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Health Costs of Wealth Gains: Labor Migration and Perceptions of HIV/AIDS Risks in Mozambique

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Abstract

The study employs survey data from rural Mozambique to examine how men's labor migration affects their non-migrating wives' perceptions of HIV/AIDS risks. Using a conceptual framework centered on tradeoffs between economic security and health risks that men's migration entails for their left-behind wives, it compares women married to migrants and those married to non-migrants while also distinguishing between economically successful and unsuccessful migration. The analysis finds that the economic success of men's migration, rather than migration itself, significantly predicts women's worries about getting infected by their husbands or their own extramarital partners, and their husbands' stance on condom use. These findings are situated within a broader context of socio-economic, gender, and marital dynamics and vulnerabilities produced or amplified by male labor migration in sub-Saharan and similar developing settings.

Migration and HIV/AIDS

A sizeable body of literature on STD/HIV/AIDS in sub-Saharan Africa and other regions has examined the association between migration and infection risks. This literature is premised on a general assumption that migrants are more likely than non-migrants to be both recipients and transmitters of any infection (Prothero 1977), but it has also been argued that "AIDS probably has a closer relationship to migration than any other infectious disease." (Caldwell, Anarfi and Caldwell 1997:51) The predominant view established in this literature is that migrants are a major vector in the spread of STD/HIV from high to low infection areas (e.g. Appleyard and Wilson 1998; Caldwell, Anarfi and Caldwell 1997; De Schryver and Meheus 1990; Decosas et al. 1995; Hunt 1989; Mtika 2007; Quinn 1994). Removed from their usual social milieu and often separated from their permanent sexual partners, migrants may be more likely to engage in risky sexual behavior (Agadjanian and Avogo 2008; Brockhoff and Biddlecom 1999; Li et al. 2004; Liu et al. 2005; Mabey and Mayaud 1997; Yang 2004) and to have higher STD/HIV infection levels than non-migrants (Yang 2004; Zuma et al. 2003, 2005). Yet some studies that examine seasonal and other temporary labor migration in southern Africa find the migration-HIV connection to be more complex and question assertions about higher risks and HIV incidence among migrants (Coffee et al. 2005, 2007; Lurie 2006; Mundandi et al. 2006).

Most literature on the migration-STD/HIV link has focused on migrants and their risks, and studies that have addressed the risks of non-migrating partners remain remarkably few. Hughes et al. (2006) have argued that migrants' wives who stay behind are at higher risks of STD/HIV due to their dependence on husbands' income and reduced power of sexual negotiation. Yet, Lurie et al. (2003a), who finds that male migrants are significantly more likely to be HIV-positive than non-migrants, detects no significant differences between their partners. Another study in South Africa (Lurie et al., 2003b) suggests that HIV infection may be transmitted not only from male migrants to their rural partners but also the other way around. These findings highlight the complexity of STD/HIV risks that migration entails for the non-migrating partners of migrants but also underscore the need for a broad sociological conceptualization of these risks. Our study offers such a sociological contribution to the largely epidemiological scholarship on the migration-STD/HIV nexus by examining how men's labor migration may influence their non-migrating wives' perceptions of HIV risks in rural sub-Saharan Africa.

Although perceptions of HIV risks may not accurately reflect actual risks (e.g., Anglewicz and Kohler 2009), they are products of individuals' socially constructed and constrained experiences and regardless of their objective accuracy often guide these individuals' further actions such as HIV testing (MacKellar et al. 2007; Spielberg et al. 2003), partner selection (Reniers 2008) and marriage timing (Ueyama and Yamauchi 2009). Not surprisingly, perceived risk is considered a necessary (albeit not sufficient) precondition of behavioral change, and as such, is a key ingredient of most common theories of health behavior (see Kowalewski, Henson and Longshore 1997 for a review of the literature). More broadly, an examination of risk perceptions can illuminate the social and gender dynamics of labor migration and its effects on rural women's social, economic and health vulnerabilities.

Migration Trends and Implications in Southern Mozambique

Our data come from rural areas of southern Mozambique's Gaza province, where low-yield subsistence agriculture is the mainstay of the economy, and the traditional social organization is anchored in a patrilineal kinship system with relatively high levels of polygyny and low rates of marital dissolution (Arnaldo 2004). For many decades, southern Mozambique has been an important part of the southern African regional migration system (Agadjanian 2008), sending labor migrants to mines and other destinations in South Africa (CAS-EMU 1997; First 1983). As a result of this flow, Mozambicans have come to constitute one of the largest migrant groups in South Africa (Adepoju 2003). However, in recent times Mozambican migration to South Africa has undergone an important transformation. On the one hand, dramatic political changes in the region, particularly the dismantling of the apartheid regime, have led to a considerable simplification of border crossing procedures thus facilitating entry of Mozambicans into South Africa. On the other hand, with a drastic reduction of recruitment of foreigners in the South African mining industry, the political pressure in that country to limit work opportunities for foreigners and rising xenophobia have resulted in limited, unpredictable and increasingly illegal employment options for most Mozambicans (De Vletter 2007; SAMP 2008). In addition to international migration, migration within Mozambique, particularly from rural to urban areas, has also grown in recent decades. Limited and controlled by the colonial regime, rural-urban migration, especially to Maputo, Mozambique's capital, increased with Mozambique's independence from Portugal in 1975 and the civil war that soon followed (Dow 1989; Jenkins 1993). After the war ended in 1992, the structural adjustment policies, which further undermined traditional subsistence agriculture and magnified socio-economic imbalances, have spurred new migration flows both to South Africa and internally (Knauder 2000).

Today, periodic environmental shocks, low and erratic agricultural yields, scarcity of non-agricultural employment, and the rising cost of living in rural areas continue to push rural men to look for job opportunities in South Africa and, to a lesser extent, in southern Mozambique's urban centers. Yet neither internal nor external destinations guarantee economic success, especially as regional economies have slowed amidst the global recession. As a result, the flows of labor from rural areas remain strong, while economic returns associated with this migration grow ever less certain. The changing scale, nature and economic impact of labor migration have contributed to changes in traditional social organization of rural communities and specifically to the erosion of the traditional patrilineal, virilocal, bridewealth-based marriage system (Agadjanian et al. forthcoming).

The described transformation of regional migration has coincided with a rise in HIV prevalence. Mozambique is among the world's worst affected countries by the HIV/AIDS epidemic: the national prevalence among adults ages 15–49, estimated from antenatal clinic surveillance data, increased from 8 percent in 1998 to 16 percent in 2007, the last year for which surveillance data are available. The national estimate masks a wide variation in HIV levels throughout the country. In 2007, seroprevalence ranged from 9 percent in the northern part of Mozambique, to 18 percent in the center, to 21 percent in the south. The surveillance data also point to a particularly rapid rise of HIV levels in the southern Gaza province, where the fieldwork for this study was conducted: estimated adult HIV prevalence there rose from 20 percent in 2004 to 27 percent in 2007 (Ministry of Health 2005, 2008). Although the 2009 National HIV Prevalence Survey produced a lower national estimate, 12 percent among adults ages 15–49, estimated seroprevalence in Gaza province, at 25 percent (30% among women) was comparable to the surveillance-based figures (Ministry of Health 2010).

