Labor Migration and Child Mortality in Mozambique

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Abstract

Male labor migration is a common phenomenon in many parts of the world, yet its consequences for child mortality remain unclear. Male labor migration could bring benefits, in the form of remittances, to the families that remain behind and thus help child survival. Alternatively, male labor migration might be spurred by economic distress, and the absence of a male adult could imperil the household's well-being and its ability to care for its members, increasing child mortality risks. In this analysis, we use longitudinal data from Mozambique to examine the association between male labor migration and under-five mortality in families that remain behind. Using a simple migrant/non-migrant dichotomy, we find no difference in mortality rates across migrant and non-migrant men's children. When we differentiate between migration economically successful and unsuccessful migration, however, stark contrasts emerge: children of successful migrants have the lowest mortality, followed by children of non-migrant men, followed by the children of unsuccessful migrants—who have the highest mortality. Our results emphasize the need to examine the complexity of men's labor migration experience.

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Introduction

The consequences of migration and immigration on families have received intense research attention in recent years. Urbanization, natural and political disasters, economic globalization and the fluidity of labor markets: these are some of the many forces that have increased migration and immigration across the world (e.g., Barrios, Bertinelli and Strobl, 2006; Berhanu and White, 2000; Castles, 2000; Orozco, 2002; Perz, 2000; Saldaña-Zorrilla and Sandberg, 2009; Samuel and George, 2002; Sanderson and Kentor, 2009; Singh et al., 2005; Zachariah, Mathew and Rajan, 2001). Although some of this population movement is taken by individuals migrating alone, almost all of these seemingly solitary migrants and immigrants have ties to their origin areas (Edwards and Ureta, 2003; Hildebrandt and Mckenzie, 2005; Hollos and Larsen, 2003; Mendola, 2010; Luke and Munshi, 2006; Tiemoko, 2004). Some of the strongest of these ties are based on the family.

Male labor migrants, whether they travel internationally or domestically, many times are part of a family formation system in their country of origin. Single, unmarried males often use labor migration as a means of increasing their wealth and economic prospects in order to increase their attractiveness as marriage partners (Parrado, 2004; Murray, 1977; Stark, 1988). In impoverished rural areas, male labor migration is a purposeful, common marriage market strategy (Mookodi, 2004; Lubkemann, 2009). Married men, too, engage in labor migration to support households that contain wives, children, and potentially other dependents. In many settings, men's labor migration is viewed as a beneficial family strategy (Fleischer, 2007; Lauby and Stark, 1988; Mendola, 2008; Rahman, 2009; Thieme and Wyss, 2005). In some cases, it may be the only viable option men have for providing for their families left behind. Labor migration, however, contains many risks and uncertainties, and the absence of a family member may place diverse types of stresses (economic, social, and relational) upon the household.

In this paper, we examine the association between men's labor out-migration in southern Mozambique and a key dimension of their non-migrating family's well-being: child survival. Rural southern Mozambique, the setting of this study, is characterized by traditionally high levels of male labor migration to South Africa, that has been historically fueled by both employment opportunities in the much richer neighboring country and the paucities of jobs outside of subsistence agriculture in the local labor market (Crush, Jeeves, and Yudelman 1991; First 1983). Although this migration has been a core part of southern Mozambique social and economic system for generations, recent times have seen considerable changes in both the type and outcomes of Mozambican migrants' employment. While crossing the international border has become much easier thanks to the growing regional integration, finding legal, reliable, and well-paying jobs in an increasingly xenophobic South Africa has become more and more difficult. As a result, while the economic stagnation of rural areas continues to push men into migration, financial returns to this migration become ever less stable and predictable (De Vletter 2007; SAMP 2008). We argue, therefore, that in considering the impact of men's migration on the wellbeing of their non-migrating household members, including survival and health of their children, a simple migrant vs. non-migrant comparison is no longer adequate. Instead, a more refined measure of men's migration experience, based on its success or failure, is needed to gain a clear assessment of its impact upon child mortality and similar family outcomes.

