The Modern Migrant Mother: Internal Migration, Stalled Fertility, and Proximate Determinants in Benin

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Introduction

Migration has long been linked with economic growth in less developed countries, serving as a safety valve for countries with high levels of unemployment and underemployment (Sorenson, 2002). In fact, remittances often contribute to substantial portions of the sending countries' gross domestic product, further increasing reliance on labor migration. The recent feminization of migration streams in sub-Saharan Africa, whether independent or accompanying migrant spouses, has led to an increased female mobility and presence in the labor force (Adepoju, 1997; 2000). However, migration has also been shown to have a salient relationship with reproductive outcomes in developing countries. For states that are dealing with stalled fertility transitions, migration not only acts as a potential economic driver, but as a vehicle for ideational change. Female migrants, traveling abroad or internally to urban areas, spend time apart from their partners but also engage in social learning and inevitably come into contact with and adopt different fertility practices.

Fertility rates in Sub-Saharan Africa, in contrast to other developing regions, have been characterized recently by periods of no significant decline. (Bongaarts, 2008). Past research points out paradoxes in this cessation, as countries where respondents report high ideal family sizes also indicate unmet need for contraception (Bongaarts and Casterline, 2012). Benin is a prime example of a country caught in a stalled fertility transition. Although different total fertility rates by background characteristics decline from survey-to-survey, Benin does not demonstrate across the board decreases in total fertility rate. For example, in 1996, the total fertility rate (TFR) was listed at 6.0, declining only slightly in 2001 to a TFR of 5.6. By 2006, TFR increased to 5.7, indicating a stagnation of progress over the decade (Measure DHS, 2012). In addition, differences by rural and urban residence, wealth quintiles, or by educational attainment demonstrate that group-specific TFR vacillates by survey, without a clear downward trend.

This study utilizes Bongaarts model of proximate fertility determinants to compare fertility practices in Benin for internal migrants and non-migrants. Employing Demographic Health Surveys data from 2006, this inquiry examines three-year birth histories to determine total fertility rates for internal migrants and non-migrants as well as fertility determinants that influence rates. A substantial gap exists between rural and urban total fertility rates in Benin. The total fertility rate of migrants, while still high, represents a bridge between the two settings. This study seeks to probe the specific determinants of lower fertility rates for migrants in comparison to their non-migrant counterparts when including non-migrants from both rural and urban settings. Evidence of varying fertility rates and differences in the constituent determinants of fertility help to demonstrate the mechanisms through which changes in fertility rates occur. Furthermore, notable group differences by migratory status contribute to the theory concerning migration and its link to reproduction outcomes and population growth.

Background

Migration in Western Francophone Africa and Benin

Migration in Benin follows the patterns of western Francophone Africa and is best understood within the context of the sub-region. Although Cote d'Ivoire differs, western Francophone Africa shares many regional characteristics, such as smaller scales of population and economy. Migration has always been present in the sub-region, although the causes have shifted through western Africa's development. Recent infrastructure improvements increased the viability of large-scale regional migration, sparking seasonal labor migration flows that slowly became institutionalized and dominated by males (Adepoju, 2003).

The institutionalization of regional migration brought with it fears of hyper-urbanization in western Africa characterized by claims of loss of agricultural output and concerns of urban slums with under and unemployment of poor, uneducated rural migrants. However, cross-sectional and longitudinal data analyses lend support to critiques of these fears, pointing to better employment outcomes for rural-to-urban migrants (Beauchemin, 2004). Moreover, state-sponsored programs intended to impede rural-to-urban migration via infrastructural development appear to act in the opposite direction, as educational and public health improvements in towns act as impetuses for internal migration to capital cities (Beauchemin, 2005). Studies indicate a decrease in the rate of rural-to-urban migration emphasized by a narrowing rural-urban wage differential and the rise of urban-out migration as a tact in western Francophone Africa (Beauchemin, 2011).

Contemporary migration in Benin is characterized by a significant regional presence, with western African countries comprising the top five destinations for Beninese emigrants (World Bank, 2010). Benin's asymmetric geographical population distribution, with high urban density in the southern cities of Cotonou and Porto Novo, is experiencing demographic shifts to central states as a result of internal agricultural migration (Doevenspeck, 2011). In fact, the Demographic Health Survey's 2006 survey of Benin indicates that approximately 33% of the sampled population of females report being current internal migrants (Measure DHS, 2012). As such, Benin possesses varied types of internal and regional international migration that expose it to different sources of potential economic development or perspectives on healthcare.