Not surprisingly, population mobility, and especially male labor migration to South Africa, has been considered an important factor fueling the rise in HIV prevalence. Although direct evidence linking migration to HIV/AIDS in Mozambique is lacking, higher seroprevalence levels around the transportation corridors and along international borders (Barradas and Arnaldo 2003; Barreto et al. 2002) indirectly support this connection. The probable link between migration to South Africa and HIV/AIDS is not known just to a small circle of policy makers and researchers: anecdotal evidence amassed during our fieldwork suggests that despite the limited (until very recently) availability of HIV testing in rural southern Mozambique, HIV/AIDS was well known and is widely believed to be brought to local communities by migrants returning from South Africa. One local woman thus summed up this common view: “We can see AIDS in those men who come back sick from South Africa... They come back skinny, with blisters, diarrhea... they don't eat anything, and if they eat something, they throw it up right away, [food] doesn't stay in their stomach.”

Trade Offs between Economic Security and Health Risks

While using the epidemiological literature on the migration-HIV/AIDS nexus as a point of departure, we broaden our conceptualization to account for complex tradeoffs that men's labor migration creates for women left behind. This approach engages the growing cross-national literature on how male labor migration affects non-migrating partners' wellbeing and opportunities. Although this literature rarely questions the pecuniary benefits of migrants' remittances, it often points to complex consequences of the combination of migrant men's physical absence with their financial dominance. On the one hand, as men migrate from rural areas, their wives tend to increase their involvement in agricultural work (Crummett 1987; Gordon 1981) assume a growing share of childcare and other household responsibilities (Parrenäs 2005), and expand their everyday management of household needs (Menjívar and Agadjanian 2007; Boehm 2008). On the other hand, however, remittances received from migrant men, while boosting the household food and material security, often

discourage women's own non-agricultural employment, especially where the returns to such employment are paltry (Amuedo-Dorantes and Pozo 2006; Lokshin and Glinskaya 2009), thus cementing women's dependence on their husbands' income and, by extension, women's overall subordination. However, when the remittances are sporadic or meager, women's economic security is understandably undermined, which in turn diminishes their dependence on their husbands and may weaken their commitment to marriage. The marital strain can be further amplified by women's emotional stress of prolonged separation, the increased burden of domestic and agricultural duties, and by their expanded decision-making ability, freedom of movement and social interactions outside their households (e.g., Gordon 1981; Sadiqi and Ennaji 2004; Salgado de Snyder 1993). It is important to note that while studies typically document an increase in left-behind women's autonomy associated with men's migration, especially when migration does not generate the returns that women expect (e.g., Boehm 2008; Hadi 2001; Pribilsky 2004), in most poor rural settings with generalized and entrenched patriarchal gender ideologies such autonomy cannot be easily converted into substantial improvements of material and social status, and women therefore may not actively seek or appreciate it. In fact, what studies often portray as women's gains in freedom of movement and decision-making resulting from men's migration, women themselves may see as unwelcome outcomes of migration's failure to deliver on its economic promise (Aysa and Massey 2004; Menjívar and Agadjanian 2007; Sadiqi and Ennaji 2004).

This complexity of the effects of men's migration on women's lives and views is projected into our conceptual framework. First, we posit that prolonged spousal separation resulting from migration is, in itself, an HIV infection risk factor for non-migrating women; and in societies where men's sexual activity is popularly assumed to be uninterrupted (Orubuloye, Caldwell and Caldwell 1997), migrants' wives are well aware of these risks (cf., Hughes, Hoyo and Puoane 2006). However, in assessing their risks women consider multiple and multidimensional implications of their husbands' migration for their and their families' wellbeing. Thus the flow of financial and material remittances from a migrant husband is a major, if not the only, economic lifeline for the left-behind household. Yet the remittances also signal to the wife that her husband may have sufficient disposable income to be used for other purposes, including commercial and transactional extramarital sex, especially because traditionally a man's wealth is expected to be invested in increasing the number of his sexual partnerships (cf., Swidler and Watkins 2007). The scant epidemiological literature on migrants' economic success and STD/HIV risks also suggests a positive relationship (He et al. 2005; Liu et al. 2005; Sevoyan and Agadjanian 2010). Although the lack or low quantity of remittances cannot be automatically interpreted as a definitive sign of a migrant's economic failure and therefore of his inability to engage in extramarital sex (see Luke 2010 for a discussion of how migrants' extramarital partnerships negatively affect remittances), in such cases women may think that their migrant husbands' access to women is reduced.

However, there may be a flip side to the economic outcome of men's migration for women's risks. The financial security built with continual remittances diminishes women's need to look for sustenance-generating opportunities, including those opportunities that may involve transactional sex or expose them to forced sex. Without such a financial shield (and by extension, social protection), women whose husbands do not remit may find themselves, other things equal, more exposed to extramarital sex themselves, and accordingly see it as a potential source of infection. Although women's involvement in extramarital partnerships may be motivated by a variety of factors, including sexual desire, romantic passion or jealousy, in resource-poor settings women are driven into such partnerships largely by their quest for economic and social security (Dunkle et al. 2004a; Tawfik and Watkins 2007; Swidler and Watkins 2007). Whereas women's extramarital ties, practical or romantic, are

probably less frequent and diverse than those of men, they may endanger women disproportionately as women typically have less power in sexual partnerships.

Yet, reduced dependence on migrant husbands' income may also lead to greater autonomy for women (Yabiku, Agadjanian and Sevoyan 2010). Whether or not this autonomy is sought or appreciated by the women, it could afford them important leverage in negotiating safer sex with their husbands. In contrast, when remittances are steady and relatively abundant, women feel more dependent on their migrant husbands and less capable of negotiating safer sex with them. Specifically, these power dynamics may manifest themselves in condom use. Prolonged separation of marital partners due to migration may already make avoiding sex or using condoms less desirable as these actions could interfere with couples' reproductive plans. Condoms also remain unpopular in marital sex as they typically connote distrust and acknowledgement of extramarital partnerships (Tavory and Swidler 2009). Because in patriarchal settings men largely set the terms of sexual intercourse and are assumed to be the ones to object to condoms, in the households of economically successful migrants the authority that economic success confers on the migrant husband may further strengthen his say in sexual matters and thus make condom use particularly unlikely. Accordingly, migrants' economic failure may undermine their authority in familial and sexual matters and therefore make them more amenable to condom use, at least in comparison to migrants whose migration has been more successful.

This conceptual framework leads to the following three sets of hypotheses. First, we expect that women who are married to migrants are more likely than women married to non-migrants to think that their husbands have been unfaithful and to worry about contracting HIV from them regardless of other factors and characteristics. Yet because higher incomes offer migrants more opportunities for paid and other transactional extramarital sex, the wives of successful migrants are expected to be particularly concerned about the risks of getting infected by their husbands. Second, because men's migration may not only increase their risks of contracting HIV in places of migration destination (and consequently their wives' perceptions of risks of getting HIV from them), but may also increase exposure of their left-behind wives to HIV through their own extramarital ties, we hypothesize that women married to migrants are more likely to express worries about getting infected by extramarital partners than women married to non-migrants net of other factors. Yet we also hypothesize that these worries will be particularly common among the wives of less successful migrants. And third, we anticipate that migrant husbands will be more resistant to using condoms than non-migrant husbands. However, because we see a migrant's economic success as magnifying gender power imbalances within the household, we expect that, all else equal, more successful migration will be associated with a lower likelihood of condom acceptance by the husband.