Hypotheses

There are divergent hypotheses of the association between men's labor migration and child mortality. Thus there are several reasons to expect a positive association between men's labor migration and child mortality (i.e., higher rates of mortality among children of male labor migrants). First, an absence of a household member often puts strain on the remaining members to organize, manage, and run the household. For example, using multilevel longitudinal analysis of data from Mexico,

Kanaiaupuni and Donato argue that the effect of migration on the risk of death is a complex process – at the initial stage, as larger numbers of community residents migrated, infant mortality increased in sending areas. In later periods, infant mortality improved with increasing in receiving of remittances (Kanaiaupuni and Donato, 1999). Another study in rural Bangladesh found that neonatal mortality in families with migrant fathers were close to double of neonatal deaths in families with present fathers (Chowdhury, 1986). There is no guarantee that the financial successes of labor migration and the expected remittances will outweigh the drawbacks of male absence from the household. Several authors have reported, for example, that among thousands of undocumented, less educated and farm working foreign labor migrants in South Africa, many are barely able to remit to their families left behind (Block, 2008; Crush, 1999; Crush, Williams and Peberdy, 2005; De Vletter, 2007). Second, there is a potential selectivity if households in the worst financial conditions send male labor migrants in the hopes of economic success (Borjas, 1987, 1994; Kanaiaupuni, 2000). In other words, if financial distress is a cause of both male labor migration and increased risk of child mortality, the association between migration and child mortality could be spurious. At the very least, this suggests a need to control for measures of economic well-being.

There are also good reasons to believe that men's labor migration would be negatively associated with child mortality, i.e., the children of migrant men have lower rates of mortality. First, the main reason men engage in labor migration is that they believe the benefits of working away from home will be greater than if they did not migrate (Taylor, Zabin and Eckhoff, 1999; Massey and Espinosa, 1997; Mendola, 2010). These men and their families are hoping that the labor migration and its remittances will provide benefits for the household in the origin area. If these hopes are fulfilled, it is reasonable to believe that the remittances will allow families better nutrition, more stable and higher quality housing, and increased ability for healthcare and medicines (De Vletter, 2007; Frank and Hummer, 2002; Mooney, 2003). All of these consequences of labor migration would promote child well-being and lower

the risk of child mortality. Second, there may also be selectivity processes operating when male labor migration has a negative, or preventative, association with child mortality. If families believe the stresses and risks of male labor migration are too great, they may withhold their men from these flows. In other words, male labor migrants could be positively selected from the families who are best-position to weather the uncertainties of migration (Egger and Radulescu, 2009; Ghatak, Levine and Price, 1996; Kothari, 2003; Skeldon, 2002). These same families might also be at lower risk of child mortality. Part of this selectivity could be addressed by having a model that is well-specified for the family's economic status. Finally, prior work has shown that male labor migration is associated with increases in women's decision-making autonomy. If migration increases autonomy (Yabiku et al, forthcoming), then women are more likely to take measures to protect their children's lives and health—thereby lowering the risk of child mortality.

Overall, there are good reasons to expect both positive and negative associations of male labor migration and child mortality. Although the literature tends to focus on the migrant versus non-migrant dichotomy (e.g., Brockerhoff, 1990; 1995; Stephenson, Matthews and McDonald, 2003), there are reasons to believe that the consequences of migration are, in part, contingent on whether or not the male labor migration is successful. Successful migration and subsequent remittances are expected to benefit child-wellbeing and lower child mortality. Unsuccessful migration is expected to be related to higher rates of child mortality. Prior research has found that the impacts of labor migration on family outcomes vary by the success or failure of the migrant's efforts (Agadjanian, Yabiku, and Cau, Forthcoming; Yabiku, Agadjanian, and Sevoyan, Forthcoming). We argue that a simple migrant versus non-migrant dichotomy is inadequate to document the associations between male labor migration and child mortality because it confounds two important groups: successful and unsuccessful labor migrants. Although they are both labor migrants, combining these two disparate groups is likely to lead to

inaccurate conclusions because these two groups share drastically different associations with child mortality and the effects of successful and unsuccessful migration may cancel each other out.