Migration and Reproductive Outcomes: A Theoretical Perspective

Migration is a salient lens through which to view fertility outcomes in developing countries. The links between internal migration, urbanization, and lowered fertility rates and better health outcomes for migrant women and their children is well supported with contemporary evidence. Examining data from Mexico, McKenzie finds that children in migrant households are more likely to have higher weight at birth, lower infant and child mortality rates, and higher probability of having been delivered by a doctor (McKenzie, 2006). Additionally, migrant mothers and townswomen in migrant-sending towns are more likely to have greater maternal health knowledge. However, while studies indicate that migration status has important connections with reproductive health (Brokerhoff and Biddlecom 1999; Lindstrom 2003) gaps in the literature exist regarding contraception, fertility practices, and migration in countries with stalled fertility transitions. Regional internal migration has been demonstrated to influence sexual practices although studies indicate that contraceptive use and choice depend on place of residence (Coast 2006; Lindstrom and Hernandez 2006).

Migration scholars have posited four potential hypotheses through which the experience of migrating impacts fertility outcomes (Hervitz, 1985; Rundquist and Brown, 1989; Lee, 1992; Singley and Landale, 1998; Kulu, 2005). The *socialization* hypothesis asserts that migrants maintain the fertility preferences of their home region and differences between migrants and stayers are only evident in the second generation. The *adaption* hypothesis builds on the concept of social diffusion, specifically the role of social interactions and connections with destination residents that mold fertility behavior (Montgomery & Casterline, 1996). Previous research details the extent to which *social diffusion* works through both learning and influence as a means to spread information on fertility behavior (Massey, 1990; Andrzejewski , 2009; Lindstrom and Muñoz-Franco, 2005; Chen, et al., 2010). The *selection* hypothesis states that fertility behavior is not dynamic throughout the process of migration and instead disparate reproductive outcomes between migrants and stayers represent latent differences between the groups. Finally, the *disruption* hypothesis posits that migrants have lower levels of fertility after a migration due to factors unique to migrating. This can include separation from spouses as well as introduction to new marriage markets that delay age of marriage or union formation.

Research Objectives

This study attempts to bridge the gap in the literature regarding stalled fertility transitions in western Africa, migration, and the adoption of urban fertility behaviors. In addition to juxtaposing differing fertility schedules for migrants versus non-migrants, this analysis serves to test the components of fertility to examine which determinants act as the mechanisms for lower fertility rates for internal migrants. Specifically, what aspect of migration within the framework of the proximate determinants is driving lower fertility rates.

Data

The data for this study come from the 2006 Benin Demographic and Health Survey (DHS). The DHS collects data on women's reproductive history, demographic characteristics, migration experience, marital status, sexual history, use and duration of post-partum amenorrhea, and contraceptive use and decision-making. In order to examine migration status and individual fertility features, the present study uses merged household and individual level data for 17,749 women aged 15 to 49. Given the strong emphasis on reproductive activities and health, the DHS data are particularly suited for the compilation of the necessary components for the Bongaarts decomposition.

Table 1 about here

Measures and Methodology

The Bongaarts decomposition of proximate fertility determinants measures total fertility through a multiplicative model that employs proportion of the female population married (or in a union), proportion of the married female population using contraception, proportion of births avoided due to abortion, miscarriage, or stillbirth, an index for post-partum amenorrhea, and finally the total fecundity rate (Bongaarts, 1978). The model used in this study employs a measure of abortions, still births, and miscarriages instead of the traditional measure of abortions due to the survey classifying these responses together for terminated pregnancies. These combined measures are used to compare which proximate determinants have the biggest impact on total fertility rate when transposing different model elements across groups. The model can be written as follows;

$$TFR = C_m \times C_c \times C_a \times C_i \times TF \quad (1)$$

In this model, TFR is the total fertility rate, CM is the proportion of the fecund female population that is in a union or married, Cc designates proportion of those in union using contraception multiplied by contraception effectiveness, Ca is proportion of births avoided due to abortion, stillbirth, or miscarriage, Ci are births avoided through post-partum amenorrhea, and TF is total fecundity. As the equation is posed, total fecundity is the concept of natural fecundity that remains after multiplying this total fertility rate by the proportions of the population utilizing aspects of marriage and family planning.

In this investigation, total fertility rate is derived by utilizing three-year birth histories for each individual in the dataset and employing a stata user-added module called TFR2 (Schoumaker, 2012). This module utilizes birth histories for each individual and produces age-specific fertility rates which can than be used to calculate the total fertility rate.