Data and Method

Our study uses household and community survey data collected in rural areas of southern Mozambique in 2006 as part of a bi-national collaborative project by research teams from Arizona State University and Eduardo Mondlane University (Mozambique), led by this study's first and second authors, respectively. The household survey sample was drawn from the population of married women ages 18–40 residing in 56 villages of four districts in southern Mozambique (an area of about 5,900 square miles with a population of 625,000). The sample facilitates explicit comparisons between wives of migrants and non-migrants and their respective households. In each district, 14 villages were selected with the probability proportional to size. In each selected village (or in a randomly picked section of particularly large villages), all households with at least one woman in a formalized or non-formalized marital union were canvassed and assigned to one of two lists: (1. those with at

least one woman married to a migrant (i.e., a man who was working or looking for work outside of the village and did not spend a single night in the village for at least 30 days before the survey) and (2. those with women whose husbands were not migrants. These two lists were used as two separate sampling frames: from each of them, 15 households were randomly selected (if there were fewer than 15 households in either list, the missing number was drawn from the other list to achieve a village sample size of 30 households). In each selected household, a married woman (randomly selected, if the household had more than one married woman) was interviewed; in households classified as migrant, the interview was conducted with a woman married to a migrant. The resulting sample included 1,680 women, of which 41 percent were wives of migrants and 59 percent were wives of non-migrants. The survey collected detailed individual and household demographic and socio-economic information, including husband's migration and work history, as well as information on HIV/AIDS knowledge, views, worries and behavior. In addition to the women's survey, in each village a separate survey was given to village leaders regarding the community's economic and social life, out-migration and HIV/AIDS was carried with a village administrator or another village official.

Variables and Model

The main outcomes for the multivariate tests are defined and operationalized as follows:

Knowledge or suspicion of husband's sexual relationships with extramarital partners—Respondents were asked whether they know or suspect that their husbands had sex with other women (excluding their other wives, for polygynous men), in the 12 months preceding the survey. This outcome is coded as a dichotomy: knows/suspects that husband had sex with other women vs. knows that he did not or is not sure. We do not distinguish between knowledge and suspicion because women themselves would consider such a distinction problematic.

Being worried about getting HIV from husband—This dichotomy is operationalized as very worried or somewhat worried about getting infected from husband vs. not worried or does not know/not sure (the three options – very worried, somewhat worried and not worried – were read to respondents by the interviewer and only a handful of them picked the second option). The survey respondents were not asked about their serostatus. Only one respondent spontaneously identified herself as HIV+, and she is excluded from the analysis.

Being worried about getting HIV from another man or other men—This variable is also operationalized as a dichotomy: very worried or worried vs. not worried or does not know/not sure. Whereas the direct question about respondents' extramarital experience (also included in the survey interview) may have produced responses that cannot be deemed reliable (cf., Curtis and Sutherland 2004), a question about perceptions of risk of contracting HIV from men other than their husbands (asked in a different section of the interview, with no reference to specific encounters – romantic, transactional or forced – that could have occurred) may have yielded a more reasonable proxy for respondents' exposure to risks through extramarital sex. Yet even if the respondents underreported their fears of getting infected by other men, there is no basis to believe that this underreporting should vary in some consistent manner across the different categories of husband's migration status and therefore should affect the intended comparisons.

Potential and actual condom use with husband—Two outcomes are considered. The first outcome is a respondent's opinion on whether or not her husband would object to using condoms with her. This outcome is derived from a corresponding question in the survey instrument that was formulated hypothetically. This dichotomy is constructed as

follows: those who think their husbands would object vs. those who think they would agree or are not sure (because fewer than 10% of the respondents stated that their husbands would accept condom use we decided against using them as a separate category). For women who reported having used a condom with their husbands at least once we assume that their husbands would not object to condom use in the future. This outcome is a proxy for perceived husbands' control over their wives in sexual matters and accordingly for the barriers that women may see in negotiating safer sex with their husbands. The second outcome is whether or not a respondent ever used a condom with her husband, regardless of time and purpose of use.

These outcomes are summarized in Table 1. All the outcomes are dichotomous. Although the dichotomous definition may not capture all the subtleties of risk exposure and corresponding perceptions, we believe that it is less affected by measurement error due to culturally specific interpretations, linguistic imprecision and individual dynamics of interviewer-respondent interaction and therefore is more robust than ordinal or nominal scales with several values.

Our main predictor is the migration status of respondent's husband. We look at differences between women married to migrants (of whom more than four-fifths worked in South Africa and the rest somewhere in Mozambique) and those married to non-migrants. Among migrants' wives, following our conceptual approach, we also examine differences in migration's economic success. We use two approaches to measure it. The first approach is based on the type and frequency of remittances. We use remittances that are either sent by the husband through formal and informal intermediaries or brought by the husband upon his return for vacation. We also consider non-monetary remittances sent by husbands as well as money that women receive from their husbands when they visit them at places of their husbands' work. To avoid an excessive fragmentation of the migrant-husband subsample that could affect the statistical power of the analysis, we subdivide women married to migrants into just two groups: those whose husbands sent/brought/gave money and other things two or more times vs. those whose husbands remitted only once or did not remit at all in the 12 months preceding the survey. This definition therefore attempts to capture objective and absolute benefits of husband's migration. Although the exact boundary between the two types of migrants' wives is drawn somewhat arbitrarily, we believe that a simple dichotomy like this is sufficient to illustrate our main conceptual points and to test corresponding hypotheses. However, because the assessment of the impact of remittances on households is a subjective process contingent on prior expectations and a number of unobservable factors, we also employ an alternative definition of husband's migration success – one based on women's own stated perceptions of whether or not the living conditions of their households improved as a result of their husbands' migration. In addition to its subjective nature, this assessment is also more general as in most cases it is not bound by a one-year time span. Given that our outcomes are of behavioral and attitudinal nature, this specification of migration success may be more relevant for the analysis of women's views than the remittances-based "objective" one. Although the two specifications are overlapping and the two indicators are highly related (the chi-square significant at $p < .01$), these indicators nonetheless have different distributions. Whereas on the "objective" variable, the more successful vs. less successful migration breakdown is 72 percent vs. 28 percent, respectively, in the variable based on wife's perception ("subjective" definition) the two subgroups are nearly equal in size (see Table 1).

Because all the outcomes are dichotomies, we use binomial logit for multivariate modeling. For each outcome we fit three models: (1. a model that compares wives of migrants to wives of non-migrants; (2. a model that compares wives of objectively more successful and objectively less successful migrants to wives of non-migrants; and (3. a model that compares

wives of subjectively more successful and subjectively less successful migrants to wives of non-migrants.

Each model includes a set of individual-, household- and community-level controls. The operationalization of these variables is presented in the lower half of Table 1. All models control for woman's age, operationalized as a set of four dummy variables. Age group is a proxy for a number of relevant socio-biological factors such as strength of sexual desire and frequency of sexual intercourse as well as age-related aspects of social status. In a setting where most women enter their first marriages at a young age and few experience more than one marriage in their lifetime, age also serves as a proxy for duration of marriage. Other woman-level controls are the bridewealth status of marriage, polygyny, education, work outside the home, religious involvement and experience of spousal violence. Bridewealth status of marriage is included as a proxy for the spouses' marital commitments and relative power within marriage: lack of bridewealth payments connotes a consensual (non-formalized) union and as such implies a weaker marital bond and therefore greater autonomy – but also greater insecurity – for the woman. Being in a polygynous union is also related to women's status, but it also may affect women's perceptions of risk from co-wives. Education is expected to be positively associated with knowledge about HIV/AIDS and therefore with awareness of, and concerns about, risks. Women's outside-the-home employment is a proxy for their social status and autonomy. Religious involvement is included because religiosity has been found to negatively correlate with risky sexual behavior (Agadjanian 2005; Elifson, Klein and Sterk 2003). Partner violence has been shown to correlate with women's HIV risks (e.g., Dunkle et al. 2004b); hence the models control for the wife's experience of physical violence at the hands of her husband as a proxy for spousal relationships and women's power within them. All but the first set of models also control for the wife's knowledge/perception of her husband's infidelity (the outcome in the first model). Because women's views on the acceptability of condoms may be particularly influenced by recent sexual intercourse, the corresponding models also control for whether a respondent recently had sex with her husband.

