrants in Ghana. In line with previous research, this difference was much more pronounced for women than for men (Van Dalen et al., 2005). Second, it appeared that the highly skilled postponed first childbirth, whereas those with

TABLE 6 Determinants of first birth for female and male migrants. Discrete-time hazard model. Relative risks and statistical significance

	Women Model 4a	Men Model 4b
Constant	0.07***	0.01***
Age^t (Ref.: 25–29)		
15–19	5.99***	0.80
20–24	1.85	1.06
30–34	0.25***	1.41
35–39	0.09***	0.66
Birth cohort (Ref.: 1950–1959)		
1933–1949	0.63	0.79
1960–1969	0.79	1.53*
1970–1979	0.61	1.37
1980–1988	0.17***	0.07***
Religion (Ref.: Charismatic/Pentecostal)		
Muslim	0.49	0.43*
Protestant	1.09	0.93
Other	1.19	0.81
Ethnicity (Ref.: Akan)		
Ga-Adangbe	1.21	0.78
Other	1.26	1.13
Level of education (Ref.: secondary)		
Less than secondary	2.16*	2.85**
Postsecondary	1.68*	1.38
Employment status^t (Ref.: economically active)		
Studying	1.33	0.88
Inactive, homemaker, or unemployed	2.18*	1.88
Duration of stay^t (Ref.: 0–1 year)		
2–3 years	0.55	3.12***
4+ years	1.11	1.02
Reason for migration^t (Ref.: better life/work)		
Family	0.86	1.41
Other/missing	1.65	1.01
Studies	0.78	1.61
Country of stay^t (Ref.: NL)		
UK	1.20	1.33
Other	0.43**	1.73*
Observations	1,578	1,906
R^2	.118	.078

Note. Covariates marked with a^t are time-varying. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted. *p<.1. **p<.05. ***p<.01.

lower educational degrees had their first child earlier. Our regression models showed that first childbirth seems to be universal for Ghanaian migrants and nonmigrants but that migrants' childbirth is postponed. As a result, we conclude that their high level of education might be one of the drivers of female migrants' delayed first birth.

In addition to that, our findings on completed fertility show that level of education is an important determinant of the number of children born by age 40. Migrants have fewer children compared with nonmigrants in Ghana, and this difference results partially from the migrants' higher levels of education. Once we controlled for level of education, the difference between migrants and nonmigrants diminished, in particular for women. Our findings are in line with a similar study based on Senegalese data, revealing that lower completed fertility of migrants is partly explained by their higher level of education (Kraus, 2016).

However, it has to be noted that low migrant fertility may also have been caused by other factors that were not observed in our data. Following the disruption hypothesis, we postulated that migration is a stressful event that may result in lower birth rates in the period shortly after migration. We did not find such a temporary drop in first births for female Ghanaian migrants. But men showed low first birth risks in the 2-years immediately following migration and particularly high risks in the third and fourth year thereafter.

We found that migrants had fewer children than nonmigrants in Ghana but the number of children of return migrants did not differ significantly from nonmigrants. This finding speaks in favour of selective return migration. Perhaps, many of these return migrants perhaps never intended to stay in Europe. For example, González-Ferrer et al. (2014) found that particularly those who had a child living in Ghana tended to return. As has been suggested by previous research, return migrants probably share not only similar levels of education but also similar fertility norms and values, which is mirrored in similar fertility levels (Lindstrom & Giorguli Saucedo, 2007; White & Buckley, 2011).

In general, our findings suggest that selectivity in terms of the level of education is highly relevant for explaining not only the lower number of children of migrants compared with nonmigrants but also the similarities between return migrants and nonmigrants in Ghana. However, we cannot rule out that migrants' lower number of children might also be a result of an adaptation towards the lower European fertility level. Previous research has shown that migrants' high levels of education are major drivers of adaptation processes in the country of destination (e.g., Krapf & Wolf, 2015), which means that both selection and adaptation effects might operate at the same time. To shed more light on the interplay between selection and timing effects, one would need to study higher order births as well. Therefore, a larger sample size would be desirable.

Apart from selection into migration, people may also select themselves into partnerships. There may also be differences between types of marriage. Couples in Ghana marry under customary or statutory law or have Muslim or Christian weddings (Van Dijk, 2014). The MAFE data contain the self-reported marital status but reveal no information about the legal status of the marriage. Thus, disentangling the different types of marriages and studying selectivity into these different types would be far beyond the scope of this study. We leave these issues for future research.