The following component for the Bongaarts decomposition is the proportion of women in a union, or Cm. This component is included to gauge the inhibiting factor of marriage on total fecundity. This figure is obtained by calculating the age-specific fertility rates for those from 15 to 49 and multiplying them by the product of the proportions of those in a union in the age-specific categories. Bongaarts originally specifies this component as the proportion of women in a marriage, while Stover updates the classification to include all sexually active women (Stover, 1998). In this inquiry, electing the proportion of women in a union bridges the gap between the two and accounts for potential flaws in both extreme options. Including all women in a union as opposed to only those who are married expands the model and allows the analysis to include more relevant data, as women in a union may also be considered to be at risk for pregnancy. Limiting the model to those in a union and not those who have recently reported sexual intercourse accounts for limitations in the data, as the survey is not specific as to the recentness of sexual activity (only the ambiguous qualifier of "in recent months" is asked). As such, this assumption attempts to balance past approaches and account for limitations in the current data.

Contraceptive use and effectiveness is used to the determine Cc, the next component in the Bongaarts equation. This more accurately measures the impact of contraception on a population. The equation for this component is listed below;

$$C_c = 1 - 1.08 * u * e$$

In this equation *u* stands for the proportion of the women of reproductive age in a union that are using contraception, and *e* represents the effectiveness of each specifically utilized contraceptive method. 1.08 is used to account for the percentage of the population thought to be sterile, assuming that those who know they are sterile will not continue or start to use contraception. Contraceptive use is recorded for all methods and the effectiveness of these methods are combined with their usage to determine the index for contraception.

The following component of the multiplicative model is the proportion of births avoided due to abortion. This equation is treated as follows;

$Ca = TFR / TFR + b * TA$ where $b = 0.4(1+ u)$ when u (prevalence of contraception) = 0.

where $b = 0.8(1+ u)$ when u (prevalence of contraception) = 1.

TA = Average number of induced abortions per woman at end of reproductive age

In this model, the total abortion, miscarriage, and stillbirth rate is calculated by dividing the number of age-specific incidences for the past year by the mid-year population of the five-year age groups and multiplying by 1000. Substantively, including miscarriages and stillbirths changes the interpretation of Ca, requiring that Ca be depicted as the number of births avoided deliberately due to abortion or inadvertently through stillbirth or miscarriage.

Thus, the final component in the Bongaarts decomposition is the index of post-partum infecundability. This refers to the ratio of fertility of post-partum infecundability without measures like breast-feeding and post-partum abstinence and with such measures. The ratio is calculated by dividing 20 (average months of birth interval without post-partum abstinence and breast-feeding) by 18.5 (months of base average birth interval in presence of breast-feeding) + average months of breast-feeding for the population. For this measure, the median number of months of breast-feeding was selected for both groups to avoid influence from outliers.

These components multiply to calculate the total fertility rate for the population at risk. In this example, the comparison will be using migratory status. The migratory status classification allows distinction between two broad groups; non-migrants and current internal migrants. Non-migrants are defined as respondents who have never changed their places of residence, while internal migrants are respondents currently residing in a region other than their home region. A third category not included for the current analysis is return migrants, respondents who report having migrated and returned to their home. This distinction is important, as it allows the assumption that respondents reporting "non-migrant" status are not former migrants who have returned home.

Summary Results

Table 2 about here

The components of the Bongaarts model, once calculated, allow for substantive simulations to be made, assigning non-migrants various elements of the internal migrant model. Age-specific fertility rates are combined with the proportion of the population in union in order to create the component Cm. Non-migrants have a Cm of 0.806 and internal migrants have a figure of 0.796. While internal migrants do have a lower figure, it is important to note that these proportions are very close and the implications that they carry with them will be demonstrated in subsequent simulations.

Contraceptive use, while already very low in Benin, is lower for non-migrants in contrast to internal migrants. Contraceptive use of any method is 13% for non-migrants whereas 20.6% of internal migrants use contraceptive methods. This figure combined with the contraceptive effectiveness yields a Cc figure of 0.93 for internal migrants in comparison to 0.95 for non-migrants. Ca or proportion of births avoided due to abortion, still birth, or miscarriage for non-migrant respondents in a union was 0.879 in comparison to 0.723 for internal migrants.

In order to calculate Ci, the index of post-partum infecundability, the median months of breast-feeding for each group was utilized. Here, it is evident that non-migrants, who on average breast-feed for eight months, gain some benefit of birthing limitation in comparison to internal migrants who only breast-feed on average for roughly six months. This disparity may be a result of less available time to breast feed in the event of anticipated migrations or a lack of time to be able to dedicate to breast feeding when in a province or city that is not one's home. The resulting index for non-migrants is 0.755 in comparison to 0.816 for internal migrants.