Three household-level control variables are also included: household material status, sales of crops by the household, and co-residence with parents-in-law (husband's father and/or mother). An index of household material status is a proxy for household wealth, a frequently invoked correlate of HIV risks (Wojcicki 2005). A dichotomous variable, whether or not the household sells any crops – is a proxy for household economic and social involvement with the outside world and related mobility of its members. Co-residence with in-laws and the influence they may wield over the marital couple circumscribe the wife's autonomy, but may also discourage her husband's involvement in risky behavior. Finally, all models include a community-level control – the approximate proportion of married men in the village who work in South Africa derived from the community survey. Because HIV/AIDS is widely believed to be brought into this area from South Africa, the scale of migration to that country may affect women's perceptions of risk regardless of individual and household-level factors.

Because under the cluster sampling design individual respondents and their households may share with other respondents and households in their villages some unobserved characteristics that may affect the associations of interest, in all statistical models we employ a random-intercept approach, allowing the intercept of the outcome variables to vary randomly by village. All statistical models are fitted using the GLIMMIX procedure in SAS (Version 9).

Results

The odds ratios from the multivariate logit models are presented in Table 2. Each of the four sections of the table corresponds to an outcome; for each outcome, the results of three models are presented – one in which no distinction is made between more and less successful migrants (models A), one in which this distinction is based on the objective definition of migrant's success (models B), and one in which the subjective definition of success is used (models C). We first estimate the likelihood of respondents knowing or thinking that their husbands have had extramarital sexual partners (Section 1). The results of Model 1.A indicate that women married to migrants are significantly more likely than non-migrants' wives to report that their husbands had had other sexual partners even after controlling for other characteristics: the odds of knowledge/suspicion of husband's infidelity among wives of migrants are 45 percent higher than those among wives of non-migrants. When we separate wives of more successful migrants from wives of less successful migrants on the basis of remittances, the difference from wives of non-migrants is strong and statistically significant only for women married to more successful migrants (Model 1.B). When we use the subjective definition of migration success, the effects of more successful migration and of less successful migration are now both statistically significant and similar in magnitude (Model 1.C). Among other effects, it is notable that being in a polygynous marriage increases suspicions of infidelity as does the experience of physical abuse by the husband. Knowledge/ suspicion of husband's infidelity is positively associated with the share of village married men who work in South Africa.

The odds ratios from the models predicting whether a respondent was worried about contracting the HIV virus from her husband are presented in Section 2. Woman's knowledge/suspicion that her husband has had extramarital sex is now included as a covariate. Again, women married to migrants are significantly different from those married to non-migrants: migrants' wives are more likely than non-migrants' wives to express worries about getting infected by their husbands (OR = 1.45, Model 2.A). When women married to more successful migrants are separated from those married to less successful migrants, based either on remittances or on women's perceptions of the effects of migration, the effect of husband's migration status is statistically significant only for wives of more successful migrants (models 2.B and 2.C). The magnitude of the effects of being married to more successful migrants vs. less successful migrants are similar in the model where migration success is objectively defined, but are rather different in the model that uses the subjective definition of migration success. It should be emphasized that the effects of men's successful migration on their wives' worries about getting infected remain strong in both models even after controlling for women's knowledge/perception of their husbands' infidelity.

Section 3 presents the results of the tests predicting worries about getting HIV from another man or other men, which, as we said earlier, is used as a proxy for women's exposure to extramarital sex. As we can see, husband's migration status per se does not significantly affect the outcome: women with migrant husbands seem less likely to express such worries, but this effect is not statistically significant (Model 3.A). When the migrant husband group is split on the basis of remittances, wives of more successful migrants are significantly less likely to worry about getting infected by other men than are the wives of non-migrants. At the same time, the effect of being married to a less successful migrant tends in the opposite direction, but is not statistically significant (Model 3.B). The corresponding coefficients in the model with migration success defined on the basis of perceptions of change in household conditions tell the same story, but the difference in the effects of the two types of migration outcomes is much less pronounced as wives of less successful migrants are now indistinguishable from wives of non-migrants (Model 3.C). The effects of most other

covariates included in the model are not statistically significant, but it is noteworthy that knowledge/suspicion that a husband has been unfaithful increases the likelihood of worries about getting infected by men other than their husbands. This statistically significant association may point to a greater likelihood of extramarital sex among women whose husbands are also engaged in sex outside marriage.

The last section of Table 2 displays the results of a model predicting women's opinion on whether their husbands would be against using condoms with them. The results show that migrants' wives, while taken together, are not significantly different from wives of non-migrants in thinking that their husbands would oppose condom use (Model 4.A). When we separate wives of more successful and less successful migrants based on remittances, the differences remain statistically non-significant (Model 4.B). However, the breakdown of the migrant category based on women's perception of migration effects on household living conditions reveals important differences between respondents married to more successful and less successful migrants: only the former are significantly more likely to think that their husbands would oppose condom use than non-migrants' wives. In fact, wives of less successful migrants appear to be less likely than the reference group to hold that opinion, but this difference is not statistically significant (Model 4.C). Again, husband's successful migration is one of the few statistically significant covariates in the model.

When we test for differences in actual condom use (whether a respondent has ever used a condom with her husband), however, neither sub-group of migrants' wives is different from non-migrants' wives. Yet, because reports of condom use may be highly unreliable and the overall reported use of condoms within marriage for disease prevention was very low (only 4% of respondents reported ever using condoms with their husbands for the sole or partial purpose of disease prevention), these results should be treated with caution (these non-significant results are not shown but are available upon request).

Discussion and Conclusion

Although coming from a particular sub-Saharan setting, the results of this study add important insights to our general understanding of how men's labor migration may shape and exacerbate women's vulnerabilities in similar resource-limited contexts. While the study did not intend to measure or explain HIV infection among wives of migrants and non-migrants, it did detect considerable attitudinal and behavioral differences between these two categories of married rural women. In most models, the effect of husband's migration status was strong and statistically significant. In fact, husband's migration status was among only a few covariates that significantly affected the outcomes considered. While the results suggest the existence of other, unobserved factors that may influence women's HIV/AIDS perceptions and risks, they also stress the key role of male labor migration.

Our analysis moved beyond the conventional migrant vs. non-migrant dichotomy and examined differences among migrants' wives. The breakdown of the migrant-husband category based on migration success illuminated the complexities of migration's effects on the social construction of HIV risks. Thus the finding that women married to migrants in general are more likely than those married to non-migrants to think that their husbands have had sex with other women may not come as a surprise. However, when wives of more successful and wives of less successful migrants were separated based on remittances, the former were significantly more suspicious of their husbands' infidelity. This may reflect women's assessment of their husbands' income and consequently the husbands' ability to pay for extramarital sex.