Data and Methods

The data for our hypothesis tests come from a longitudinal survey of women married to migrants and non-migrants in southern Mozambique. The first wave of data collection took place in 2006. Approximately equal numbers of women married to migrants and women married to non-migrants were sampled in 56 villages of four districts of Gaza Province. In total, 1678 women aged 18-40 were interviewed; in the 2009 wave 2 survey, 1314 of these same women were reinterviewed and a freshened sample of 458 additional women were added to the study. These followup surveys have just been completed, and the final reinteview rate is likely to increase substantially. The questionnaire content in both surveys was similar: complete childbearing and pregnancy histories, husband's migration histories, woman's work history, HIV/AIDS-related knowledge, perceptions, and experiences, marital history and characteristics, ethnocultural characteristics, and several measures of socioeconomic well-being.

Dependent variable: childhood (under-five) mortality between the two survey waves (2006 to 2009). Child mortality is often used for mortality between 1-5, a complement to infant mortality (<1) (Ahmad, Lopez and Inoue, 2000; Muhuri, 1996). In our person-year file, each child contributes one observation for each year of life the child is at risk of death. For children born in 2006 or after, children begin the risk of death in the year of their birth, and they stay at risk of death through age 5; ages 0-5 is the standard age range for childhood mortality. If a child survives through age 5, he or she contributes 5 years of risk, and each year the dependent variable is coded 0; after 5 years of age, children are censored and no longer contribute person-years. If a child dies between the age of 0 and 5, he or she is coded 0 in the years leading up to death, is coded 1 in the year of death, and does not contribute any

more person-years following the year of death. Note that children born before 2006 become at risk of death in 2006, as long as they are age 5 or younger; they remain at risk until they die or become older than 5 years old, at which point they are censored. These coding procedures are the standard way for creating a discrete-time person-year file (Allison 1995). As it is typical in poor settings, recall and timing of pregnancies outcomes in surveys are problematic. However, because our analysis focuses on a very rare event, it is likely that child deaths will be recalled.

Primary independent variable: men's labor migration status. Men's labor migration is measured in 2006 at the wave 1 survey of the men's wives. Men were coded as non-migrants if their wives reported that their men were spent all their nights in the women's community in the previous month. For all other responses, men were coded as migrants. Because our hypotheses differ by the success or failure of men's labor migration, we further differentiated these migrants into successful and unsuccessful migrants. In our previous research (Agadjanian, Yabiku, and Cau, Forthcoming; Yabiku, Agadjanian, and Sevoyan, Forthcoming), we employed two different approaches to defining men's migration success and failure. One approach, that we dubbed "objective," is based on reported remittances. The other, "subjective," approach is based on respondent's perceptions of the consequences of their husbands' migration for their households. Of their labor migrant husbands, women were asked the question, "In your opinion, since your husband went to work there, did the living conditions in your household improve, worsen, or remain the same?" Men whose wives said their lives improved were coded as successful migrants; all others were coded as unsuccessful migrants. As the "subjective" operationalization proved more informative in previous studies, we use it in the current study as well, although our analyses in the future will explore both variations.

Controls. We include a variety of controls to prevent spurious associations between male labor migration and child mortality. These include the woman's and husband's ages, as well as their education. Education is coded in categories: no education 1-4 years, and 5 or more years. Religion is

coded into three divisions: no church membership, a mainline religion (mostly Catholics and Mainline Protestant), and other religions (primarily Evangelicals and Pentecostals). Whether or not the woman is part of a polygamous union is coded 1 if polygamous, and 0 otherwise. Finally, an important control is the household's economic position in 2006, prior to the risk of child mortality. Income and other precise numeric measures of wealth are not easily translated to this setting, and instead we use indicators of a household's status with regards to ownership of four consumer items—radio, bicycle, motorcycle, and automobile. A simple three-level scale is used: household owns none of these goods; household owns only a radio; household owns a bicycle, motorcycle, or car.