The final measure that impacts the total fertility rate (and is actually derived from the rate itself) is the figure for total fecundity. This measure accounts for natural fertility and contextual variations by group that may influence the total fertility rates. In this figure, non-migrants have a substantially greater number than internal migrants, 10.008 in comparison to 9.078. The difference in total fecundity may be due to lower levels of reported abortions by internal migrants or potentially by the natural contraceptive of being away from one's partner in the event that internal migrants in a union to not migrate with their partner. Moreover, delays in union formation due to changes to dating and marriage markets can further act to impede total fecundity for internal migrants.

Having discussed briefly the components of the decomposition, this study utilizes these measures to produce six simulations that transpose values for each group in order to measure the difference in total fertility rate. These simulations are represented as charts to depict the projected total fertility for each group and the difference between the two values.

Figure 1 about here

The first simulation is the base model, which simply reports the actual total fertility rate of 5.87 for non-migrants and 5.48 for internal migrants. This simulation states the proportion of the two listed as 0.93.

Figure 2 about here

The second simulation presumes the total fertility rate for non-migrants if they were given the total fecundity of internal migrants. This simulation portrays a substantial increase as the total fertility rate for non-migrants actually rises to a TFR of 6.42 in comparison to the original value of 5.87. This is a sizable increase, totaling more than half a child in substantive terms for total fertility rate of non-migrants.

Figure 3 about here

The third simulation presumes the total fertility rate for non-migrants if they were to receive the contraception index that internal migrants possess. The shift in this simulation is more modest in comparison with the transposition of total fecundity. In this model, total fertility rate for non-migrants only drops to 5.71 down from 5.87, which places TFR for non-migrants on pace with the average TFR for Benin.

Figure 4 about here

The fourth simulation seeks to show the impact of transposing the proportion of the population in a union for internal migrants to the equation for non-migrants (see Figure 7). This simulation yields little substantive change in the total fertility rates, only decreasing the TFR of non-migrants down to 5.79 from 5.87. Thus, this determinant is not very influential when considering other factors that have lead to greater decreases in total fertility rate.

Figure 5 about here

The next simulation utilizes the index of post-partum breast-feeding and abstinence. The simulation is designed to give non-migrants the post-partum index of internal migrants to observe the impact on total fertility rate. Since internal migrants breast feed for less time and are fecund for greater periods of time as a result, the expected result is an increase in total fertility rate. Indeed, the total fertility rate for non-migrants shoots to 6.35 from 5.87, a jump of 0.48, or nearly half a child in substantive terms. This simulation shows the important role that breast-feeding plays in suppressing the total fecundity of non-migrants.

Figure 6 about here

The final simulation transposes the internal migrant's proportion of births avoided due to abortion, miscarriage, or stillbirth onto the model for non-migrants. The results are dramatic, as non-migrant fertility is decreased to 4.83 from 5.87, substantively accounting for one less child during the life course for non-migrants. This simulation indicates that the impact of abortions, stillbirths, and miscarriages are salient factors in the lower migrant total fertility rate.

Discussion

The results from the Bongaarts decomposition simulations serve to show the specific influence that each determinant of fertility can have on group total fertility rates. These findings demonstrate the impact that certain aspects of the internal migrant fertility regime can have when transposing their values on non-migrants. Greater decreases in total fertility rate for non-migrants is equivalent to greater impact for proximate determinants of the fertility of internal migrants.

Interpreting the simulations, the most influential positive determinant for internal migrants in comparison to non-migrants is the great difference in total fecundity. This resulted in the largest increase in total fertility rate for non-migrants, actually dropping below that of internal migrants. Substantively, if non-migrants were given the total fecundity of internal migrants, they would have approximately half a child more. This is impractical though, as total fecundity is determined by myriad contextual factors that can lead to lower fertility rates that are difficult to mandate. Moreover, total fecundity is a nebulous concept that encapsulates unknown factors. Potential reasons for higher total fecundity can include improved nutrition due to improved economic resources for migrants, as well as greater access to medical resources in the event that internal migrants have moved to urban areas to take advantage of the improved economic opportunities. This finding, though difficult to truly disentangle, provides some support for studies that migrant selectivity accounts for differences in total fertility rate, although this finding indicates that migrant selectivity may extend to greater overall fecundability.

Beyond total fecundity, the second-most positive influential component in the model was the post-partum index. In this case, non-migrants actually had a lower index that resulted in lower fertility. Transposing internal migrants' index figure to non-migrants resulted in a near half-child increase, showing the inhibiting factor of breast-feeding for non-migrants.