As we expected, migrants' wives also were more likely to worry about getting infected by their husbands, even after controlling for knowledge of a husband's infidelity. However, only women married to successful migrants were significantly different from those married to non-migrants. This finding fits with our conceptual argument and supports the corresponding hypothesis: for women married to more successful migrants, greater perceived risk of infection may be the tradeoff for material benefits derived from migration. The results for these models are paralleled by the results of the women's concern about getting the HIV virus from men other than their husbands. As we hypothesized, wives of migrant men whose migration they perceived as beneficial for their households were less likely to worry about getting infected by other men than were wives of non-migrants. We conclude that although women who are physically separated from their migrant husbands for prolonged periods of time have greater exposure to possible extramarital sexual encounters, the material benefits that these women derive from their husbands' migration may more than offset these heightened risks by reducing the need to engage in transactional sexual partnerships.

With regard to condom acceptance by husbands, migrants' wives, as a whole, were no different from non-migrants' wives. However, as we had anticipated, women married to more successful migrants were more likely than non-migrants' wives to think that their husbands would object to condom use. Interestingly, this difference was statistically significant only when we used the classification of migration success based on woman's subjective assessment, which is arguably more relevant to women's other attitudes and views regarding their relationships with their husbands than the "objective" classification based on remittances.

Our findings regarding the effects of more vs. less successful migration relate well to the literature on how income and other components of socio-economic status affect HIV risks and prevalence. This literature has produced conflicting evidence (e.g., Fortson 2008; Hargreaves et al. 2008; Mishra et al. 2007). In a review of studies linking SES and HIV/AIDS in sub-Saharan Africa, Wojcicki (2005) observed a non-linear relationship between women's SES and their HIV risks: the risks appear to increase with the initial increase in SES and then to decline as SES rises further. The growth of rural incomes associated with labor migration may represent an early stage of rising SES. Our findings therefore shed light on the mechanisms that produce the initial positive association between income and HIV risks.

However, our findings also illustrate how in contemporary sub-Saharan and similar settings SES may interact with gender inequality to shape HIV/AIDS risks. Typically, the literature sees the two factors as mutually reinforcing (Hunter 2007; Krishnan et al. 2008). Yet our study suggests that the relationship between poverty and gender inequality is more complex. In rural Mozambique, as in many other rural settings, where employment opportunities for women outside subsistence agriculture are very limited, improvements in a marital unit's socio-economic standing are possible mainly by virtue of the male partner's earnings, typically made from work outside the community. In such settings, incomes generated by men's migrant labor may considerably shore up their families' material wellbeing (at least in comparison to families with no access to migrant remittances), but the gains in economic security may well be offset by increased exposure to HIV/AIDS risks. Importantly, these heightened risks may not stem just from migrant men's wider networks of concurrent sexual partnerships and therefore greater likelihood of being infected but also from the reduced ability of women who depend economically on those men's incomes to negotiate safer sex. And insofar as women's negotiating power is undermined by the economic success of their husbands' migration, this success bolsters men's sense of gendered preeminence, the sense

that is further enhanced by the domineering masculine identities nurtured in migrants' milieu (Campbell 1997).

Cast in the context of intra-household gender dynamics, our findings lend support to a more general argument that men's migration, while yielding material benefits to their wives and other household members, may also reinforce the patriarchal hierarchy within the household and thereby potentially increase the wives' vulnerabilities. This general conclusion resonates with the literature that points to complex and often contradictory effects of migration on household wellbeing, marital relationships, and gender roles and relations in origin areas (e.g., Aysa and Massey 2004; Boehm 2008; Kothari 2003; Menjívar and Agadjanian 2007; Murray 1981; Salgado de Snyder 1993).

With the data at hand, we cannot examine the longer-term consequences of men's migration and of its divergent economic outcomes for women left behind. These consequences may not be straightforward. While the failure of migrants to provide adequate financial and material support to their wives may diminish women's dependence on their husbands and offer them greater decision-making autonomy, in a stagnant rural economy such independence and autonomy rarely translate into tangible benefits for women and children. Unable to secure adequate livelihoods, these women may choose to exit their marriages and, as part of survival strategies, to engage in unstable, often transactional sexual relationships. Migration may become an option for these women as well, and, as some studies have found, may expose women to disproportionate risks of STD/HIV (Yang and Xia 2006; 2008; Zuma et al. 2003). In comparison, for the wives of more successful migrants the growing fear of HIV may eventually outweigh the economic benefits of their husbands' migration emboldening the women to seek dissolution of their marriages. Anglewicz (forthcoming) recently argued that HIV infection may trigger migration. Reniers (2008) and Smith and Watkins (2005) showed that divorce is increasingly becoming a risk-reduction mechanism in high-prevalence settings, and this mechanism may be at work even in such a strongly patriarchal context with traditionally low divorce rates as the one we examined in this study (Arnaldo 2004). Yet, at the same time, improved knowledge of HIV transmissibility and ultimately of one's own serostatus and of its implications through rapidly widening HIV testing and antiretroviral treatment may lead to a decrease in worries about infection (cf., Smith and Watkins 2005) and thus reduce the pressure to exit marriage. These choices and trajectories will be ultimately conditioned by both the evolving dynamics of the HIV/AIDS epidemic and the broader social and economic transformation of rural society.

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References

- Adepoju, Aderanti. Continuity and Changing Configurations of Migration to and from the Republic of South Africa. *International Migration*. 2003; 41(1):3–28.
- Agadjanian, Victor. Gender, Religious Involvement, and HIV/AIDS Prevention in Mozambique. *Social Science & Medicine*. 2005; 61(7):1529–1519. [PubMed: 15869833]
- Agadjanian, Victor. Research on International Migration in Sub-Saharan Africa: Foci, Approaches, and Challenges. *Sociological Quarterly*. 2008; 49(3):407–421.
- Agadjanian, Victor; Yabiku, Scott T.; Cau, Boaventura. Men's Migration and Women's Fertility in Rural Mozambique. *Demography*. Forthcoming.
- Agadjanian, Victor; Avogo, Winfred. Forced Migration and HIV/AIDS Risks in Angola. *International Migration*. 2008; 46(3):189–216.