Analysis method: multi-level discrete-time event history. Because our dependent variable is a rate and may be censored, event history models are appropriate (Allison 1995). With a properly constructed person-year file, a discrete-time event history model can be estimated using logistic regression procedures. Our person-year file contains multiple children per woman, and thus there is a lack of independence between observations that must be modeled. We use multi-level models, specifically random intercepts models estimated using SAS PROC GLIMMIX, to account for the clustering of multiple children per woman. Because the sampling of women was clustered by village, there is also the possibility of non-independence of children within the same village. We choose to model the dependence of children within women, rather than women within villages, because the dependence of children within the same woman is likely to be much greater. Preliminary analyses that modeled the village-level clustering indicated that there was little dependence between women in the same village, but this will be explored further in the final manuscript presented at PAA.

In a discrete-time event history model, the baseline hazard must be specified. Typically, the age pattern of mortality is a quadratic, which allows for the well-known "bathtub" shape. Our initial analyses indicated that over the short period of risk we model (only up to 5 years), a linear specification was adequate.

Because we are concerned with the time ordering of men's labor migration and child mortality, it is important that the predictor variables are measured prior to the risk of child mortality. Thus we use the 2006 men's migration status (non-migrants, successful migration, or unsuccessful migrant) to predict the mortality of their children ages 0-5 in 2006-2009. The other variables in the model (the control variables) also come from the 2006 survey.

For missing data in the predictor variables, we use multiple imputation. The highest level of missing data was for the husband's age and education measures, because wives often do not know them. For the multiple imputation, we created 5 datasets that replaced the missing values with plausible values from the distributions of observed variables. Each imputed dataset was analyzed separately, and the results were combined to properly reflect the uncertainty in the missing values. This approach has successfully been used before with the 2006 data (Yabiku, Agadjanian, and Cau, Forthcoming).

Results

Table 1 presents the descriptive statistics for the variables used in the analysis. Of the 4864 children at risk of death between the ages of 0 and 5 from 2006-2009, 16% died. About one-third of the children had a father who was a labor migrant; 18% of children had fathers who were successful labor migrants, and 16% had fathers who were unsuccessful labor migrants. The descriptives for the remaining control variables are also in Table 1.

(Table 1)

In Table 2 we present multivariate results. The models will be expanded for the final manuscript to be presented at PAA. Although preliminary, these results are very intriguing. In model 1 of Table 2, we use a simple measure of men's labor migration. The measure is a simple 1/0 dichotomy of whether or not the child's father is a labor migrant, which is how much of previous research has operationalized male labor migration. The difference in child mortality for migrants and non-migrants is not significant.

Of the control variables, only high economic material status is significant, and it has the expected sign. Children whose households were high economic material status had rates of mortality 37% (1.00 - .63 = .37) lower than children in low material status homes. The baseline hazard of child mortality is parameterized with the child's age, and it has an expected negative effect: the rate of 0-5 child mortality decreases as children become older. Note that we also explored parameterizing this baseline hazard as a quadratic (adding a term for child's age squared), but the linear specification provided better fit, and we present that here.

(Table 2)

In Table 3 we differentiate the male labor migrants into successful and unsuccessful migrants, based on the wife's perception. The results differ greatly from Table 2. Table 3 shows sharp destinations between all three groups of men. Men who are unsuccessful migrants have children with rates of 0-5 mortality that are 2 times as high as successful migrants (coefficient is 2.08, $p<.05$). Even when compared to non-migrants, the children of successful migrants are advantaged: non-migrant men's children have rates of mortality that are 51% higher than children of successful migrants (1.51 -1.00 = .51), and this coefficient approaches significance ($p=.13$). Thus there is a clear gradient in which the children of successful migrants have the best 0-5 survival, followed by the children of non-migrants, and finally followed by the children of unsuccessful migrants.

(Table 3)

Recall that our measures of male labor migration status come from 2006, which is before the risk of child mortality begins. Thus the woman's opinions on the man's migration success or failure are not influenced by child deaths after the first survey wave. Although there still may be unmeasured factors affecting both male labor migration and child mortality, our longitudinal design excludes the possibility that women are letting child deaths color their evaluations about the success of their husband's migration.

Discussion and Future Steps

These results illustrate the importance of going beyond simple assumptions about the nature of men's labor migration and its consequences for child mortality. When ignoring the success or failure of migration, the children of male labor migrants are no different from the children of non-migrants. When the fathers' migration success is considered, however, the children of unsuccessful migrants fare the worse, while the successful migrants are most advantaged.