Transposing the proportion of internal migrants in a union and their use and effectiveness of contraceptive choice both made minor reductions in the TFR for non-migrants. However, the most influential negative element in the multiplicative model for internal migrants is the proportion of births avoided due to abortion, miscarriage, or stillbirth. Applying this figure to the model for non-migrants resulted in a drop in TFR from 5.87 to 4.83, substantively more than one child across the life span for non-migrants. This figure is difficult to interpret though, as it includes abortions, miscarriages, and stillbirths. As such, it is impossible to disentangle terminated pregnancies due to deliberate action as opposed to unfortunate natural circumstances. If interpreted as disruptive behavior, this finding, coupled with lower proportion of migrants in marriages could be construed as support for the *disruption* hypothesis as later entry into marriage markets or unintended miscarriage as a result of migration works to lower overall TFR. Moreover, a greater number of proportional births avoided due to effectiveness and breadth of contraceptive use along with deliberate terminations lends support to *selectivity* and *adaption* hypotheses, as migrants may be more likely than stayers to contracept or employ abortion to avoid unwanted pregnancies when away from their homes.

The findings from these simulations work to show the most influential factors in the differences in fertility rates between non-migrants and internal migrants in Benin. In this instance, total fecundity and post-partum index have the greatest positive effect on total fertility rate, whereas union status, contraceptive choice and use, as well as births avoided due to abortion, miscarriage, or stillbirth have the greatest negative effect on total fertility rate. What these findings indicate is that differences in fertility rates are not resulting purely from increased contraceptive usage, but potentially from the structural disruptions of the act of migration itself along with a potentially higher likelihood to terminate unwanted pregnancies. For countries in stalled fertility transitions, this implies that the subsection of the populace partially responsible for lowering stalled fertility may do so through contraception, later marriage or structural separation from partners, or increased probability for pregnancies to end in a termination. Future studies can expand this model to include the role of return migrants in fertility outcomes. Furthermore, comparing these findings by residential context for urban and rural residents will reveal where and in what ways internal migrants and return migrants differ most from non-migrants.

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Appendix

Table 1: Descriptive Statistics in percentages	Non Migrants	Internal Migrants	Total
Current contraceptive use by method type			
No method	86.5	79	83.8
Folkloric method	0.2	0.3	0.2
Traditional method	7.8	12.1	9.4
Modern method	5.5	8.7	6.7
Total	100	100	100
Age in categories			
15 to 19	19.8	13.8	17.7
20 to 24	17.1	18.2	17.5
25 to 29	19.8	21.8	20.5
30 to 34	14.9	17.2	15.7
35 to 39	11.6	12	11.7
40 to 44	8.6	9.4	8.9
45 to 49	8.2	7.6	8
Total	100	100	100
Educational Attainment			
No education	73	55	66.5
Incomplete primary	12.9	20.8	15.7
Primary school	2.4	3.4	2.8
Incomplete secondary	10.9	17.8	13.4
Secondary school	0.5	1.3	0.8
Higher	0.4	1.7	0.9
Total	100	100	100
Respondents that are married or living together			
No union	25.6	23.8	25
In a union	74.4	76.2	75

Total	100	100	100
Household wealth quintiles			
1st Quintile	23.3	12	19.2
2nd Quintile	22.1	12.6	18.7
3rd Quintile	21.6	14.6	19.1
4th Quintile	19.3	23.8	20.9
5th Quintile	13.7	37.1	22.2
Total	100	100	100
Residence			
Rural	65.4	43.3	57.4
Urban	34.6	56.7	42.6
Total	100	100	100

Table 2 - Components of the Proximate Determinants of Fertility Framework	**Non-migrants**	**Internal Migrants**	**Proportion**
TFR	**5.870**	**5.481**	0.93
TM = TFR/Cm	7.279	6.890	0.95
TNM = TM/Cc	7.614	7.411	0.97
TNM' = TNM/Ca	8.657	10.244	1.18
TF = TNM'/Ci	11.471	12.549	1.09
Cm	0.806	0.796	0.99
Cc	0.956	0.930	0.97
Ca	0.879	0.723	0.82
Ci	0.755	0.816	1.08
i=months of ppa	8.000	6.000	0.75
u = % in union using contraception	0.049	0.078	1.61
e = ave contraceptive effectiveness	0.837	0.832	0.99
Simulation 1 -- Total Fecundity at internal migrant level			
TFR	**6.422**	**5.481**	0.85
TM = TFR/Cm	7.279	6.890	0.95
TNM = TM/Cc	7.614	7.411	0.97
TNM' = TNM/Ca	8.657	10.244	1.18
TF = TNM'/Ci	12.549	12.549	1.00
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i=months of ppa	8.000	6.000	0.75
u = % marrieds using contraception	0.049	0.078	1.61
e = ave contraceptive effectiveness	0.837	0.832	0.99
Simulation 2 -- predicted TFR if non-migrants had the proportion contraception of internal migrants			
Cm	0.806	0.796	0.99
Cc	**0.930**	**0.930**	1.00
Ca	0.879	0.723	0.82
Ci	0.755	0.816	1.08
TF	11.471	12.549	1.09
TFR = (product of above terms)	**5.708**	**5.481**	**0.96**