- Amuedo-Dorantes, Catalina; Pozo, Susan. Migration, Remittances, and Male and Female Employment Patterns. *American Economic Review*. 2006; 96(2):222–226.
- Anglewicz, Philip. Migration, Marital Change, and HIV Infection in Malawi. *Demography*. Forthcoming.
- Anglewicz, Philip; Kohler, Hans-Peter. Overestimating HIV Infection: The Construction and Accuracy of Subjective Probabilities of HIV Infection in Rural Malawi. *Demographic Research*. 2009; 20(6): 65–96. [PubMed: 19672478]
- Appleyard, Reginald; Wilson, Andrew. Migration and AIDS. *International Migration*. 1998; 36(4): 445–468. [PubMed: 12295093]
- Arnaldo, Carlos. Ethnicity and Marriage Patterns in Mozambique. *African Population Studies*. 2004; 19(1):143–164.
- Aysa, Maria; Massey, Douglas S. Wives Left Behind: The Labor Market Behavior of Women in Migrant Communities. In: Jorge, Durand; Massey, Douglas S., editors. *Crossing the Border: Research from the Mexican Migration Project*. Russell Sage Foundation; 2004. p. 131-144.
- Barradas, Ricardo; Arnaldo, Carlos. The HIV/AIDS Situation in Mozambique. Presented at the Commonwealth Geographical Bureau Workshop on HIV/AIDS and the Social Sciences in Eastern and Southern Africa; June 24–27; Pretoria, South Africa. 2003.
- Barreto, Avertino L.; Foreit, Karen G.; Noya, P António; Nhatave, Isabel; Gaspar, Manuel C. Cultural and Demographic Determinants of HIV Prevalence in Mozambique. Presented at the 14th International AIDS Conference; July 7–12; Barcelona, Spain. 2002.
- Boehm, Deborah A. 'Now I Am a Man and a Woman!': Gendered Moves and Migrations in a Transnational Mexican Community. *Latin American Perspectives*. 2008; 35(1):16–30.
- Brockerhoff, Martin; Biddlecom, Ann E. Migration, Sexual Behavior and the Risk of HIV in Kenya. *International Migration Review*. 1999; 33(4):833–856.
- Caldwell, John C.; Anarfi, John K.; Caldwell, Pat. Mobility, Migration, Sex, STDs, and AIDS: An Essay on Sub-Saharan Africa with Other Parallels. In: Gilbert, Herdt, editor. *Sexual Cultures and Migration in the Era of AIDS: Anthropological and Demographic Perspectives*. Clarendon Press; 1997. p. 41-54.
- Campbell, Catherine. Migrancy, Masculine Identities and AIDS: The Psychosocial Context of HIV Transmission on the South African Gold Mines. *Social Science & Medicine*. 1997; 45(2):273–281. [PubMed: 9225414]
- Center for African Studies/Eduardo Mondlane University. *The Mozambican Miner: A Study of the Export of Labor*. Maputo, Mozambique: Center for African Studies and Eduardo Mondlane University; 1997.
- Coffee, Megan P., et al. Patterns of Movement and Risk of HIV Infection in Rural Zimbabwe. *Journal of Infectious Diseases*. 2005; 191(S1):S159–S167. [PubMed: 15627226]
- Coffee, Megan P.; Lurie, Mark N.; Garnett, Geoff P. Modeling the Impact of Migration on the HIV Epidemic in South Africa. *AIDS*. 2007; 21(3):343–350. [PubMed: 17255741]
- Crummett, Maria de los Angeles. Rural Women and Migration in Latin America. In: Carmen D, Deere; Leon, Magdalena, editors. *Rural Women and State Policy: Feminist Perspectives on Latin America Agricultural Development*. Westview Press; 1987. p. 239-260.
- Curtis SL, Sutherland EG. Measuring Sexual Behaviour in the Era of HIV/ AIDS: The Experience of Demographic and Health Surveys and Similar Enquiries. *Sexually Transmitted Infections*. 2004; 80 Suppl ii:ii22–ii27. [PubMed: 15572636]
- De Schryver, Antoon; Meheus, André. Sexually Transmitted Diseases and Migration. *International Migration*. 1990; 29(1):13–32. [PubMed: 12159616]
- De Vletter, Fion. Migration and Development in Mozambique: Poverty, Inequality and Survival. *Development Southern Africa*. 2007; 24(1):137–153.
- Decosas J, Kane F, Anarfi JK, Sodji KD, Wagner HU. Migration and AIDS. *Lancet*. 1995; 346(8978): 826–828. [PubMed: 7674750]
- Dow, S. School of Social Sciences. Flinders University of South Australia; 1989. *Urban Settlement Strategies in Mozambique: A Case Study of Maputo*.
- Dunkle, Kristin L.; Jewkes, Rachel K.; Brown, Heather C.; Gray, Glenda E.; McIntyre, James A.; Harlow, Sioban D. Transactional Sex among Women in Soweto, South Africa: Prevalence, Risk

- Factors and Association with HIV Infection. *Social Science and Medicine*. 2004a; 59(8):1581–1592. [PubMed: 15279917]
- Dunkle, Kristin L.; Jewkes, Rachel K.; Brown, Heather C.; Gray, Glenda E.; McIntyre, James A.; Harlow, Sioban D. Gender-Based Violence, Relationship Power, and Risk of HIV Infection in Women Attending Antenatal Clinics in South Africa. *The Lancet*. 2004b; 363(9419):1415–1421.
- Elifson, Kirk W.; Klein, Hugh; Sterk, Claire E. Religiosity and HIV Risk Behavior Involvement among 'at Risk' Women. *Journal of Religion and Health*. 2003; 42(1):47–66.
- First, Ruth. *Black Gold: The Mozambican Miner, Proletarian and Peasant*. St. Martin's Press; 1983.
- Fortson, Jane G. The Gradient in sub-Saharan Africa: Socioeconomic Status and HIV/AIDS. *Demography*. 2008; 45(2):303–322. [PubMed: 18613483]
- Gordon, Elizabeth B. An Analysis of the Impact of Labor Migration on the Lives of Women in Lesotho. *Journal of Development Studies*. 1981; 17(3):59–76.
- Kothari, Uma. Staying Put or Staying Poor? *Journal of International Development*. 2003; 15(5):645–657.
- Hadi, Abdullahel. International Migration and the Change of Women's Position among the Left-Behind in Rural Bangladesh. *International Journal of Population Geography*. 2001; 7(1):53–61.
- Hargreaves, James R., et al. Systematic Review Exploring Time Trends in the Association between Educational Attainment and Risk of HIV Infection in Sub-Saharan Africa. *AIDS*. 2008; 22(3):403–414. [PubMed: 18195567]
- He, Na, et al. Characteristics and Sexually Transmitted Diseases of Male Rural Migrants in a Metropolitan Area of Eastern China. *Sexually Transmitted Diseases*. 2005; 32(5):266–292.
- Hughes, Gail D.; Hoyo, Catherine; Puoane, Thandi R. Fear of Sexually Transmitted Infections Among Women With Male Migrant Partners - Relationship to Oscillatory Migration Pattern and Risk-Avoidance Behavior. *South African Medical Journal*. 2009; 96(5):434–438. [PubMed: 16751920]
- Hunt, Charles W. Migrant Labor and Sexually Transmitted Disease: AIDS in Africa. *Journal of Health and Social Behavior*. 1989; 30(4):353–373. [PubMed: 2689507]
- Hunter, Mark. The Changing Political Economy of Sex in South Africa: The Significance of Unemployment and Inequalities to the Scale of the AIDS Pandemic. *Social Science & Medicine*. 2007; 64(3):689–700. [PubMed: 17097204]
- Jenkins, Paul. *Urban Development and Housing in Mozambique: A Current Analysis and Bibliography*. Research Paper No.50. Edinburgh College of Art, Harriot Watt University, Centre for Environment and Human Settlement; 1993.
- Knauder, Stefanie. *Globalization, Urban Progress, Urban Problems, Rural Disadvantages: Evidence from Mozambique*. Ashgate; 2000.
- Kowalewski, Mark R.; Henson, Kevin D.; Longshore, Douglas. Rethinking Perceived Risk and Health Behavior: A Critical Review of HIV Prevention Research. *Health Education & Behavior*. 1997; 24(3):313–325. [PubMed: 9158976]
- Krishnan, Suneeta; Dunbar, Megan S.; Minnis, Alexandra M.; Medlin, Carol A.; Gerds, Caitlin E.; Padian, Nancy S. Poverty, Gender Inequities, and Women's Risk of Human Immunodeficiency Virus/AIDS. *Annals of the New York Academy of Sciences*. 2008; 1136:101–110. [PubMed: 17954681]
- Li, Xiaoming; Fang, Xiaoyi; Lin, Danhua; Mao, Rong; Wang, Jing; Cottrell, Lesley; Harris, Carole; Stanton, Bonita. HIV/STD Risk Behaviors and Perceptions Among Rural-to-Urban Migrants in China. *AIDS Education and Prevention*. 2004; 16(6):538–556. [PubMed: 15585430]
- Liu, Hongjie, et al. Risk Factors for Sexually Transmitted Disease Among Rural-to-Urban Migrants in China: Implications for HIV/Sexually Transmitted Disease Prevention. *AIDS Patient Care and STDs*. 2005; 19(1):49–58. [PubMed: 15665635]
- Lokshin, Michael; Glinskaya, Elena. The Effect of Male Migration on Employment Patterns of Women in Nepal. *The World Bank Economic Review*. 2009; 23(3):481–507.
- Luke, Nancy. Migrants' Competing Commitments: Sexual Partners in Urban Africa and Remittances to the Rural Origin. *American Journal of Sociology*. 2010; 115(5):1435–1479.
- Lurie, Mark N. The Epidemiology of Migration HIV/AIDS in South Africa. *Journal of Ethnic and Migration Studies*. 2006; 32(4):649–666.