In addition, there are many unobservable factors that might be related with selectivity. These factors are of course difficult to measure, but considering other socioeconomic indicators than the level of education and perhaps adding information on norms and values concerning family and childbirth might be useful in future studies.

Our approach to compare migrants with those who never emigrated from Ghana helps to understand the selectivity of migration in terms of the level of education and its consequences for fertility and thus closes a research gap. However, similar to studies where migrants are contrasted with the majority population at destination, this is a one-sided perspective. To gain a better understanding of migrant fertility and its determinants, one would need to combine several data sources on the population of origin, on migrants, and on the population in the countries of destination.

TABLE 7 Incidence Rate Ratios of the number of children ever born for Ghanaian migrants and return migrants compared with nonmigrants

	Women		Men	
	Model 5a	Model 6a	Model 5b	Model 6b
Constant	4.34***	4.02***	4.75***	4.79***
Migrant status (Ref.: nonmigrant)				
Migrant	0.67***	0.87	0.74***	0.79**
Return migrant	0.98	0.99	0.98	1.00
Birth cohort (Ref.: 1950–1959)				
1933–1949	1.15	1.02	1.20**	1.17
1960–1969	0.75***	0.74***	0.74***	0.74***
Ethnicity (Ref.: Akan)				
Ga-Adangbe	0.80**	0.83**	0.76***	0.78***
Other	0.99	1.00	0.79***	0.80**
Religion (Ref.: Charismatic/Pentecostal)				
Muslim	1.22	1.15	1.23**	1.21**
Protestant	1.04	1.08	0.90	0.92
Other	1.04	1.07	0.94	0.94
Level of education (Ref.: secondary)				
Less than secondary		1.27***		1.09
Postsecondary		0.80*		0.91
Observations	337	337	242	242
Residual deviance	332.7	306.0	146.7	143.7
Chi^2 goodness of fit test (*p* value)	.402	.769	.999	.999

Note. Based on migrants and nonmigrants aged 40+ at interview, only those migrants who migrated up to age 29. Data: Migrations between Africa and Europe Ghana 2009–2010, weighted. *p<.1. **p<.05. ***p<.01.

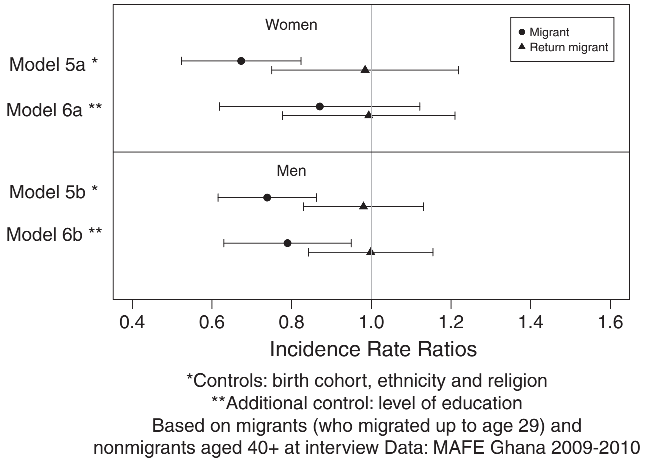


FIGURE 5 Incidence Rate Ratios of the number of children for Ghanaian migrants and return migrants in comparison with nonmigrants in Ghana and 95% confidence intervals

Another suggestion for future research is to focus on the different receiving contexts in Europe. We did not find any significant differences in first birth risks between migrants in the Netherlands and the UK. This is surprising given the fact that the UK attracted a larger share of well-educated immigrants from Ghana compared with the Netherlands. Due to the small sample size, we were not able to include interaction effects between country of stay and other covariates or to evaluate the effect of our covariates for each of the receiving countries separately. Such approaches would be helpful to fully understand the interplay of different receiving contexts and educational selectivity but have to left to future research.

Our findings might be transferable to other migration streams, which are dominated by the highly skilled. Furthermore, Ghana holds what could be a forerunner position in terms of modernisation and demographic change within Sub-Saharan Africa. As a consequence, our study might be useful to predict future developments in other countries. Of course this is true only if the countries in that region follow Ghana's lead.

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