Simulation 3 -- predicted TFR if non-migrants had proportion of internal migrants in a union?			
Cm	**0.796**	**0.796**	1.00
Cc	0.956	0.930	0.97
Ca	0.879	0.723	0.82
Ci	0.755	0.816	1.08
TF	11.471	12.549	1.09
TFR = (product of above terms)	**5.791**	**5.481**	**0.95**
Simulation 4 -- predicted TFR if non-migrants had the impact of CI of internal migrants?			
Cm	0.806	0.796	0.99
Cc	0.956	0.930	0.97
Ca	0.879	0.723	0.82
Ci	**0.816**	**0.816**	1.00
TF	11.471	12.549	1.09
TFR = (product of above terms)	**6.349**	**5.481**	**0.86**
Simulation 5 -- predicted TFR if non-migants had the impact of Ca of internal migrants?			
Cm	0.806	0.796	0.99
Cc	0.956	0.930	0.97
Ca	**0.723**	**0.723**	1.00
Ci	0.755	0.816	1.08
TF	11.471	12.549	1.09
TFR = (product of above terms)	**4.828**	**5.481**	**1.14**

Figure 1

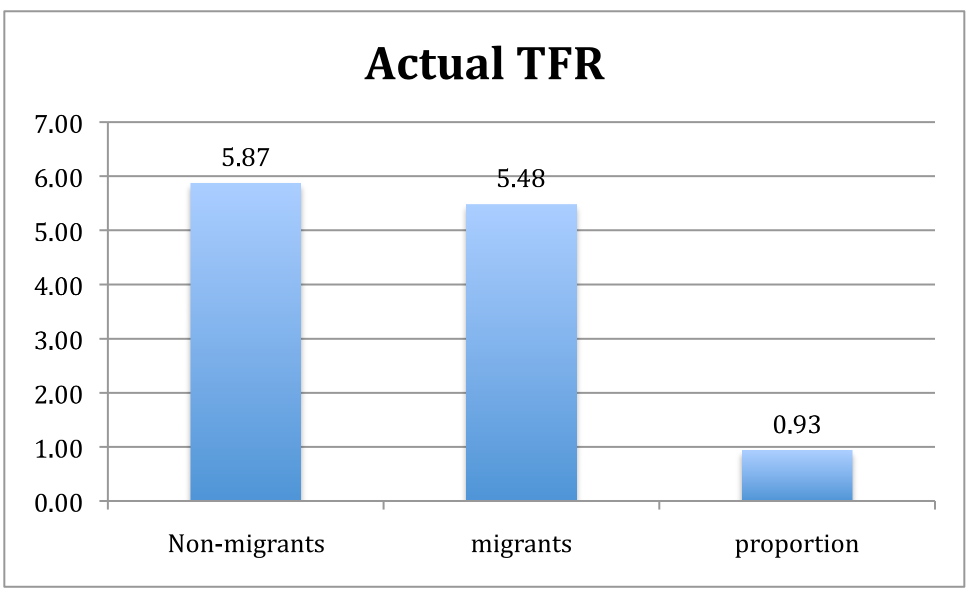


Figure 2

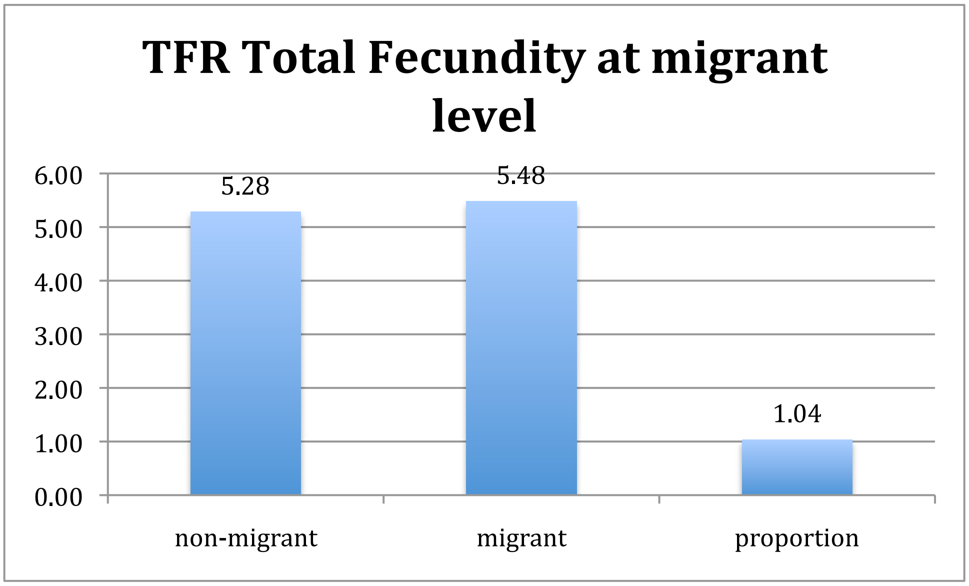


Figure 3

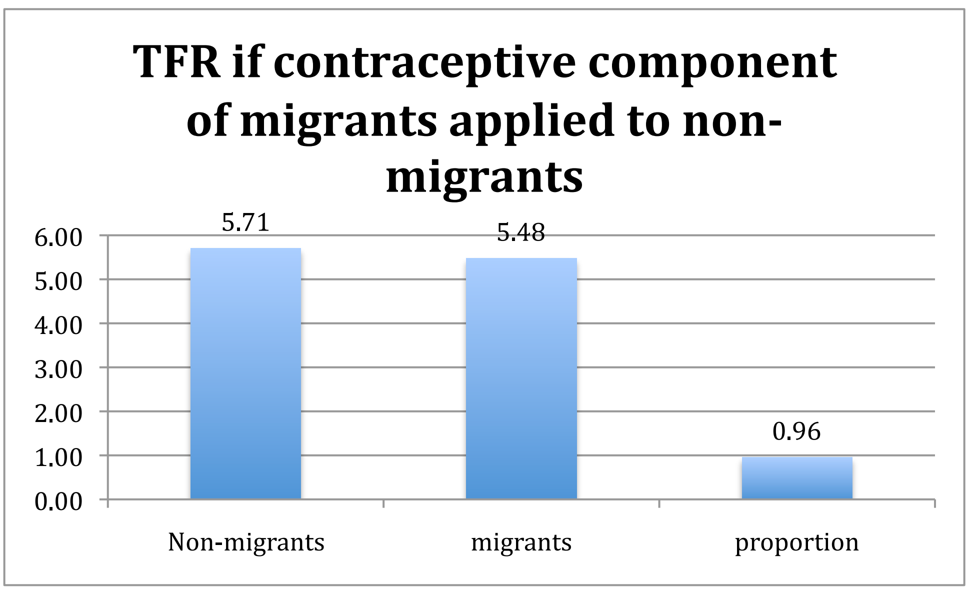


Figure 4.

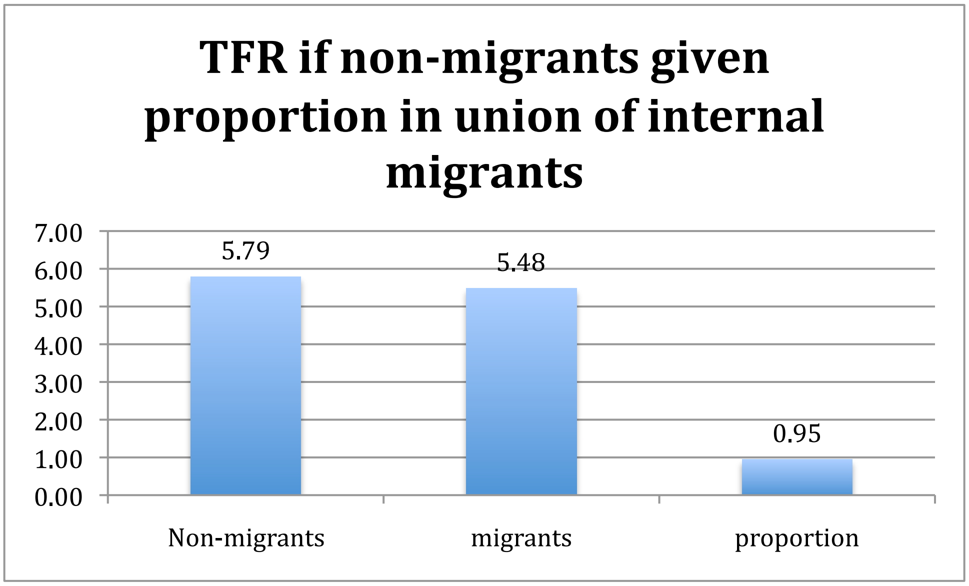


Figure 5.