- Lurie, Mark N., et al. The Impact of Migration on HIV-1 Transmission in South Africa: A Study of Migrant and Non-Migrant Men and Their Partners. *Sexually Transmitted Diseases*. 2003a; 30(2): 149–156. [PubMed: 12567174]
- Lurie, Mark N. Who Infects Whom? HIV-1 Concordance and Discordance Among Migrant and Non-Migrant Couples in South Africa. *AIDS*. 2003b; 17(15):2245–2252. [PubMed: 14523282]
- Mabey, David; Mayaud, Philippe. *Sexually Transmitted Diseases in Mobile Populations*. *Genitourinary Medicine*. 1997; 73(1):18–22. [PubMed: 9155550]
- MacKellar, Duncan A., et al. Perceptions of Lifetime Risk and Actual Risk for Acquiring HIV Among Young Men Who Have Sex with Men. *AIDS Behavior*. 2007; 11(2):263–270.
- Menjívar, Cecilia; Agadjanian, Victor. Men's Migration and Women's Lives: Views from Rural Armenia and Guatemala. *Social Science Quarterly*. 2007; 88(5):1243–1262.
- Ministry of Health. *Relatório sobre a Revisão dos Dados de Vigilância Epidemiológica do HIV - Ronda 2004*. Maputo, Mozambique: Ministry of Health; 2005.
- Ministry of Health. *Relatório sobre a Revisão dos Dados de Vigilância Epidemiológica do HIV - Ronda 2007*. Maputo, Mozambique: Ministry of Health; 2008.
- Ministry of Health. *Inquérito nacional de prevalência, riscos comportamentais e informação sobre o HIV e SIDA (INSIDA), 2009. Relatório final*. Maputo, Mozambique: Ministry of Health; 2010.
- Mishra, Vinod, et al. HIV Infection Does Not Disproportionately Affect the Poorer in Sub-Saharan Africa. *AIDS*. 2007; 21(S7):S17–S28. [PubMed: 18040161]
- Mtika, Mike M. Political Economy, Labor Migration, and the AIDS Epidemic in Rural Malawi. *Social Science & Medicine*. 2007; 64(12):2454–2463. [PubMed: 17462799]
- Mundandi, Costantino; Vissers, Debby; Voeten, Hélène; Habbema, Dik; Gregson, Simon. No Difference in HIV Incidence and Sexual Behavior Between Out-Migrants and Residents in Rural Manicaland, Zimbabwe. *Tropical Medicine and International Health*. 2006; 11(5):705–711. [PubMed: 16640623]
- Murray, Collin. *Families Divided: The Impact of Migrant Labour in Lesotho*. Cambridge University Press; 1981.
- Orubuloye IO, Caldwell John C, Caldwell Pat. Perceived Male Sexual Needs and Male Sexual Behaviour in Southwest Nigeria. *Social Science & Medicine*. 1997; 44(8):1195–1207. [PubMed: 9131743]
- Parreñas, Rhacel Salazar. *Children of Global Migration: Transnational Families and Gendered Woes*. Stanford University Press; 2005.
- Pribilsky, Jason. 'Aprendemos a Convivir': Conjugal Relations, Co-Parenting, and Family Life among Ecuadorian Transnational Migrants in New York City and the Ecuadorian Andes. *Global Networks*. 2004; 4(3):313–334.
- Prothero, R Mansell. Disease and Human Mobility: A Neglected Factor in Epidemiology. *International Journal of Epidemiology*. 1977; 6(3):259–267. [PubMed: 591173]
- Quinn, Thomas C. Population Migration and the Spread of Types 1 and 2 Human Immunodeficiency Viruses. *Proceedings of the National Academy of Sciences of the United States of America*. 1994; 91(7):2407–2414. [PubMed: 8146131]
- Reniers, Georges. Marital Strategies for Regulating Exposure to HIV. *Demography*. 2008; 45(2):417–438. [PubMed: 18613488]
- Sadiqi, Fatima; Ennaji, Moha. The Impact of Male Migration from Morocco to Europe on Women: A Gender Approach. *Finisterra: Revista Portuguesa de Geografia*. 2004; 39(77):59–76.
- Salgado De Snyder VN. Family Life Across the Border: Mexican Wives Left Behind. *Hispanic Journal of Behavioral Sciences*. 1993; 15(3):391–401.
- Sevoyan, Arusyak; Agadjanian, Victor. Male Migration, Women Left Behind, and Sexually Transmitted Diseases in Armenia. *International Migration Review*. 2010; 44(2):354–375.
- Smith, Kirsten P.; Watkins, Susan C. Perceptions of Risk and Strategies for Prevention: Responses to HIV/AIDS in Rural Malawi. *Social Science & Medicine*. 2005; 60(3):649–660. [PubMed: 15550312]

- South African Migration Project. Southern African Migration Project Migration Policy Series # 50. Cape Town, South Africa: Idasa; 2008. *The Perfect Storm: The Realities of Xenophobia in Contemporary South Africa*.
- Spielberg, Freya, et al. Overcoming Barriers to HIV Testing: Preferences for New Strategies Among Clients of a Needle Exchange, a Sexually Transmitted Disease Clinic, and Sex Venues for Men Who Have Sex with Men. *Journal of Acquired Immune Deficiency Syndromes*. 2003; 32(3):318–327. [PubMed: 12626893]
- Swidler, Ann; Watkins, Susan C. Ties of Dependence: AIDS and Transactional Sex in Rural Malawi. *Studies in Family Planning*. 2007; 38(3):147–162. [PubMed: 17933289]
- Tavory, Iddo; Swidler, Ann. Condom Semiotics: Meaning and Condom Use in Rural Malawi. *American Sociological Review*. 2009; 74(2):171–189.
- Tawfik, Linda; Watkins, Susan C. Sex in Geneva, Sex in Lilongwe, and Sex in Balaka. *Social Science & Medicine*. 2007; 64(5):1090–1101. [PubMed: 17123678]
- Ueyama, Mika; Yamauchi, Futoshi. Marriage Behavior Response to Prime-Age Adult Mortality: Evidence from Malawi. *Demography*. 2009; 46(1):43–63. [PubMed: 19348108]
- Wojcicki, Janet M. Socioeconomic Status as a Risk Factor for HIV Infection in Women in East, Central and Southern Africa: A Systematic Review. *Journal of Biosocial Science*. 2005; 37(1):1–36. [PubMed: 15688569]
- Yabiku, Scott T.; Agadjanian, Victor; Sevoyan, Arusyak. Husbands' Labor Migration and Wives' Autonomy. *Population Studies*. 2010; 64(3):293–306. [PubMed: 20865630]
- Yang, Xiushi. Temporary Migration and the Spread of STDs/HIV in China: Is There a Link? *International Migration Review*. 2004; 38(1):212–235.
- Yang, Xiushi; Xia, Guomei. Gender, Migration, Risky Sex, and HIV Infection in China. *Studies in Family Planning*. 2006; 37(4):241–350. [PubMed: 17209282]
- Yang, Xiushi; Xia, Guomei. Temporary Migration and STD/HIV Risky Sexual Behavior: A Population-Based Analysis of Gender Differences in China. *Social Problems*. 2008; 55(3):322–346.
- Zuma K, Gouws E, Williams B, Lurie M. Risk Factors for HIV Infection Among Women in Carletonville, South Africa: Migration, Demography and Sexually Transmitted Diseases. *International Journal of STD & AIDS*. 2003; 14(12):814–817. [PubMed: 14678589]
- Zuma K, et al. Risk Factors of Sexually Transmitted Infections among Migrant and Non-Migrant Sexual Partnerships from Rural South Africa. *Epidemiology and Infection*. 2005; 133(3):421–428. [PubMed: 15962548]