The final version of our manuscript will build upon these intriguing findings. First, we will thoroughly explore the nature of the sample attrition and its potential biases. As mentioned previously, the followup rate for the wave 2 survey was 78%, which is high (and is likely to increase as the recently completed followup interviews are added). Nevertheless, it is possible that the estimates could be biased by the nonrandom attrition of the 22% of nonrespondents. Further analyses will examine if these 22% of nonrespondents differ from the longitudinal respondents on the key independent variables, most notably the success or failure of men's labor migration. Second, we will add additional predictors to the model that can help understand the context in which male labor migration occurs. The data collection includes contextual measures in 2006, such as the household's proximity to health units and other community characteristics. These are important controls if more or less advantaged households are making residential location decisions based on community services.

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Table 1: Descriptive Statistics

	Mean	Std. Dev.
Child died	.16	.37
Husband is not migrant	.66	.47
Husband is migrant	.34	.47
Husband is successful migrant	.18	.39
Husband is unsuccessful migrant	.16	.37
Wife's Age	29.61	5.95
Wife No Education	.27	.45
Wife Education 1-4 Years (ref=no education)	.50	.50
Wife Education 5+ Years (ref=no education)	.23	.42
Polygynous union	.23	.42
Husband's Age	36.30	9.17
Husband No Education	.19	.39
Husband Education 1-4 Years (ref=no education)	.47	.50
Husband Education 5+ Years (ref=no education)	.34	.47
No religion	.14	.35
Mainline Religion (ref=no religion)	.27	.45
Other Religion (ref=no religion)	.58	.49
Low Material Economic Status	.34	.47
Medium Material Economic Status	.33	.47
High Material Economic Status	.34	.47

N=4864 Children

Table 2: Relationship between male migration and rate of child mortality

Husband is not migrant (ref=migrant)	1.01
	(0.04)
Wife's Age	1.02
	(0.97)
Wife Education 1-4 Years (ref=no education)	0.80
	(-0.99)
Wife Education 5+ Years (ref=no education)	1.05
	(0.19)
Polygynous union	1.29
	(1.09)
Husband's Age	0.98
	(-1.12)
Husband Education 1-4 Years (ref=no education)	0.76
	(-1.11)
Husband Education 5+ Years (ref=no education)	0.71
	(-1.22)
Mainline Religion (ref=no religion)	1.55
	(1.38)
Other Religion (ref=no religion)	1.18
	(0.60)
Medium Material Economic Status (ref=low status)	0.90
	(-0.51)
High Material Economic Status (ref=low status)	0.63*
	(-1.98)
Child's Age	0.64***
	(-7.38)
Intercept	0.06***
	(-4.78)
N (person-years)	7187

*p<.05, **p<.01, ***p<.001, two-tailed tests
Coefficients are odds ratios, with z-statistics in parentheses

Table 3: Relationship between success of male migration and rate of child mortality

Husband is not migrant (ref=successful migrant)	1.51
	(1.52)
Husband is unsuccessful migrant (ref=successful migrant)	2.08*
	(2.34)
Wife's Age	1.02
	(1.04)
Wife Education 1-4 Years (ref=no education)	0.81
	(-0.93)
Wife Education 5+ Years (ref=no education)	1.06
	(0.21)
Polygynous union	1.24
	(0.93)
Husband's Age	0.98
	(-1.06)
Husband Education 1-4 Years (ref=no education)	0.78
	(-1.01)
Husband Education 5+ Years (ref=no education)	0.76
	(-1.02)
Mainline Religion (ref=no religion)	1.53
	(1.34)
Other Religion (ref=no religion)	1.16
	(0.54)
Medium Material Economic Status (ref=low status)	0.85
	(-0.79)
High Material Economic Status (ref=low status)	0.61*
	(-2.09)
Child's Age	0.63***
	(-7.40)
Intercept	0.03***
	(-5.23)
N (person-years)	7187

*p<.05, **p<.01, ***p<.001, two-tailed tests
Coefficients are odds ratios, with z-statistics in parentheses