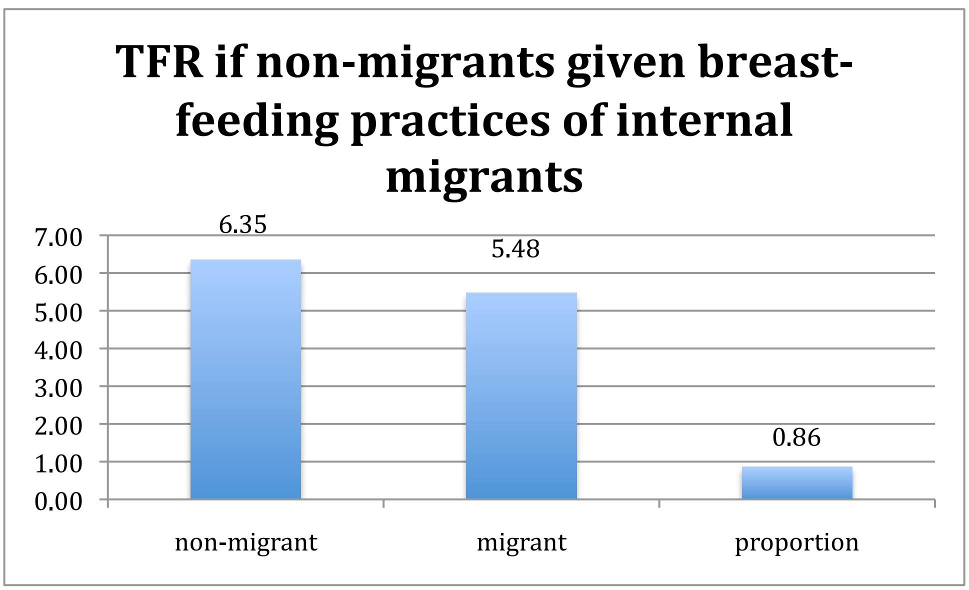
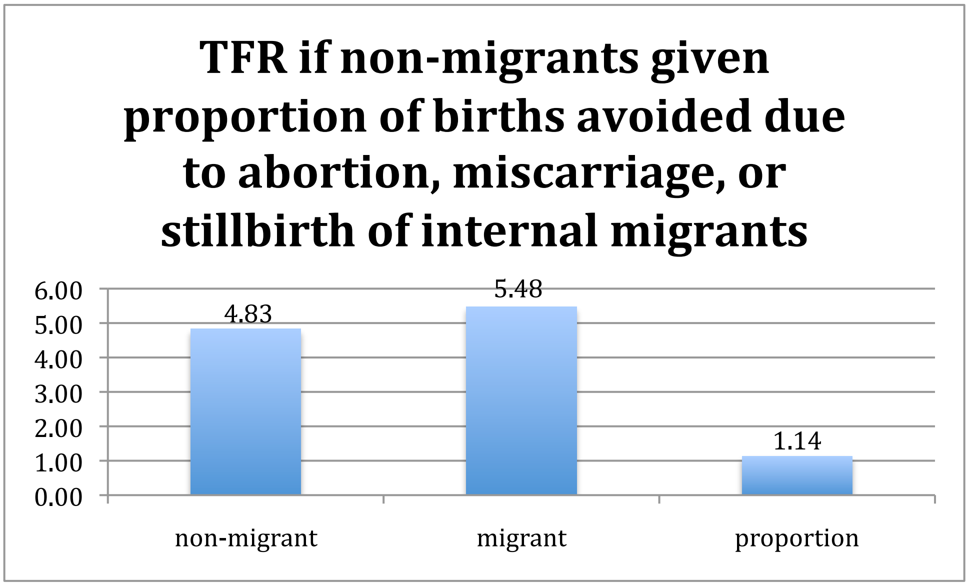


Figure 6.


TFR if non-migrants given proportion of births avoided due to abortion, miscarriage, or stillbirth of internal migrants
6.00
5.00
4.00
3.00
2.00
1.00
0.00
4.83
5.48
1.14
non-migrant
migrant
proportion