Table 1

Variable Definition and Distribution

Outcomes		
Knowledge/ suspicion of husband's extramarital sexual partnerships	Knows/ suspects that husband has extramarital sex	32.1
	Knows that husband is faithful or not sure	67.9
Worries about getting infected by husband	Worried	83.2
	Not worried/unsure	16.8
Worries about getting infected by another man	Worried	18.9
	Not worried	81.1
Perceived husband's objection to condom	Thinks husband would object to condom use	30.5
	Thinks husband would accept or not sure	69.5
Condom use with husband ^a	Used at least once	8.2
	Never used	91.8
Predictors: Husband's Migration Status		
Husband's migration status ^b	Husband is a migrant	41.1
	Husband is not a migrant	58.9
Success of husband's migration, based on remittances	Sends/brings remittances often/regularly	29.8
	Sends/brings remittances seldom/never	11.3
Success of husband's migration, based on wife's assessment of its effect on household	Migration has improved HH wellbeing	20.6
	Migration has not improved HH wellbeing	20.5
Individual-Level Controls		
Woman's age	18–20	15.9
	21–25	28.0
	26–30	28.0
	31 or older	28.1
Bridewealth payment status of marriage	Bridewealth paid fully or partly	39.6
	No bridewealth paid	60.4
Type of marital union	Polygynous union	21.1
	Monogamous union	78.9
Woman's education	None	26.7
	1 to 4 years	45.3
	5 or more years	28.0
Woman's current work for income	Works for income	21.5
	Does not work for income	78.6

Woman's attendance of religious services	Attends at least once week	54.8
	Has no religion or attends less than once a week	45.2
Physical abuse by husband	Husband beat her up at least once	34.9
	Husband never beat her up	65.1
Household-Level Controls		
Household material possessions (radio, bicycle, motorcycle, car)	Scale from 1 to 4	2.1 ^c
Sale of crops by household	Household sells at least some crops	10.2
	Household does not sell any crops	89.8
Co-resident parents-in-law	At least one co-resident parent-in-law	38.4
	No co-resident parents-in-law	61.6
Community-Level Control		
Share of village married men working in South Africa	Scale from 1 (almost 0) to 4 (75% or more)	2.7 ^c

Notes: Percentages unless noted otherwise.

^a Only 4% of respondents ever used a condom with their husbands to prevent disease or to prevent both disease and pregnancy;

^b 83% of migrants worked in South Africa and the rest in Mozambique (mainly in the capital Maputo);

^c mean.

Table 2

Women's HIV/AIDS-related Perceptions

	1. Knows/ Thinks that Husband had Extramarital Sex			2. Worried about Getting Infected by Husband			3. Worried about Getting Infected by Other Men			4. Thinks Husband Would Object to Condom Use		
	A	B	C	A	B	C	A	B	C	A	B	C
Predictors and Controls												
Husband's Migration Status												
Migrant	1.45**			1.45*			.81			1.06		
More successful migrant	1.55**	1.49**		1.45*	1.56*		.64*	.63*		1.05	1.38*	
Less successful migrant	1.19	1.41*		1.47	1.37		1.29	1.00		1.14	.79	
Individual (Woman) Controls												
Age 21-25	1.24	1.22	1.24	1.39	1.38	1.38	1.04	1.08	1.06	1.53*	1.53*	1.50*
Age 26-30	.93	.92	.93	1.72*	1.72*	1.72*	.95	.99	.96	1.36	1.37	1.36
Age 31+	.89	.87	.89	1.48	1.48	1.47	1.24	1.30	1.26	1.53*	1.54*	1.49*
At least some bridewealth paid	.92	.91	.91	1.18	1.18	1.17	.94	.98	.97	.96	.96	.92
In polygynous union	1.36*	1.37*	1.36*	1.05	1.05	1.05	.80	.78	.78	1.32*	1.32*	1.37*
Education 1 to 4 years	1.33*	1.33*	1.33*	1.73	1.73	1.72**	.98	1.00	1.01	.96	.96	.94
Education 5 or more years	1.32	1.31	1.32	1.55*	1.55*	1.54*	1.02	1.04	1.05	.81	.81	.79
Works outside-the-home for income	1.46**	1.46**	1.46**	1.58*	1.58*	1.58*	.94	.91	.93	1.06	1.06	1.06
Attends religious services 1+ times per week	1.14	1.13	1.14	.72*	.72*	.72*	.90	.92	.90	1.07	1.07	1.08
Husband beat her up at least once	2.52**	2.53**	2.52**	1.05	1.05	1.05	1.06	1.05	1.06	.89	.89	.89
Knows/ thinks husband is unfaithful				2.50**	2.50**	2.50**	1.60**	1.64**	1.61**	1.15	1.15	1.15
Has not had sex with husband recently										.81	.80	.82
Household-Level Controls												
Household material possessions scale	1.12	1.11	1.12	1.05	1.05	1.04	.98	1.00	1.00	1.02	1.03	1.01
Household sells at least some crops	1.28	1.28	1.28	1.90*	1.89*	1.90*	1.88**	1.87**	1.89**	1.36	1.36	1.35
Co-resident parents-in-law	.99	.98	.99	1.09	1.09	1.09	1.09	1.11	1.09	.92	.92	.92
Community-Level Control												
Share of married men in South Africa	1.22*	1.21*	1.22*	.98	.98	.98	.80	.80	.79	.93	.93	.93

Predictors and Controls	1. Knows/ Thinks that Husband had Extramarital Sex			2. Worried about Getting Infected by Husband			3. Worried about Getting Infected by Other Men			4. Thinks Husband Would Object to Condom Use		
	A	B	C	A	B	C	A	B	C	A	B	C
Model Chi-square	1,629	1,630	1,629	1,540	1,539	1,543	1,367	1,345	1,354	1,580	1,579	1,584

Notes: Odds ratios from random intercept logit models. A – No distinction within the migrants' wives category; B – Migrant's success defined on the basis of remittances; C – Migrant's success defined on the basis of wife's perceptions. Reference categories: Husband is non-migrant, ages 18–20; No bridewealth paid; In monogamous union; No education; Does not work for income; Has no religious affiliation or attends religious services less than once a week; Husband never beat her up; Thinks husband is faithful or unsure; Household does not sell crops; No co-resident in-laws; Significance level:

** p ≤ .01,

* p ≤ .05.

N = 1,671